

**Odisha Integrated Irrigation Project for
Climate Resilient Agriculture
(OIIPCRA)**

Project Implementation Plan (PIP)

**The Project Director
Odisha Integrated Irrigation Project for Climate Resilient Agriculture
OIIPCRA: OCTDMS
Water Resource Department, Government of Odisha**

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Abbreviations

AAO	Assistant Agriculture Officer
ABSO	Agribusiness Support Organization
AHO	Assistant Horticulture Officer
AMU	Agri-Knowledge Management Unit
APC	Agriculture Production Commissioner
ARD	Animal Resource Development
ATMA	Agriculture Technology Management Agency
AWS	Automatic Weather Station
BMP	Best Management Practices
CA	Chartered Accountant
CAG	Comptroller and Auditor General
CAGR	Compound Annual Growth Rate
CAPS	Conservation Agriculture Production System
CB & ID	Capacity Building and Institution Development
CIFA	Central Institute of Freshwater Aquaculture
CIFRI	Central Inland Capture Fisheries Research Institute
CIFT	Central Institute of Fisheries Technology
CAN	Capacity Need Assessment
COF	College of Fisheries
CS	Chief Secretary, Govt. of Odisha
CSA	Climate Smart Agriculture
CWB	Crop Water Budgeting
DDA	Deputy Director, Agriculture
DDH	Deputy Director, Horticulture
DLPMT	District Level Project Monitoring Team
DOA	Department / Directorate of Agriculture
DOF	Directorate of Fisheries
DOH	Directorate of Horticulture
DOWR	Department of Water Resources
DPR	Detail Project Report
DSL	Dead Storage Level
DSR	Direct Seeded Rice
EA	Environmental Assessment
EE-MI	Executive Engineer, Minor Irrigation
EMF	Environment Management Framework
ESMF	Environment and Social Management Framework
F&ARD	Fishery and Animal Resource Development (Department)
FCR	Food Conversion Ratio
FFDA	Fish Farmer's Development Agency
FIG	Farmer Interest Group
FISHCOPFED	National Federation of Fisheries Cooperatives Ltd.
FPC	Farmer Producer Company
FPO	Farmer Producer Organization
FSF	Fish Seed Farmers
FTC	Farmer's Training Centre
FTL	Full Tank Level
GCF	Green Climate Fund

GHG	Green House Gas
GOI	Government of India
GOO	Government of Odisha
GP	Gram Panchayat
GRC	Grievance Redressal Committee
GSDP	Gross State Domestic Product
GSVA	Gross State Value Aided
HYV	High Yield Variety
ICAR	Indian Council of Agricultural Research
ICT	Information and Communication Technology
IEC	Information, Education and Communication
IGA	Income Generating Activities
IIAP	Integrated Irrigation & Agriculture Plan
IMAGE	Institute of Management of Agricultural Extension
IMC	Indian Major Carp
INCID	Indian National Committee on Irrigation and Drainage
INM	Integrated Nutrient Management
IP	Implementing Partners
IPM	Integrated Pest Management
IPNM	Integrated Plant Nutrient Management
IT	Information Technology
IWRM	Integrated Water Resource Management
JAO	Junior Agriculture Officer
JHO	Junior Horticulture Officer
KVK	Krishi Vigyan Kendra
M&E	Monitoring and Evaluation
MIDH	Mission for Integrated Development of Horticulture
MIP	Minor Irrigation Project
MIS	Management Information System
MLE	Monitoring, Learning and Evaluation
MT	Metric Ton
MWL	Maximum Water Level
NGO	Non-Government Organization
O&M	Operation and Maintenance
OCTDMS	Odisha Community Tank Development & Management Society
OIIPCRA	Odisha Integrated Irrigation Project for Climate Resilient Agriculture
OP	Operational Policy
OPDC	Odisha Pisciculture Development Corporation
OSAMB	Odisha State Agriculture Marketing Board
OUAT	Odisha University of Agricultural Technology
PD	Project Director
PET	Potential Evapotranspiration
PFCS	Primary Fishermen Cooperative Society
PHM	Post-Harvest Management
PIU	Project Implementing Unit
PMKSY	Pradhan Mantri Krishi Sinchai Yojna
PMU	Project Management Unit
PP	Pani Panchayat
PPDO	Project Procurement Development Objectives
RGCA	Rajiv Gandhi Centre for Aquaculture
SA	Social Assessment
SAU	State Agriculture University

Project Implementation Plan: OIIPCRA

SC	Scheduled Caste
SCADA	Supervisory Control and Data Acquisition
SDSO	State Dam Safety Organization
SHG	Self-Help Group
SMF	Social Management Framework
SO	Support Organisation
SPMU	State Project Monitoring Unit
SRI	System of Rice Intensification
S-SPU	Sub-State Project Unit
ST	Scheduled Tribe
TBL	Top Bank Level
TMT	Thousand Metric Ton
TOR	Terms of Reference
TOT	Training of Trainers
TPPF	Tribal People's Planning Framework
TSO	Technical Support Organization
WHO	World Health Organization
WP	Water Productivity
WUA	Water User Association
WUE	Water Use Efficiency

Executive Summary

1.0 About the Project

Odisha economy which is primarily agrarian, is undergoing rapid transformation. The per capita income of the state has increased by 30 percent between 2012-17 period. However, the most critical sector, agriculture, which is source of livelihood for more than 62 percent of the people, suffers from various challenges. These include (a) small landholding (b) less diversification (c) erratic monsoon (d) frequent extreme weather events, (e) price realisation of the produced commodities, (f) value addition of agricultural / horticultural commodities etc. To enhance productivity and to address climate variability and change for farm income stability, irrigation and water productivity management play a critical role. A good number of major, medium and minor irrigation projects have been constructed in the state during last six decades, thereby increasing irrigation facilities from 1.83 lakh hectares in 1951 to 38.16 lakh hectares in 2017. However, this has not been able to address the farm distress fully. Further the state government has taken steps to rationalize irrigation development in the state, through convergence of various schemes to provide irrigation facilities to at least 35% of the cultivable land in each block. The state has 314 blocks of which 222 blocks have been covered till 2017.

Government of Odisha, through this proposed “Odisha Integrated Irrigation Project for Climate Resilient Agriculture” (OIIPCRA), is well-positioned to demonstrate considerable climate co-benefits,

as many of its components explicitly address building resilience to current climate variability, and enhancing adaptation and mitigation. GoO believes that market-oriented production system can be a viable and supportive approach to enhance farmer’s income, benefiting particularly marginal and small farmers. The crop planning and production system can be designed in the command areas as well as in the non-command areas based on the market demand. It is the



Improve farm income through intensification and diversification of select commodities with good market potential through a sustainable value chain approach



Improving the resilience of the farming system in at least 1.2 lakh ha. of cultivable area (command and rainfed parcels), investing in tanks and cascade



Investing in building sustainable community level institutions like water user associations, farmer interest groups, fishermen society and self help groups to institutionalise and integrate irrigation and agriculture planning process that will enhance the income of the small holders

reversal of traditional “Production to Marketing” approach to “Demand driven Production” and can benefit the farmers in both enhancing production and marketing. While adopting market-oriented agriculture production system, care is to be taken to address all the three critical components, i.e., (1) bringing Water Use Efficiency (WUE) and Water Productivity (WP), (2) diversification in the present production system and product value addition, and (3) supply chain improvement and its efficient management.

Project Development Objective: The Project Development Objective is to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected districts of Odisha.

Project Beneficiary: Project beneficiaries include small and marginal farmers, Water Users' Associations (Pani Panchayats), Producer Organizations (POs), and other agri-entrepreneurs (AEs). Targeted investments will be undertaken to address any gender gaps as well as benefit of other vulnerable groups like fisher folk including fisher women, tribal farmers of different holding categories, women self-help groups etc.

2.0 Project Components

The project envisages to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected cascades of Odisha. Further, in order to improve the market share of the produces at producer end, the project intends to promote / strengthen supply chain and value chain of agricultural / horticultural / fisheries produces (feasible commodities only based on scoping study), using Farmer Producer Organizations (FPOs) / Primary Fishers Cooperative Societies (PFCS). Apart from this, the project intends to establish different centres at the OUAT and Agriculture Department to support climate resilience in agriculture and promote agribusiness.

The project has four components to achieve the Project Development Objective (PDO). In addition, there is a **contingent component** for any unforeseen natural disaster which is quite frequent in Odisha and has a probability to affect the state during the project life cycle. This zero-



cost, contingent emergency response component (CERC) will finance eligible expenditures in case of natural or man-made crises, disasters, severe economic shocks, or other crises and emergencies in Odisha. Implementation of this subcomponent will follow a detailed Contingent Emergency Response Implementation Plan (CERIP) satisfactory to the World Bank that will be prepared for each eligible crisis.

Component 1: Climate-Smart Intensification and Diversification of Production: The objective of this component is to increase agricultural productivity, strengthen the capacity of organized farmer groups to cope or adapt to climate change stresses affecting crop production, and diversify production in Rabi in response to effective demand as expressed by pre-identified commercial off-takers or gleaned from other reliable market signals. Support under this component is proposed to be organized around two mutually inclusive, overlapping and reinforcing subcomponents.

Sub-Component 1.1: Support to Improved Productivity and Climate Resilience: The objectives of the sub-component in the agriculture sector (agriculture and horticulture) are; (i) Reduce the cost of production; (ii) Enhance productivity and climate resilience through technology adoption; (iii) Crop diversification towards market oriented high value crops and (iv) Promote agribusiness through supply chain management and value chain improvement. In this context, the project plans to take up agriculture and horticulture interventions along with Agri-business interventions. The sub-component objectively looks at promoting agricultural technologies that are sustainable and climate resilient vis-à-vis supports improving income of the farmers.

Specific interventions under the project area, (1) promotion of climate resilient seed varieties, (2) demonstration of climate resilient technologies, (3) strengthening the extension system, (4) Price forecasting of different commodities, (5) establishment of market infrastructures / processing units, (6) organizing and strengthening farmer's groups, and (7) capacity building of different stakeholders. This sub-component will be executed by the Department of Agriculture and Farmers Empowerment

(DoA&FE) (the Directorate of Agriculture & Food Production and the Directorate of Horticulture are the implementing agencies for agriculture and horticulture interventions, respectively).

Sub-Component 1.2: Support to Aquaculture Production: The project intends to have an opportunistic approach, in terms of fishery promotion in the project tanks. The project approach is to intervene in providing end to end solution, i.e., from seed production to market linkage where capacity building will be a cross cutting in all the project activities. Based on the feasibility of the tanks, the project will focus on seed promotion augmentation of inland species, improvement of existing hatcheries, fish production and management support and facilitating marketing of the produce by providing facilities to the fishermen folk.

The fishery sector intervention objectively looks at (1) increasing the income of fisher folks by utilizing project tanks / water bodies, (2) propagation of scientific fish farming technologies among the fishers for improved production, (3) strengthening pure line fish seed production and supply chain management, (4) demonstrating intensive and semi-intensive fish farming in the ponds in the project area for higher return to the fishers, (5) strengthening post-harvest management through infrastructure and support to fishers; and (6) support to selected Fishermen Cooperatives and Government Institutions for fishery-based enterprise.

Sub-Component 1.3: Support to Diversification and Produce Marketing: The objective of this sub-component is two-fold: (i) support farmers to reduce the current emphasis on food grains (especially paddy and wheat) and increase the share of high-value agriculture (e.g. fruits, spices and vegetables) in their overall production structure; and (ii) improve produce marketing to reduce price risks associated with diversification, increase incomes, and ensure sustained farmer adoption of Climate Smart Agriculture (CSA) practices. A successful shift in favour of more diversified production would also result into improved nutrition outcomes for farmers and the broader community, help reduce the water footprint of paddy, foster biodiversity, and strengthen resilience of the production systems to climate change.

Under this component, the project would fund Technical Assistance (TA) to the Department of Agriculture and Farmer Empowerment (DAFE) to promote and build productive alliance models for these and other competitive value chains that could emerge during implementation. To support productive alliances, the project will provide funding for (i) increasing farmer awareness of diversification opportunities; (ii) continuous identification of competitive value chains; (iii) farmer experimentation with new crops and training/demonstration of relevant production technologies; (iv) training farmers on production and marketing skills (including on input sourcing, production, aggregation, and new technologies, among others); (v) business plan development; (vi) fostering linkages with the financial sector or other government programs for access to credit; and (vii) financing – on a cost-sharing basis – of selected productive investments identified in the business plans. Project support to crop diversification will be based on agronomic/agro-ecological suitability, comparative advantage of specific cascades, and local, national or international market opportunities.

Component 2: Improving Access to Irrigation and Water Productivity: Access to reliable irrigation is generally critical to enhancing crop productivity, building resilience to climate change, promoting diversification and access to markets. It is important in the targeted project areas that are characterized by frequent droughts and rainfall variability. The objective of this component is “to use water more efficiently, reduce water losses and save water during Kharif season, and transfer these savings to Rabi season.” To realize this objective, the project will support modernization of hydraulic assets, institutional reforms, and capacity strengthening.

Sub-Component 2.1: Support to Water Sector Reforms: Crop diversification and intensification require a higher quality of irrigation service delivery to meet the requirements of grown crops. Traditional arrangements for irrigation management often lack the capacities and incentives to deliver these improved services. The project will pursue institutional reforms and strengthen decentralized

irrigation system management along with incentivizing local Pani Panchayats to deliver high performing irrigation and O&M services in a public-private community partnership mode. It will also explore regulatory reform in ground water management.

Under this sub-component (1) project will support the introduction of Integrated Water Resource Management (IWRM) in one catchment on pilot basis, (2) regulation related to ground water extraction for irrigation will be reformed, (3) support the establishment of a PP support unit within the DoWR, (4) conduct a study into options for PPP in irrigation management to increase the efficiency of water use and improve the quality of irrigation service delivery.

Sub-Component 2.2: Support to Investments in Cascades: Under this sub-component, the project will invest in the modernization of hydraulic assets. To that end, a comprehensive water assessment will be conducted in the Project cascades to identify opportunities for reducing water losses and for transferring the savings water for Rabi season. For each of these opportunities, the implications on downstream water use will be identified through preparation of a pre and post-project tank / cascade-wide water balance. Investments include strengthening of canal bunds, modernizing hydraulic canal structures, installation of field channels and sub-surface pressurized pipes, and developing groundwater extraction in safe zones. Self-practicing tool kit for cascade approach will be developed within 2 years of project cycle.

Component 3: Institutional Capacity Strengthening: The objective of this component is to improve overall capacity of the GoO for inter-departmental planning, coordination and implementation of cross-sectoral programs in agriculture, horticulture, fishery and water resource sectors. In this respect, the project will support in building a secretariat within the office of the Agriculture Production Commissioner (APC) for the purposes of planning, convergence, coordination, oversight, monitoring, analytics, policy formulation, and partnerships building. Besides ensuring better project outcomes, a strengthened office of the APC would help guide the state's long and short-term vision for water and agriculture development, build the state's capacity to deliver programs, and help forge strategic long-term partnerships for improved performance of relevant sectors.

At the district level, the project will finance the establishment, staffing and operation of a Monitoring Cell within the office of the PD-ATMA to be charged with monitoring all activities in the agriculture, fisheries, and water sectors, including those funded under the project. In addition, based on capacity assessment, the project will support capacity building of departmental staff on technical and managerial aspects. Along with this, the project component will also support in strengthening the capacity of the community institutions / organizations, such as Pani Panchayat, Water User Associations, Farmer Producer Organizations, Primary Fishers Cooperative Societies etc.

Component 4: Project Management: This component will strengthen capacities for project management, monitoring and evaluation (M&E) (including, inter alia, the areas of procurement and financial management) through the provision of goods, consultant services, training, and financing of incremental operating costs. This component will also develop a comprehensive management information and data collection and reporting system on key performance outputs and impact indicators through baseline surveys, participatory assessments, mid-term reviews and final evaluations. Staffing of the State Project Monitoring Unit (SPMU) will include a number of technical, financial management, M&E and safeguards (social and environmental) experts. Detailed implementation arrangements will be spelled out in the Project Operational Manual (POM). Regular training of SPMU staff will be organized to strengthen their capacities to implement the project.

Support to Integrated Production System for Strengthening Livelihoods

Small ruminants and poultry are well integrated in to the production system and overall livelihood of rural communities, especially among the landless, small and marginal farmers in Odisha. For the landless, goat rearing and poultry are the essential means of generating livelihood income. Small ruminants and poultry not only contribute to food and nutritional security at the household level, also

generate income and employment. They also play a greater role in agricultural waste management. In the context of climate change, Integrated Production and Management System (IPMS) appears to be a promising adaptation package both in drought, flood and disaster-prone/ affected areas. Systematic development of these allied activities not only diversifies the livelihood, also bring resilience in the production system.

In view of the recent cyclonic storm and its impact on the life and livelihood of the people, the project envisages to take up additional measures to support farmers, more particularly marginal and small farmers in the tank command and non-command areas of cyclone affected district/s. In this context, the project will take up two most affected districts, i.e., Puri and Khurdha to improve adaptation ability and strengthen recovery mechanism. The project will take up 15 tanks in Puri and 10 tanks in Khurdha as a part of the intervention. The newly added 25 tanks will be additional to the project jurisdiction or it will be adjusted within the overall scope of intervention of the project.

The project will have specific interventions in these districts from climate change and adaptation perspectives. The interventions will include the followings;

1. Promotion of climate resilient agricultural practices / climate smart technologies in the tank command and non-command areas;
2. Support to fishery activities in the selected tanks, involving fishermen cooperatives (PFCS);
3. Strengthening livelihood of vulnerable farmers (mostly marginal and small farmers) in reestablishing animal husbandry supply chain, focusing on small ruminants and poultry;
4. Supporting farmers with agricultural and horticultural inputs, more particularly with climate resilient seed varieties;
5. Strengthening community level institutions for a greater collaboration with other project interventions.

Promotion of Climate Resilient Agricultural Practices: The project will support the farmers of different holding categories in tank command and non-command areas to adopt climate resilient agricultural technologies and practices. Technology transfer will support the farmers to prevent / minimize the crop loss in climate stress situations in a longer term. The transfer of climate resilient agricultural technologies and practices will be taken up through demonstrations, organizing farmer's field schools, in-situ hand holding and guidance, training and exposure of the farmers.

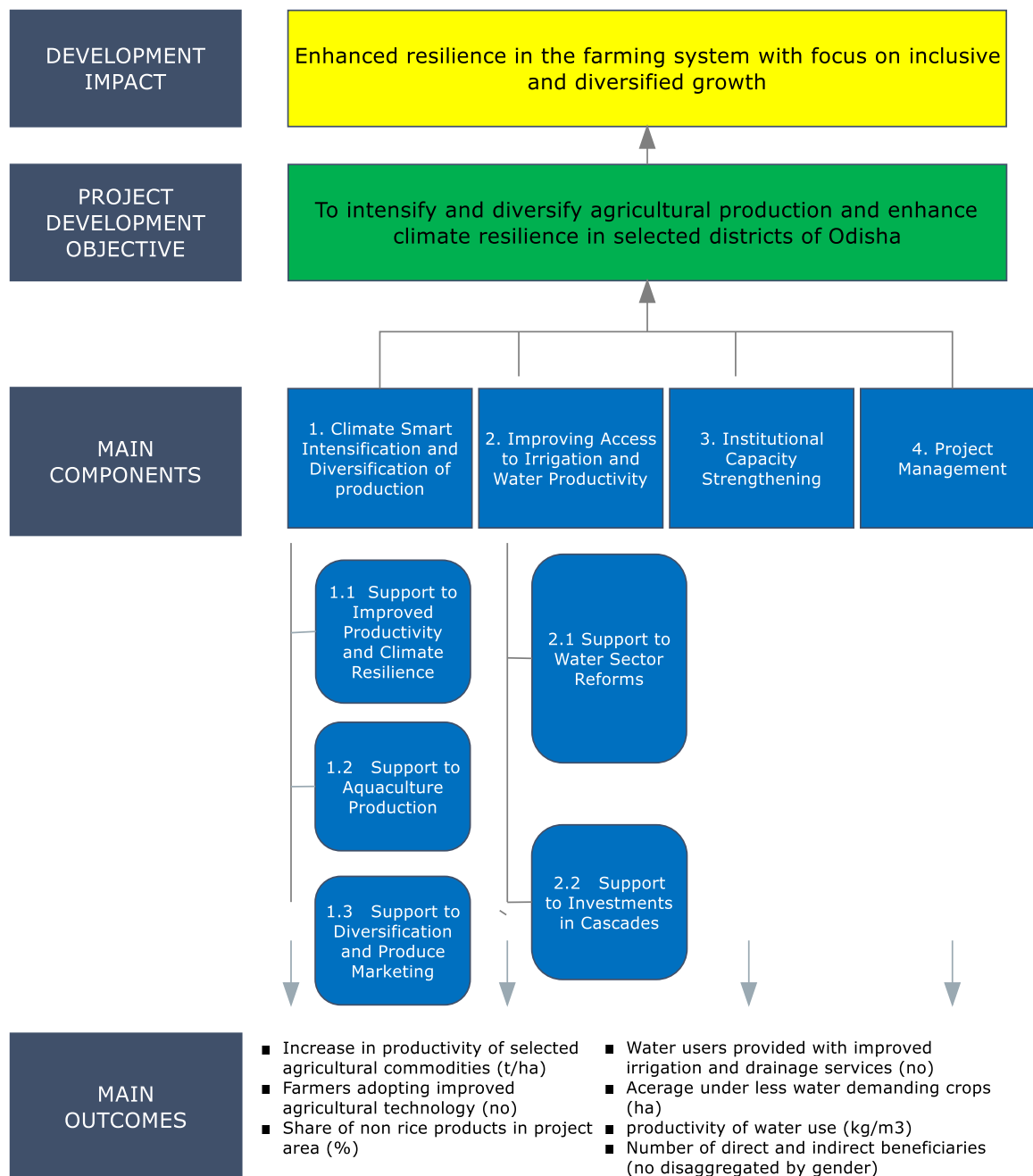
Fishery Promotion: Feasible tanks will be taken up for fish farming, in collaboration with local PFCS and other government / non-government institutions / organizations. The project will support the fishers in strengthening their fishery activities with the supply of fish seeds, feeds, value addition activities and linking with overall fish supply chain.

Poultry Promotion (including backyard Poultry): Poultry and small ruminants will be promoted in selected tank villages in two project districts (Puri and Khurdha district affected by cyclone *Fani*). Promotion and establishment of poultry / small ruminant based supply chain will be taken up in village saturation mode. As a part of inclusive strategy of the project, landless households, women, marginal and small farmers, scheduled caste and scheduled tribe families will be given high priority. While detail modalities of support system will be finalized in the later stage, the project will strategize the intervention in a cluster development approach, exploring PPP mode of operation. Possible convergence approach will be explored with existing schemes / programs / market mechanisms for wider coverage and remunerative return to the growers.

Promotion of Climate Resilient Seed Varieties: Climate resilient seed varieties, developed by OUAT, CRRI and other institutions will be promoted for adoption in the project areas. The project will support in providing subsidized seeds to the farmers, focusing on marginal and small holders, including women and SC/ST farmers.

Strengthening Community Level People’s Institutions: Along with different support provisions, the project will strengthen the community level institutions such as water user associations, producer organisations, farmer interest groups etc. to take up different activities in collaboration and synergy with other line departments and its efficient management. Trainings, exposure and hand holding support will be provided under the project to improve their functioning and service delivery capability.

3.0 Project Design Framework:

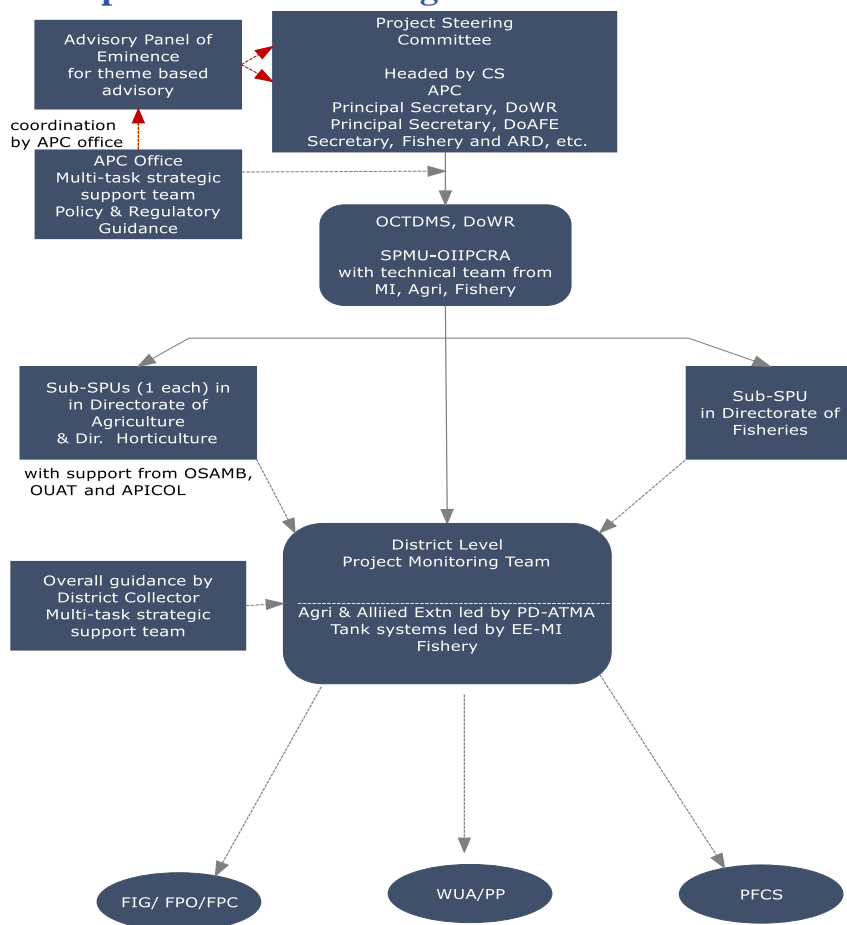


4.0 Geographical Coverage

The project will cover 15 districts in the state with intensive focus for agricultural development and increase in the irrigation potentiality. The framed project activities will be implemented over a period of six years in a phased manner.

SN	Project District	No of Blocks	No of GPs	No of MIP tanks	Designed CCA (Kharif)	Designed CCA (Rabi)
1	Balangir	10	17	21	4809	623
2	Balasore	5	6	6	456	0
3	Bargarh	4	19	24	2226	279
4	Bhadrak	5	12	13	1356	60
5	Boudh	1	8	10	755	0
6	Gajapati	1	3	3	351	121
7	Ganjam	18	166	251	18149.7	722
8	Jajpur	3	3	5	598	150
9	Kalahandi	10	30	36	3555	424
10	Kandhamal	4	6	6	452	50
11	Keonjhar	11	39	49	12015	3057
12	Mayurbhanj	20	81	107	11266	1049
13	Nabarangpur	3	3	3	125	8
14	Nuapada	2	2	2	86	0
15	Subarnpur	1	1	2	94	0
Grand Total		98	396	538	56293.7	6543

5.0 Project Implementation Arrangement



6.0 Project Financing

The total cost of the project estimated to be USD 234.70 million, of which IBRD will finance USD 164.40 million and Government will finance USD 70.30 million of the total cost of the project (refer **Table 36**).

Project Components	Project Cost (USD)	IBRD Financing (USD)	Counterpart Funding
1. Climate Resilient Intensification and Diversification of Production	74.44	52.10	22.30
2. Improving Access to Irrigation and Water Productivity	137.42	96.20	41.20
3. Institutional Capacity Strengthening	9.6	6.70	2.90
4. Project Management	12.83	9.00	3.80
5. Contingent Emergency Response	0.00	0.00	0.00
Total Project Cost	234.30	164.00	70.30
Front end fees	0.40	0.40	
Total financing required	234.70	164.40	70.30

Chapter One: Introduction

1.1 Overview

With a geographical area of 1, 55,707 sq. km, Odisha is the ninth largest state by area in India and the eleventh largest state by population. The State has a long coastline of 480 km with continental shelf area of 24,000 sq. km along the Bay of Bengal which reflects the rich potential of inland, brackish water and marine fishery resources in the State of Odisha. As per 2011 Census, the State has a population density of 270 per Sq. Km and is predominantly a rural state with 83.3 percent of the population living in villages dependent mainly on agriculture as their primary source of livelihood.

Odisha's Gross State Domestic Product (GSDP) was Rs 3, 77, 202 Crore at current price in 2016-17. The Compound Annual Growth Rate (CAGR) of agriculture during 2011-17 was 2.8 percent only. In spite of the fact that the contribution of agriculture and allied sector is declining from 62% in the 1950's to 19.98% in 2017, this sector still remains the main employment provider to small and marginal workers. Good rise in forestry and fishery sectors is leading to the growth of primary sector in the state. In 2017-18, the tertiary sector contributed 45.25% to the state's GSVA at current prices, followed by the secondary sector at 27.05% and the primary sector at 27.70%.

At a CAGR of 12.58 per cent, the tertiary sector has been the fastest growing among the three sectors from 2011-12 to 2017-18F. The growth has been driven by trade, transport, storage, communication & services related to broadcasting and other services. The primary sector grew at a CAGR of 8.23

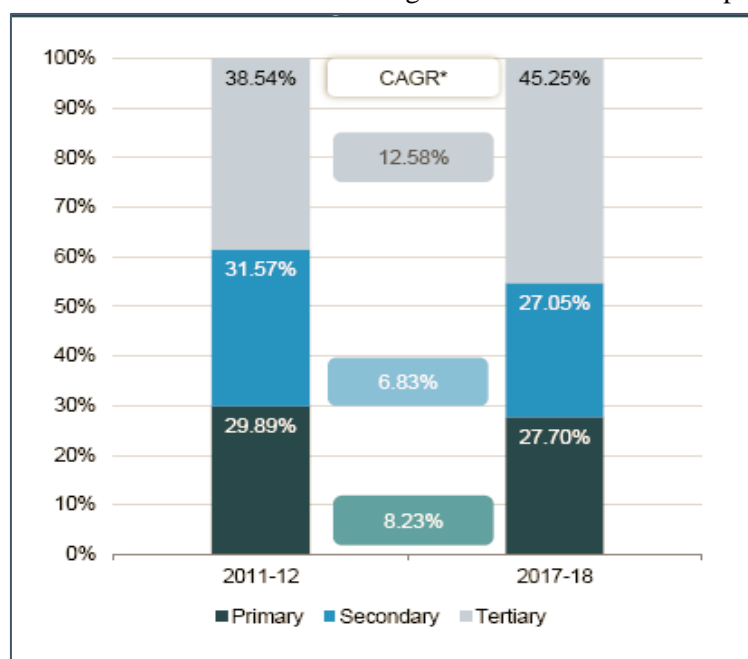


Figure 1 Share of primary, secondary and tertiary sector to GSDP

percent between 2011-12 and 2017-18. The secondary sector grew at a CAGR of 6.83 per cent between 2011-12 and 2017-18. This was driven by manufacturing, construction and electricity, gas & water supply. Gross State Value Added by economic activity at current basic prices for agriculture, forestry and fishing is Rs 76, 32, 274. Industry sector is of great importance for Odisha's economy. The manufacturing GVA in the organized industrial sector is 88 percent, which is much more than the corresponding national average. For the past five years, the industry sector has CAGR which is as a whole has been 5.72 percent per annum. There is a disconcerting issue that relates to the declining share of the industry in the GSDP. It is seen that the sector declined from 43.6 percent in 2011-12 to an estimated 34.8 percent in 2017-18, even as the mineral-rich State has a huge potential for industrialization. Odisha is a middle-income state with an average per capita annual income of INR 77, 193¹.

The government has observed appreciable growth in terms of the target of getting inclusive growth with imperative execution in both development and welfare sectors. In 2016-17, the Gross State Domestic Product (GSDP) grew at the rate of 10.39 percent. The state government has also proposed

¹ Odisha Economic Survey 2017-18

an idea for the primary sector to capture the declining pattern and centering on farm productivity, water productivity, enhancement of agriculture and allied infrastructure to address the value chain gap and upgrade farm income.

Table 1: Real Growth of GSDP (percent) by Sectors (2013-14 to 2017-18)

Sector	2013-14	2014-15	2015-16	2016-17	2017-18
Agriculture, Forestry and Fishing	-4.16	7.84	-13.52	19.65	-4.7
CAGR % (2011-17)	-	-	-	-	2.81
Industries	16.23	-7.02	16.47	6.35	5.23
CAGR % (2011-17)	-	-	-	-	5.72
Services	7.79	7.75	8.11	10.74	12.42
CAGR % (2011-17)	-	-	-	-	9.02
GSVA at basic price	8.9	1.3	7.49	10.14	6.64
GSDP	9.26	1.8	8.17	10.39	7.14
CAGR % (2011-17)	-	-	-	-	6.98
CAGR % (All India), 2011-17	-	-	-	-	6.82

Source: Directorate of Economic Survey, Odisha

During 2011-17, the agriculture had Compound Annual Growth Rate (CAGR) of 2.8 percent only. The contribution of water supply & other utility services expanded marginally from 3.52 percent in 2011-12 to 3.72 percent in 2013-14 and 4.07 percent in 2015-16 and in 2017-18, it again declined marginally to 3.64 percent. The contribution of mining and quarrying sector varies from 12 percent in 2011-12 to 7.72 percent in 2017-18. Contribution of construction sector varies from 9.35 percent in 2011-12 to 7.18 percent in 2017-18. The industries sector observed Compound Annual Growth Rate (CAGR) of 5.72 percent. The annual growth of the services sector expanded from 7.41 percent in 2012-13 to 10.74 percent in 2016-17 and it further accelerated to 12.42 percent in 2017-18. During 2011-17, the average annual growth rate (Compound Annual Growth Rate) was 9.02 percent.²

1.2 Demographic Features

The population of Odisha, as per 2011 census is 4,19,74,218 out of which 2,12,12,136 are male and 2,07,62,082 are female with a sex ratio of 979. The density population for Odisha is 270 persons per square kilo meter (km), as against 382 persons per square km at all India level in 2011. The literacy rate of the State is 72.9 percent in 2011.

Table 2: Population of Project Districts

Districts	Population in ('000 No)					Percentage to Total Population		Sex Ratio (No. of Females per '000 males)			Population Density Per Sq. Km		District Population to State Population in %
	M	F	T	R	U	R	U	R	U	T	2001	2011	
Balasore	1186	1134	2320	2067	253	89.08	10.92	957	959	957	532	610	5.53
Bargarh	749	732	1481	1331	150	89	10.13	979	961	977	231	254	3.53
Bhadrak	760	746	1506	1320	186	87.66	12.34	985	956	981	532	601	3.59
Bolangir	830	819	1649	1452	197	88.03	11.97	992	948	987	203	251	3.93
Boudh	221	220	441	421	20	95.37	4.63	993	947	991	121	142	1.05
Gajapati	283	295	578	507	71	87.77	12.23	1048	1006	1043	120	134	1.38
Ganjam	1779	1750	3529	2761	768	78.24	21.76	995	941	983	385	430	8.41
Jajpur	926	901	1827	1692	135	92.61	7.39	976	944	973	560	630	4.35
Kalahandi	787	790	1577	1455	122	92.26	7.74	1008	953	1003	169	199	3.76
Kandhamal	360	373	733	661	72	90.14	9.86	1043	984	1037	81	91	1.75
Keonjhar	907	895	1802	1549	253	85.95	14.05	999	920	988	188	217	4.29
Mayurbhanj	1256	1264	2520	2327	193	92.34	7.66	1010	956	1006	213	242	6.0
Nabarangpur	605	616	1221	1133	88	92.82	7.18	1021	990	1019	194	231	2.91

² Odisha Economic Survey 2017-18

Districts	Population in ('000 No)					Percentage to Total Population		Sex Ratio (No. of Females per '000 males)			Population Density Per Sq. Km		District Population to State Population in %
Nuapara	302	308	610	576	34	94.42	5.58	1024	983	1021	138	158	1.45
Subarnapur	311	299	610	560	50	91.82	8.18	961	945	960	232	261	1.45
Odisha	21212	20762	41974	34971	7003	83.31	16.69	989	932	979	236	270	100

Source: Population Census 2011, Odisha

The district of Ganjam and Mayurbhanj are having the maximum population as compared to all other districts. Population wise Ganjam is largest district in Odisha having 8.41% of total population and having the highest rural population. Jajpur is having maximum Population Density 630 per sq. km. The percentage of urban population to the total population in the State is 16.69% and share of rural population to the total population is 83.31%. In districts like Boudh and Nuapara most people are living in rural area i.e. 95.37% and 94.42% respectively. Gajapati, Kandhamal, Koraput and Raygada have good sex ratio as compared to other districts. The population density per sq. km for 2011 is 270 and that in 2001 is 236 with an increase of 14.41%.

Table 3: Overview of State Demography

Particulars	Total	Rural	Urban
Total Population Person	41974218	34970562	7003656
Total Population Male	21212136	17586203	3625933
Total Population Female	20762082	17384359	3377723
Main Working Population Person	10707543	8623947	2083596
Main Working Population Male	8794413	7045991	1748422
Main Working Population Female	1913130	1577956	335174
Main Cultivator Population Person	3279769	3219409	60360
Main Cultivator Population Male	2924537	2869857	54680
Main Cultivator Population Female	355232	349552	5680
Main Agricultural Labourers Population Person	2420540	2355909	64631
Main Agricultural Labourers Population Male	1746831	1697973	48858
Main Agricultural Labourers Population Female	673709	657936	15773
Main Other Workers Population Person	4565748	2702910	1862838
Main Other Workers Population Male	3807869	2239950	1567919
Main Other Workers Population Female	757879	462960	294919
Marginal Worker Population Person	6834046	6479767	354279
Marginal Worker Population Male	3108242	2895583	212659
Marginal Worker Population Female	3725804	3584184	141620
Marginal Cultivator Population Person	824220	810942	13278
Marginal Cultivator Population Male	450813	442804	8009
Marginal Cultivator Population Female	373407	368138	5269
Marginal Agriculture Labourers Population Person	4319453	4263034	56419
Marginal Agriculture Labourers Population Male	1735005	1706770	28235
Marginal Agriculture Labourers Population Female	2584448	2556264	28184
Marginal Other Workers Population Person	1348779	1092219	256560
Marginal Other Workers Population Male	798385	636313	162072
Marginal Other Workers Population Female	550394	455906	94488
Non-Working Population Person	24432629	19866848	4565781
Non-Working Population Male	9309481	7644629	1664852
Non-Working Population Female	15123148	12222219	2900929

Source: Population Census 2011, Odisha

As per census 2011, Odisha had 41.04 lakh cultivators and 67.40 lakh agricultural labourers out of 175.42 lakh total workers. The shares of cultivators and agriculture labourers together have fallen by 3% from 64.8% to 61.82% between 2001 and 2011 because of lower participation of women cultivators which decreased by 19% from 9 lakh to 7.29 lakh during the same interval. However, the

number of male cultivators increased by 0.28 lakh during this period. Among the districts, Balasore has the highest number of cultivators (2.89 lakh). Mayurbhanj has the highest number of agricultural labourers (5.69 lakh) and persons working in household industries (1.14 lakh).

The Population Census 2011 shows that the State has more percentage of main working population in rural region (80.4%) than in urban region (19.6%). It can be easily observed that the rural region forms major part of the main cultivator population (98.16%) and main agricultural labourer population (97.33%). According to Population Census 2011, the State has more number of marginal other worker population in rural regions (80.98%) than in urban region (19.02). The annual growth rate of the population in Odisha from 2001 to 2011 is 18.42%. The main worker population increased to 1.11% from 2001 to 2011.

1.3 Geo-Physical

From the topographical point of view, the State has been divided into four zones, namely, (1) Coastal plain in the east (10%), (2) Middle mountain and highland region in central part (70%), (3) Central plateau (5%), and (4) Western rolling uplands in west (15%)

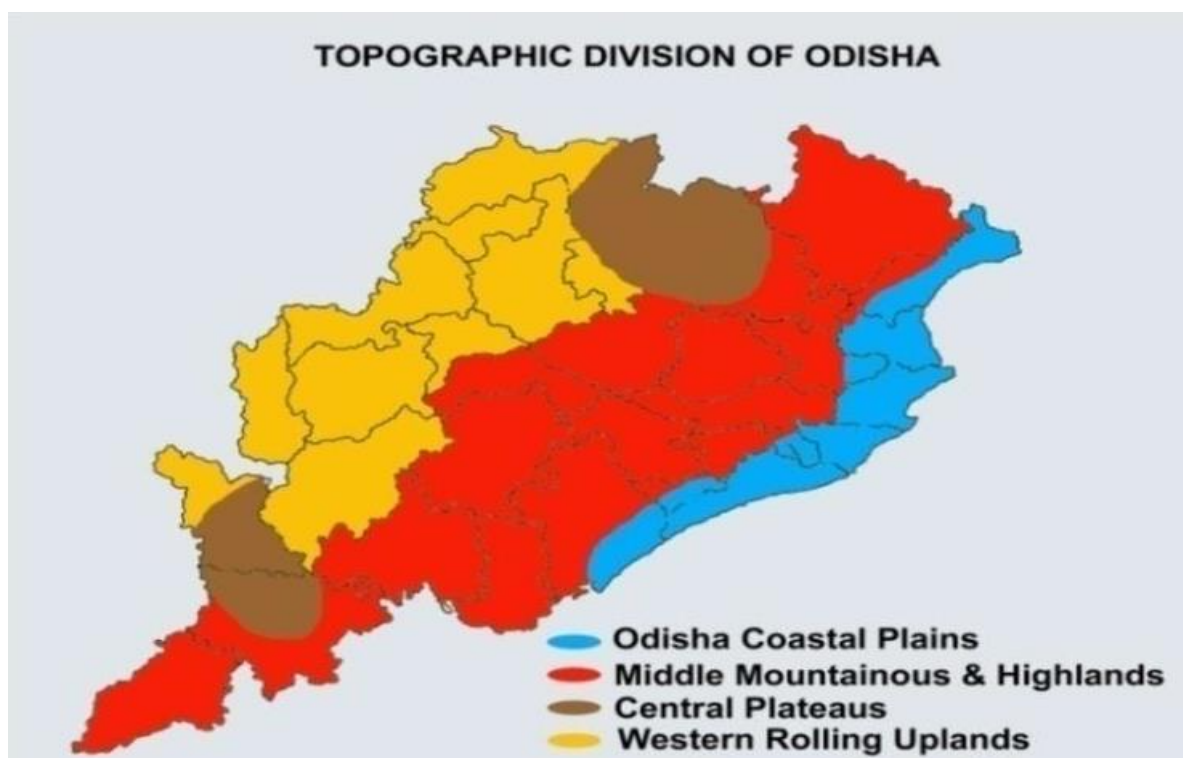


Figure 2: Topographic Division of Odisha
Source: Panchayati Raj Department, Govt. Odisha

1.4 Climatic Features

Odisha has ten agro climatic zones which are characterized by high temperature, high humidity, medium to high rainfall and mild winters of short period. As per Koppen's climatic classifications most part of Odisha comes under the Aw having a tropical Savannah type of climate.

The agriculture sector of the State frequently suffers from natural calamities like cyclones, droughts and flash floods which generously influence production and profitability of horticulture. On the basis of climate type, land form and soil, the state is divided into ten agro-climatic zones:

1. North Western Plateau
2. North Central Plateau
3. North Eastern Coastal Plain
4. East and South Eastern Coastal Plain
5. North Eastern Ghat
6. Eastern Ghat High Land
7. South Eastern Ghat
8. Western Undulating Zone
9. Western Central Table Land
10. Mid Central Table Land

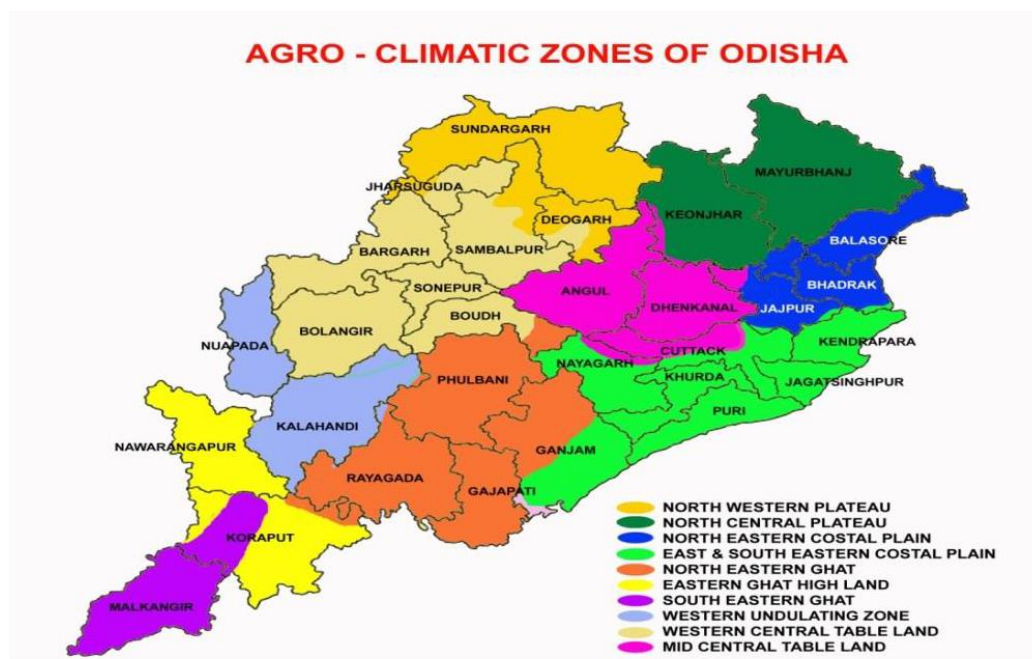


Figure 3 Agro Climatic zones of Odisha
Source: Panchayati Raj Department, Govt. Odisha

Dry spell sets off an endless loop of financial effects starting with yield disappointment, joblessness, erosion of assets, diminish in pay, intensifying of living conditions, poor sustenance, and, in this way, diminished hazard absorptive limit, which thus enhance the vulnerability of the poor to another dry season.

Table 4: Agro-Climatic Zones of the Districts under the Project

Sl. No.	Agro-climatic Zone	Agricultural Districts	Climate	Normal			Broad Soil groups
				Mean annual rainfall (mm)	Mean maximum summer temp (°C)	Mean minimum winter temp (°C)	
	North Central Plateau	Mayurbhanj, major parts of Keonjhar (except Anandpur & Ghasipura block)	Hot & moist Sub-humid	1534	36.6	11.1	Lateritic, Red & Yellow, Mixed Red & Black
	North Eastern Coastal Plain	Balasore, Bhadrak, Parts of Jajpur & Hatdih block of	Moist sub-humid	1568	36.0	14.8	Red, Lateritic, Deltacolluvial, Coastal alluvial & Saline

Sl. No.	Agro-climatic Zone	Agricultural Districts	Climate	Normal			Broad Soil groups
				Mean annual rainfall (mm)	Mean maximum summer temp (°C)	Mean minimum winter temp (°C)	
		keonjhar					
	East & South Eastern Coastal Plain	Part of Ganjam	Hot & Humid	1577	39.0	11.5	Saline, Lateritic, Alluvial, Red & Mixed red & Black
	North Eastern Ghat	Gajapati, Kandhamal, Part of Ganjam	Hot & moist, Sub-humid	1597	37.0	10.4	Brown forest, Lateritic Alluvial, Red, Mixed Red & Black
	Eastern Ghat High Land	Nabarangpur	Warm & humid	1522	34.1	7.5	Red, Mixed Red & Black, Mixed Red & Yellow
	Western Undulating Zone	Kalahandi & Nuapada	Hot & moist Sub-humid	1352	37.8	11.9	Red, Mixed Red & Black and Black
	Western Central Table Land	Bargarh, Bolangir, Boudh, Sonepur	Hot & moist Sub-humid	1614	40.0	12.4	Red & Yellow, Red & Black, Black, Brown forest, Lateritic

Source- http://cesorissa.org/database_agriculture.asp

1.5 Rainfall

The south-west monsoon accounts for about 80% of the annual rainfall in the state. The South West Monsoon generally sets in between 5th June and 10th June in the coastal plain and by 1st of July the entire State is under the full influence of the south-west monsoon. By 15th October, the south-west monsoon pulls back completely from Odisha. These are the normal dates which vary from year to year. As per “Thorntwaite’s classification”, Odisha comes under the sub-humid category inferring deficient winter downpours.

Table 5: Rainfall Statistics of Project Districts in 2017

Sl. No	Name of the District	Geographical area in Sq. Km	Normal rainfall (mm)	Actual average rainfall (mm) 2017	Deviation from normal (mm)
1	Balasore	3806	1592.0	1628.4	36.4
2	Baragarh	5837	1367.3	1045.1	-322.2
3	Bhadrak	2505	1427.9	1506.9	79
4	Bolangir	6575	1289.8	1049.9	-239.9
5	Boudh	3098	1623.1	1164.2	-458.9
6	Gajapati	4325	1403.3	1406	2.7
7	Ganjam	8206	1276.2	1150.8	-125.4
8	Jajpur	2899	1559.9	1477	-82.9
9	Kalahandi	7920	1330.5	1331.8	1.3
10	Kandhamal	8021	1427.9	1226.4	-201.5
11	Keonjhar	8303	1487.7	1211.2	-276.5
12	Mayurbhanj	10418	1600.6	1390	-210.6
13	Nabarangpur	5291	1569.5	1551.9	-17.6
14	Nuapada	3852	1286.4	1097.1	-189.3
15	Subarnapur	2337	1418.5	1108.2	-310.3
	Odisha	155707	1451.2	1283.1	-168.1

Source: District at a glance 2018, Economic Survey, Odisha

As noted above, Boudh observed the maximum negative deviation from normal rainfall (-458.9 mm) indicating less rainfall. District Balasore observed a positive deviation (36.4mm) indicating good rainfall. From the Annexure 2, the State observed actual rainfall of 1283.1 mm of rainfall and when it was compared to the normal rainfall of 1451.2 mm of rainfall, there was altogether deviation of -168.1 mm which means deficit rainfall. Districts like Boudh, Bargarh and Sundergarh have observed very

high negative value of deviation from normal rainfall, indicating less rain. Although districts like Koraput, Kendrapara, Bhadrak, Jagatsinghpur and Balasore observed good amount of rainfall in 2016-17 and have more value of actual rainfall than normal rainfall.

Table 6: Monthly Average Potential Evapotranspiration of Project Districts

District	Unit: mm/day											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Balangir	5.57	6.35	7.24	8.01	8.19	6.87	5.27	4.94	5.23	5.75	5.81	5.46
Baleswar	5.22	5.9	6.72	7.42	7.43	6.35	5.25	4.95	4.97	5.3	5.49	5.18
Bargarh	5.48	6.29	7.23	8.14	8.39	7.08	5.39	4.96	5.23	5.77	5.82	5.42
Baudh	5.39	6.13	6.94	7.67	7.82	6.62	5.24	4.98	5.2	5.56	5.65	5.31
Bhadrak	5.21	5.86	6.58	7.15	7.19	6.23	5.19	4.94	4.97	5.3	5.47	5.19
Gajapati	5.33	5.99	6.52	6.83	6.83	6.06	5.11	5.02	5.15	5.34	5.42	5.2
Ganjam	5.25	5.88	6.37	6.7	6.68	5.92	5	4.94	5.09	5.32	5.42	5.15
Jajpur	5.23	5.89	6.62	7.18	7.29	6.31	5.26	5.03	5.07	5.38	5.53	5.22
Kalahandi	5.63	6.4	7.23	7.85	8	6.63	5.17	4.92	5.22	5.66	5.75	5.47
Kandhamal	5.4	6.12	6.84	7.41	7.5	6.38	5.13	4.94	5.15	5.5	5.58	5.3
Kendujhar	5.32	6.1	7.1	8.03	8.28	6.91	5.57	5.23	5.31	5.57	5.64	5.27
Mayurbhanj	5.24	5.97	6.96	7.83	8	6.72	5.43	5.08	5.15	5.44	5.56	5.19
Nabarangpur	5.76	6.57	7.44	8.07	8.24	6.8	5.23	4.93	5.29	5.79	5.84	5.58
Nuapada	5.62	6.43	7.34	8.12	8.34	6.91	5.26	4.88	5.24	5.8	5.85	5.49

Source: [http://www.indiawaterportal.org/met_data/\(08-06-2018,4:00PM\)](http://www.indiawaterportal.org/met_data/(08-06-2018,4:00PM))

As noted above, the highest Potential Evapotranspiration (PET) is found highest during the months of March, April, May and June (Summer season) and is lowest during December and January (winter season) in every year. In Odisha, PET is generally high in the district (Western Odisha) like Sundargarh, Nabarangpur, Jharsuguda, Bargarh, Balangir, Nuapada and low in the district (Eastern Odisha) like Kendrapara, Jagatsinghpur, Khordha, Cuttack and Ganjam.

1.6 Temperature

The State has been experiencing increase in temperature in its different parts. The State's coastal regions have temperature fluctuation and heat waves. Dry and very high humidity (about 80%) also persists in the coastal influencing the lives and employments of individuals amid heat wave conditions in summer months. There are three noteworthy seasons - summer (March-June), rainy Season (July-September) and the winter (October-February). Odisha lying only South of the Tropic of Cancer, has a tropical atmosphere. In summer it is warm nearly during the time, in the Western regions of Sundargarh, Sambalpur, Baragarh, Bolangir, Kalahandi and Mayurbhanj with most extreme temperature drifting between 42-48° C and in winter, it becomes cool. In the coastal districts, the climate is equable but highly humid and sticky. The summer maximum temperature ranges between 40-45° C and the low temperatures are usually between 10-14° C. Winter isn't exceptionally serious aside from in a few districts in Koraput and Phulbani where least temperature may drop to 2-4° C.

Table 7: Annual Average Rainfall, Temperature and Humidity, Odisha

Year	Average Rainfall (mm)	Average Temp. (Degree Celsius)	Relative Humidity (%)
2007	1588.37	25.95	72.35
2008	1549.91	26.54	76.54
2009	1369.71	27.33	74.4
2010	1293.94	27.08	75.63
2011	1339.4	26.38	71.15
2012	1384	26.92	69.82
2013	1414.05	27.44	71.64
2014	1608.8	24.74	74.52
2015	1224.7	25.67	76.24
2016	1283.1	26.62	80.29

Source: agriodisha.nic.in, IMD, Agricultural Statistics

The State observed an annual average rainfall of 1283.1 mm, average temperature of 26.62 degree Celsius and relative humidity of 80.29% in 2016. The state observed a good amount of rainfall (1588.37 mm) in 2007 as compared to the other years. The highest average temperature was observed in the year 2013.

1.7 Economy

The economy of Odisha recorded an annual average growth rate of 4.2 percent during the period 1951-2011 against the all-India average of 4.9 percent at base price of 2004-05. This implies a gap of 0.7 percentage points for the State from national average. From 2003 onwards, the growth rate of the State accelerated and entered into a higher trajectory of above 8 percent as against the national average of 7.5 percent thus becoming one of the fast-growing economies of the country. However, contribution of agriculture sector to GSDP has been reducing.

Table 8: Gross State Value Added by Economic Activity (percentage share) at Current Basic Prices

Sl. No.	Economic Activity	Percentage Share						
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1.	Agriculture, Forestry and Fishing	17.87	21.44	20.24	22.21	20.04	21.57	19.98
1.1	Crops	11.60	15.05	13.56	15.03	12.34	13.96	12.54
1.2	Livestock	2.45	2.56	2.60	2.72	2.81	2.92	3.00
1.3	Forestry and Logging	2.60	2.49	2.80	2.93	3.06	2.68	2.36
1.4	Fishing and Aquaculture	1.22	1.34	1.28	1.53	1.83	2.01	2.08
2.	Mining and Quarrying	12.03	10.70	10.23	9.16	9.47	8.26	7.72
	Primary	29.89	32.15	30.46	31.37	29.51	29.84	27.70
3.	Manufacturing	18.69	16.91	18.43	16.00	16.10	16.46	16.23
4.	Electricity, Gas, Water Supply & Other Utility Services	3.52	3.76	3.72	3.42	4.07	3.60	3.64
5.	Construction	9.35	8.32	8.25	8.11	7.80	7.39	7.18
	Secondary	31.57	28.99	30.41	27.53	27.98	27.45	27.05
6.	Trade, Repair, Hotels and Restaurants	9.24	9.78	9.88	10.26	10.08	10.14	10.37
6.1	Trade & Repair Services	8.35	8.91	9.03	9.43	9.19	9.24	9.46
6.2	Hotels & Restaurants	0.89	0.87	0.84	0.84	0.89	0.90	0.92
7.	Transport, Storage, Communication & Services related to Broadcasting	6.12	6.26	6.32	6.94	7.39	7.54	8.01
7.1	Railways	0.81	0.94	0.95	1.16	1.28	1.25	1.37
7.2	Transport by means other than Railways	3.72	3.77	3.71	3.89	4.03	4.14	4.36
7.2.1	Road transport	3.15	3.22	3.18	3.29	3.46	3.57	3.76
7.2.2	Water transport	0.19	0.17	0.15	0.16	0.13	0.13	0.13
7.2.3	Air transport	0.02	0.03	0.02	0.03	0.05	0.05	0.06
7.2.4	Services Incidental to Transport	0.37	0.35	0.35	0.41	0.39	0.38	0.40
7.3	Storage	0.06	0.06	0.07	0.06	0.06	0.06	0.07
7.4	Communication & Services related to Broadcasting	1.52	1.49	1.59	1.82	2.01	2.09	2.21
8.	Financial Services	3.62	3.65	3.43	3.61	3.89	3.95	4.12
9.	Real estate, Ownership of Dwelling & Professional Services	7.75	7.63	7.65	7.87	8.12	7.76	7.81
10.	Public Administration and Defense	3.92	3.94	4.96	5.14	5.19	4.98	6.20
11.	Other Services	7.89	7.60	6.89	7.29	7.85	8.35	8.74
	Tertiary	38.54	38.86	39.13	41.10	42.52	42.72	45.25
12	Total GSVA at Basic Prices	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Directorate of Economics and Statistics, Odisha

Table 9: GVA by Economic Activity (growth over previous years) at Current Basic Prices

Sl. No.	Economic Activity	Growth over previous year					
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1.	Agriculture, Forestry and Fishing	35.79	6.22	15.54	-6.33	22.26	1.64
1.1	Crops	46.79	1.37	16.68	-14.74	28.49	-1.46
1.2	Livestock	18.26	14.52	10.09	7.16	18.06	12.66
1.3	Forestry and Logging	8.33	26.63	10.08	8.58	-0.56	-3.32
1.4	Fishing and Aquaculture	24.88	6.88	26.51	23.66	24.87	13.78
2.	Mining and Quarrying	0.69	7.55	-5.76	7.39	-0.96	2.55
	Primary	21.67	6.66	8.39	-2.32	14.81	1.89
3.	Manufacturing	2.33	22.70	-8.60	4.50	16.04	8.26
4.	Electricity, Gas, Water Supply & Other Utility Services	20.83	11.44	-3.42	23.65	0.37	11.07
5.	Construction	0.71	11.60	3.43	-0.08	7.57	6.55
	Secondary	3.92	18.05	-4.70	5.53	11.39	8.17
6.	Trade, Repair, Hotels and Restaurants	19.66	13.69	9.41	1.95	14.26	12.26
6.1	Trade & Repair Services	20.67	14.17	9.83	1.20	14.26	12.27
6.2	Hotels & Restaurants	10.21	8.78	4.86	10.37	14.34	12.22
7.	Transport, Storage, Communication & Services related to Broadcasting	15.83	13.48	15.65	10.60	15.81	16.61
7.1	Railways	30.23	14.15	28.65	14.47	11.11	19.62
7.2	Transport by means other than Railways	14.77	10.52	10.57	7.57	16.42	15.77
7.2.1	Road transport	15.78	11.15	8.95	9.11	17.23	15.54
7.2.2	Water transport	1.51	0.62	11.96	-19.94	17.34	12.56
7.2.3	Air transport	111.39	-26.56	68.48	88.32	0.43	43.49
7.2.4	Services incidental to Transport	8.91	12.62	21.54	0.08	11.27	15.49
7.3	Storage	10.14	18.52	3.01	4.77	10.49	15.76
7.4	Communication & Services related to Broadcasting	10.94	20.34	20.21	14.82	17.73	16.48
8.	Financial Services	14.32	5.71	10.68	11.96	15.25	14.41
9.	Real estate, Ownership of Dwelling & Professional Services	11.40	12.88	8.17	7.22	8.45	10.55
10.	Public Administration and Defense	13.64	41.79	9.12	4.86	8.96	36.52
11.	Other Services	8.89	2.11	11.31	11.79	20.80	14.92
	Tertiary	14.07	13.33	10.58	7.41	14.07	16.27
12.	Total GVA at Basic Prices	13.14	12.55	5.27	3.84	13.54	9.75
13.	Gross State Domestic Product	13.30	13.29	6.00	5.28	14.00	10.28
14.	Per capita GSDP	12.16	12.15	4.93	4.23	12.85	9.17

Source: Directorate of Economics and Statistics, Odisha

Odisha remains a better performer as an economy among all major States in current decade. Both industries and services sectors, accounting for more than four-fifths of GSDP, continued to be the largest contributors to economic growth. However, the share of industries sector was 43.59 percent in 2011-12 and it declined to 34.77 percent in 2017-18. Services sector witnessed a continuous expansion with a share in total gross value-added rising from 38.54 percent in 2011-12 to 45.25 percent in 2017-18. Agriculture and allied sector, being still monsoon-dependent to some extent, showed a fluctuating trend. Its share increased from 17.9 percent in 2011-12 to 22.2 percent in 2014-15 and again declined to 20 percent in 2015-16 owing to deficient monsoon. It once again dropped to 20.0 percent in 2017-18 after rising to 21.6 percent in 2016-17.³

1.8 Agriculture

The State covers 35 percent of geographical area as the net cropped area and has dependence of more than 60 percent of State's workforce on agriculture for their sustenance. Agriculture in Odisha is the sector that is firmly associated to the welfare of the citizens as it impacts livelihoods of more than 2/3rd of its population. Agriculture and allied sectors cover the following economic activities:

³ Odisha Economic Survey 2017-18

- Crop production
- Livestock
- Forestry and logging
- Fishing

The annual growth rates of agriculture sector fluctuated significantly during 2011-12 to 2017-18. In the year 2016-17, the growth rate accelerated significantly to 19.65 percent on a low base as a result of increased production of crops but it reduced to negative growth of 4.70 percent during 2017-18 following decreased crop production as per second advance estimate of crop statistics. In the year 2011-17, the Compound Annual Growth Rate (CAGR) was 2.8 percent only. Although share of the agriculture and allied sector is going downward from 62 percent in the 1950's to 19.98 percent in 2017, this sector still continues to be the main employment provider to small and marginal workers. Development of this sector is critical not just to ensure food security and lessening of poverty in rural regions, yet additionally to maintain growth of the rest of the economy.

Crop, livestock, fishery and forest exist as the main sub-sectors of broad agriculture sector. Crop production sector in Odisha was buoyant in 2016-17. The State observed transient growth in the field of crop area, production, productivity, food security, irrigation during the year leading to rise in the income of the farmers. Though the contribution of crop sector to GSDP in Odisha consistently reduced over the decades since 1950s till early 2010s, but it started improving from 2011-12, but the trend is varying. Formulation of State Agriculture Policy 2013, Odisha Fishery Policy 2015 and exclusive agriculture budget by the State Government paved the way for sustainable practices with higher investment, efficient production technology, post-harvest solutions, effective value addition and remunerative market options in agriculture sector.

The year 2016-17 noticed a remarkable growth of about 20 percent in agriculture sector after an extreme compression of over (-) 13 percent in 2015-16. The reason to a great extent was because of vagaries of climate. It is also seen that there is a significant negative growth in every alternative year in the recent past, the annual average growth rate (CAGR) for the sector is 2.8 percent for the period 2011-17. The main yield rice, constituting in excess of 90 percent of aggregate sustenance grain production, recorded a bumper harvest of 97 lakh MT and productivity of 24 qtl/ha in 2016-17. Intensive cultivation and expansion in the coverage of irrigated land has led to an increase in the area under cultivation of rice and crop yield in the State. Traditional paddy growing areas have been increasingly diverted to HYV paddy as well as cash crops, improving the commercial viability of agriculture and making it remunerative for the farmers. With 1.17 lakh ha of additional potential created during 2016-17, the total irrigation potential of the State stands at 55.91 lakh ha (Kharif-37.83 ha and Rabi 18.08 ha). Nevertheless, only about one-third of net sown area is irrigated and principal crop yields are lower than the leading States in the country.⁴

The State Government has undertaken various short gestation projects like Mega Lift Irrigation Projects, Deep Bore well Construction Programme, and Check Dam Construction Programme, with an objective to rapidly meet the irrigation needs of the farmers. The target is to bring an additional 10 lakh hectare of cultivable land under irrigation cover by the end of 2019.

Although Odisha has observed half of the expected transition in the agriculture sector, namely the rapid decrease in the contribution of the agriculture and allied sectors' (crops, livestock, forestry and logging, and fisheries) output in the GSDP, the other half of the transition has not made much headway. Thus, the share of agriculture in GSDP has declined to 20 percent from an overbearing 60 percent in the 1960s, but the contribution of population dependent on the agriculture sector remains to be important at around 50 percent. There is a need for continued policy priority for agriculture, especially in its allied sectors, in terms of the high job potential, good agro-climatic conditions, and plenteous water resources spread over 11 river basins, extensive coastline and the growing irrigation

⁴ Agricultural chapter, Odisha Economic survey 2017-18

potential. This would also help to enhance factor productivity and living standards of the population who are dependent on the sector. The State Government has been implementing strategic policy initiatives and making budgetary arrangements for agriculture sector to represent inherent constraints associated with over-dependence on rain-fed farming, inadequate irrigation coverage, low level of capital formation, over-dependence on paddy cultivation, slow pace of modernization, small land holdings, and continued prevalence of old tenancy practices in some areas and above all frequent occurrence and impact of natural calamities on the performance of the sector. Many of these measures need to be reassessed and perhaps further intensified to accomplish the desired results.

Odisha's main agriculture products are rice, pulses, oilseeds, vegetables, groundnut, cotton, jute, coconut, spices, sugarcane, potato and fruits. As per Budget 2018-19, an amount of Rs 4,511.16 crore has been allocated to the Department of Agriculture and Farmers' Empowerment.

Table 10: Area under Different Crops in Odisha (Area in '000 Ha)

Year	Rice (in Lakh ha.)	Cereals	Pulses	Oil Seeds	Fibres	Vegetables
2006-07	44.5	4612.76	501.86	257.41	95.94	808.3
2007-08	44.52	4629.91	550.23	264.63	86.85	613.6
2008-09	44.54	4622.26	499.9	241.65	89.21	621.61
2009-10	43.65	4538.85	590.07	239.79	81.64	638.47
2010-11	42.25	4439.9	600.12	244.03	101.57	647.03
2011-12	40.05	4192.77	481.97	196.91	127.72	646.68
2013-14	41.8	4362.47	780.83	193.93	144.96	668.49
2014-15	39.5	4339.63	826.33	175.87	145.36	661.07
2015-16	39.42	4365.26	721.29	317.05	144.29	650.97
2016-17	39.63	4391.3	711.94	294.43	151.05	651.19
2017-18	37.66	4167.81	708.1	286.5	160.17	651.52

Source: Statistical Abstract of Odisha and Odisha at a glance 2015 and District wise AYP Odisha

The above table shows that the area under rice cultivation is reflecting a declining trend. During the years 2006 to 2009, the area under rice cultivation was more and it started decreasing after 2009. Same situation is observed for area under total cereal cultivation which started decreasing after 2009. In case of vegetables, the area under cultivation is almost constant. Area under fibre cultivation has started expanding from 2010-11. During 2014-15, more area was taken for pulse cultivation and during 2015-16 more area was included for oilseeds cultivation.

Table 11: Production of Different Crops in Odisha (in 000' MT)

Year / District	Rice (Lakh M.T)	Cereals	Pulses	Oil Seeds	Fibres	Vegetables
2006-07	69.28	10509.22	351.77	147.94	256.83	7690.7
2007-08	76.55	11644.44	383.52	171.67	278.13	7810.52
2008-09	69.16	10521.47	381.13	151.95	287.99	7944.49
2009-10	70.22	10716.96	399.3	150.3	268.27	8441.2
2010-11	69.31	10709.71	424.06	152.32	368.68	8502.35
2011-12	58.95	9060.31	361.85	138.77	350.94	8964.43
2013-14	76.13	7940.16	419.27	156	396.47	9246.89
2014-15	94.88	10087.61	439.35	124.63	403.28	9237.98
2015-16	58.75	6693.65	386.33	212.41	426.81	9067.65
2016-17	97.94	10684.44	382.92	188.74	482.95	8973.77
2017-18	65.51	7406.87	392.45	182.71	525.68	8978.2

Source: Statistical Abstract of Odisha and Odisha at a glance 2015 and District wise AYP Odisha

It can be noted that though the area under rice cultivation has decreased in 2014-15, but the production has increased leading to high yield of rice. The State observed remarkable growth in the overall production of rice, cereals, pulses and fibres during 2014-15 and drastic decrease in production in the very next year.

Table 12: Average Yield of Different Crops in Odisha

Year / District	Rice (kg/ha)	Total Cereals	Total Pulses	Total Oil Seeds	Total Fibres	Total Vegetables
2006-07	1557	22.78	7.01	5.75	2.68	95.15
2007-08	1720	25.15	6.97	6.49	3.2	127.29
2008-09	1553	22.76	7.62	6.29	3.23	127.81
2009-10	1609	23.61	6.77	6.27	3.29	132.21
2010-11	1640	24.12	7.07	6.24	3.63	131.41
2011-12	1472	21.61	7.51	7.05	4.95	138.62
2013-14	1821	18.2	5.37	8.04	5.76	138.32
2014-15	2443	23.25	5.32	7.09	5.78	139.74
2015-16	1491	15.33	5.36	6.7	5.32	139.3
2016-17	2472	24.33	5.38	6.41	5.76	137.81
2017-18	1739	17.77	5.54	6.38	5.91	137.8

Source: Statistical Abstract of Odisha and Odisha at a glance 2015 and District wise AYP 2017-18 Odisha;

Note: Yield rate in quintal /ha

Table 13: Major Fruits Production in Odisha

Name of Fruits	2014-15			2015-16			2016-17		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Mango	197.7	769.93	38.9	199.3	778.69	54.23	199.4	817.91	41
Banana	24.76	469.25	190	24.47	462.64	201.02	24.49	466.77	191
Citrus	27.54	268.37	97.5	27.91	267.96	104.32	0.97	7.11	73.5
Pineapple	0.93	11.6	125	0.95	11.62	147.11	0.94	11.55	123
Papaya	3.01	69.88	232	3.03	70.1	259.64	3.05	71.02	233
Coconut*	50.68	3255	6423	50.91	3277.07	64.03	50.91	3424.44	46.3
Others	73.31	567.46	77.4	73.31	567.47	86.71	20.28	105.32	51.9
Total	329	2156.49		320	2158.48		300.1	1479.68	

Source: Directorate of Horticulture, Odisha; (Area in '000 ha, Production in '000 MT, yield rate quintal/ha)

*Coconut production in lakh numbers

Odisha produced about 14.8 lakh MT fruits in 3.00 lakh hectare area in 2016-17. Mango was the principal fruit with 8.18 lakh MT production followed by banana (4.67 lakh MT and other fruits (1.05 lakh MT). The cultivation of citrus fruits was less in 2016-17 as compared to 2015-16 and 2014-15. It can be noted from the table that the total production of fruits in 2016-17 decreased to 14.8 lakh MT when it is compared to the total production of 2015-16, which is 21.58 lakh MT.

Table 14: Major Vegetable Production in Odisha

Name of Vegetables	2012-13		2013-14		2014-15		2015-16		2016-17	
	A	P	A	P	A	P	A	P	A	P
Beans	11.23	52.11	11.23	52.11	11.23	52.1	10.6	48.7	10.58	48.72
Bitter Gourd	11.49	112.3	11.41	111.8	11.49	112	11.06	108	10.92	106.9
Bottle Gourd	10.19	137.9	10.19	138.1	10.19	138	10.14	138	10.11	138
Brinjal	130.08	2194	125.52	2158	130.1	2194	120.1	2047	118	2013
Cabbage	40.98	1148	40.98	1151	40.96	1148	39.13	1098	37.73	1058
Cauliflower	44.7	675.5	44.07	667.7	44.7	676	42.96	649	40.73	616.6
Cucumber	2.45	34.51	2.46	34.59	2.45	34.5	2.14	29.2	2.08	28.43
Garlic			13.26	48.23					12.89	47.03
Mushroom		6.29		8.44		6.29		10.9		16.05
Ladies Finger	67.04	593.9	65.24	578.5	67.04	594	64.01	566	63.97	565.8
Onion	34.92	419.1	35.81	432.1	34.92	419	30.84	369	33.44	378.7
Potato	14.14	201.1	14.66	249.8	14.14	201	16.24	274	25.19	302.2
Radish	12.65	134.8	12.65	137.8	12.65	135	12.55	136	12.52	136
Pumpkin							22.56	492	21.07	460.1
Sweet Potato	43.46	410.1	42.03	396.2	43.46	410	41.43	391	40.8	384.9
Tomato	96.55	1383	97.02	1386	96.65	383	93.32	1327	91.04	1312
Others	168.26	1968	164.06	1932	168.8	2968	147.2	1488	113.5	1115

Name of Vegetables	2012-13		2013-14		2014-15		2015-16		2016-17	
	A	P	A	P	A	P	A	P	A	P
Total	688.14	9470	690.6	9482	688.1	9470	664.2	9174	644.5	8728

Source: Directorate of Horticulture, Odisha, A: Area; P: Production; (Area in '000 ha, Production in '000 MT, yield rate quintal/ha)

The State produced 87.28 lakh MT vegetables in 6.45 lakh hectare area in 2016-17. Brinjals, cabbage, cauliflower, okra and tomato are some of the major vegetables produced in the State. The area for major vegetable production in the state decreased during 2015-16 and 2016-17 which resulted in the less production of vegetables. From the table it can be noted that the year 2013-14 observed more production of vegetables.

Table 15: Major Spices Production in Odisha

Name of Spice	2014-15		2015-16		2016-17	
	Area	Production	Area	Production	Area	Production
Betel Vines	-	-	-	-	2.05	99765.6 (in Lakh no.)
Tamarind and Others	-	-	-	-	10.93	83.8
Coriander	19.8	10.87	19.6	10.76	19.61	10.86
Chilly	76.02	73.58	71.69	68.57	71.7	69.28
Ginger	16.92	132.63	16.57	127.78	16.57	128.01
Turmeric	28.02	220.74	27.86	215.32	27.86	218
Total	186.9	880.79	182.1	847.97	148.7	509.55

Source: Directorate of Horticulture, Odisha (Area in '000 ha, Production in '000 MT)

Turmeric (2.18 lakh MT) and ginger (1.28 lakh MT) were the major spices produced in the State in 2016-17. The production of coriander, chilly, ginger and turmeric increased during 2016-17 as compared to the previous years. Even Betel vines have production of 99765.6 (in Lakh no.) in 2016-17.

Table 16: Major Floricultural Crop Production in Odisha

Year	Marigold		Rose		Gladioli		Tuberose	
	Area (ha)	Production (quintal)	Area (ha)	Production (quintal)	Area (ha)	Production (quintal)	Area (ha)	Production (quintal)
2013-14	2680	245810	1870	3580	2370	2350	510	12820
2014-15	2735	245810	1870	3598	2374	2359	511	12820
2015-16	2609	245820	1857	3575	1578	1558	503	12810
2016-17	2608	235221	1859	3584	1580	1560	507	12968

Source: Directorate of Horticulture, Odisha (Area in hectare; production in quintal; Gladioli in lakh spike)

Odisha has a good potential in floriculture. Odisha also contributes about 3 percent of the total flower production of the country. Rose, gladioli, marigold and tuberose are the main flowers grown in Odisha. In 2016-17, the State cultivated major flowers like marigold, rose, gladioli and tuberose in about 6554 ha area.

Table 17: Yield Rate of Principal Crops in Odisha (Quintal/ha)

Principal Crops	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rice (Total)	14.5	23.61	18.21	23.63	14.91	24.72	17.39
Autumn Rice	7.78	17.32	14.63	17.75	7.19	12.85	10.88
Winter Rice	14.33	24.02	17.39	23.78	14.85	25.86	17.51
Summer Rice	32.13	31.65	34.22	33.42	33.56	35.31	31.33
Ragi	5.62	7.7	8.09	7.38	6.2	7.06	8.79
Gram	7.8	7.74	7.68	7.7	7.75	7.68	7.78
Sugarcane (000' MT/ha)	610.19	655.45	658.91	719.51	644	626.79	735.65
Mustard	2.12	2.75	2.69	2.44	2.05	3.46	4.35
Jute	14.77	17.52	18.09	16.25	21.74	16.78	24.95

Principal Crops	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Cotton	3.86	4.82	4.1	4.23	4.04	4.78	4.8
Potato	109.03	122.12	115.98	123.24	101.73	125.93	118.8
Groundnut	11.89	12.31	14.49	12.68	10.97	12.29	14.62
Wheat	16.4	19	15.75	16.28	13.47	14.21	18.55

Source: Directorate of Agriculture and Food Production, Odisha, Directorate of Economics and Statistics, Odisha

Odisha experienced buoyancy in crop production sector in 2016-17 as shown in the above table. The net sown area increased to 56.31 lakh hectare. The yield rate of principal crops decreased during 2017-18 except sugarcane with yield rate of 735.65 000' MT/ha. The yield rate of rice, the principal crop of the State, was impressive at 24.72 qtl per hectare. In 2016-17, the yield rate of winter rice (25.86 qtl/ha) and summer rice (35.31 qtl/ha) was higher compared to all the previous years. The yield rate of autumn rice was higher in 2016-17 than 2015-16 but was less as compared to 2012-13, 2013-14 and 2014-15. The higher in 2016-17 than 2015-16 but was less as compared to 2012-13, 2013-14 and 2014-15. The yield rate of jute was more in 2015-16 than 2016-17.

Table 18: Yield Rate of Crops in Project Districts by Agro-Climatic Zone

Sl. No.	Climatic zones	District	Rice						Total Cereals						
			2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	
1	North central Plateau	1	Mayurbhanj	1726	1390	2176	984	2358	2023	1720	1414	2170	1000	2358	2024
		2	Keonjhar	2276	1555	2348	1132	2190	2097	2430	1660	2350	1309	2266	2181
2	North Eastern Coastal Plain	3	Balasore	1765	1248	2291	1702	2785	2329	1766	1251	2290	1703	2785	2329
		4	Bhadrak	3195	1466	1421	2506	3102	1942	3141	1466	1422	2505	3100	1943
		5	Jajpur	2545	1062	1856	1232	2579	1376	2609	1081	1855	1244	2568	1393
3	East and South Eastern Coastal Plain	6	Ganjam	2051	367	2710	1923	2851	1575	1698	533	2430	1788	2603	1638
4	North Eastern Ghat	7	Gajapati	1787	891	1487	975	2485	2089	1653	1142	1519	1155	2135	2008
		8	Kandhamal	1664	1550	1852	860	1793	1561	1675	1661	1870	1289	1932	1884
5	Eastern Ghat High Land	9	Nabarangpur	1616	2869	2328	1254	2657	2464	1593	2994	2616	1760	2845	2748
6	Western Undulating Zone	10	Kalahandi	2100	2498	2329	1118	2380	2151	2006	2576	2433	1366	2436	2189
		11	Nuapada	2564	2006	2121	848	1458	677	2542	1948	2035	901	1463	798
7	Western Central Table Land	12	Bargarh	2120	2274	2928	1924	2437	1049	2119	2270	2920	1924	2437	1060
		13	Bolangir	4220	3192	3114	940	2209	791	4189	3150	3079	979	2213	876
		14	Boudh	1761	1803	2300	954	3099	1844	1752	1801	2289	961	3085	1852
		15	Subarnapur	3195	3068	3361	2514	3319	2345	3179	3055	3352	2512	3314	2348
			State Total	2361	1821	2363	1491	2472	1739	2293	1837	2324	1533	2433	1777

Note: Yield rate of crops from 2012-13 to 2017-18 (Yield in Kg/ha)

Sl. No.	Climatic zones	District	Total Pulses						Total Food grains						
			2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	
1	North central Plateau	1	Mayurbhanj	571	566	572	605	567	594	1531	1264	1877	952	2054	1745
		2	Keonjhar	483	556	557	534	547		2249	1364	1837	1125	1820	1777
2	North Eastern Coastal Plain	3	Balasore	453	457	458	460	472	505	1660	1193	2158	1567	2570	2131
		4	Bhadrak	494	479	483	492	508	511	2014	1349	1339	2399	2906	1808
		5	Jajpur	592	477	483	476	470	512	1803	865	1445	990	1848	1128
3	East and South Eastern Coastal Plain	6	Ganjam	569	526	524	531	521	524	1310	530	1589	1364	1829	1149
4	North Eastern Ghat	7	Gajapati	537	546	551	537	536	536	1182	947	1208	952	1652	1535
		8	Kandhamal	575	477	508	477	504	543	1370	1319	1514	1004	1525	1429
5	Eastern Ghat High Land	9	Nabarangpur	476	487	482	493	490	532	1260	2776	2415	1592	2641	2470
6	Western Undulating Zone	10	Kalahandi	475	577	573	568	575	569	1294	1734	1621	995	1544	1376

Sl. No.	Climatic zones		District	Total Pulses						Total Food grains					
				2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
		11	Nuapada	505	476	473	470	469	513	1837	1263	1257	684	967	646
7	Western Central Table Land	12	Bargarh	492	473	479	459	470	486	2016	1910	2416	1601	1976	929
		13	Bolangir	510	492	491	495	493	506	3255	2047	1997	792	1475	701
		14	Boudh	473	498	499	492	505	530	1328	1343	1603	774	2019	1285
		15	Subarnapur	488	489	489	492	511	548	2600	2428	2563	2021	2619	1850
			State Total	508	507	508	502	502	526	1737	1426	1761	1225	1832	1365

Sl. No.	Climatic zones		District	Total Oil seeds						Total Fibres					
				2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	North central Plateau	1	Mayurbhanj	848	796	947	1331	928	849	768	836	845	764	920	925
		2	Keonjhar	648	483	484	459	480	748	732	1331	1367	1409	1275	1597
2	North Eastern Coastal Plain	3	Balasore	1451	1188	1464	1430	1565	1427	1446	1416	2032	1566	2004	2456
		4	Bhadrak	1231	1170	1148	1175	1162	970	507	2538	2541	2455	2388	2380
		5	Jajpur	1033	1691	1772	1753	1900	1712	528	1784	1779	1868	1771	2270
3	East and South Eastern Coastal Plain	6	Ganjam	856	1040	1002	891	958	837	458	573	637	649	645	785
4	North Eastern Ghat	7	Gajapati	1013	854	931	944	838	1133	652	505	506	457	464	540
		8	Kandhamal	466	381	391	428	482	688	1381	471	476	430	430	526
5	Eastern Ghat High Land	9	Nabarangpur	378	669	682	718	717	1432	452	849	856	785	810	828
6	Western Undulating Zone	10	Kalahandi	930	1035	1042	1032	1093	977	487	365	402	393	515	511
		11	Nuapada	593	956	1030	989	935	885	793	401	434	433	509	541
7	Western Central Table Land	12	Bargarh	1202	1121	1146	1071	1134	1241	2940	561	506	457	468	514
		13	Bolangir	1063	1268	1284	1299	1256	1101	511	473	471	399	523	516
		14	Boudh	1720	567	569	550	561	634	1764	612	571	533	547	566
		15	Subarnapur	1183	1158	994	1000	1059	1197	549	536	530	531	497	525
			State Total	919	928	917	895	889	887	657	576	578	532	576	591

Sl. No.	Climatic zones	District	Total Vegetables						Total Condiments and Spices						
			2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	
1	North central Plateau	1	Mayurbhanj	13909	14079	14298	14331	13987	13995	3269	3267	4066	4114	4143	4112
		2	Keonjhar	13218	14616	14775	14500	14678	14693	1453	2463	2733	2716	2717	2720
2	North Eastern Coastal Plain	3	Balasore	12435	12680	12655	12362	12273	12275	1744	1765	5006	5021	2044	1894
		4	Bhadrak	13536	13468	13762	13688	13602	13676	1247	1195	1648	1684	1521	1494
		5	Jajpur	14369	13474	13617	13551	13465	13442	1956	1537	2444	2438	1826	1816
3	East and South Eastern Coastal Plain	6	Ganjam	12485	14134	14120	14140	14111	14108	2696	1494	3866	3926	1892	1779
4	North Eastern Ghat	7	Gajapati	12646	13477	12471	12787	12380	12380	1482	2696	3596	3611	3443	3411
		8	Kandhamal	14596	15667	15742	15309	14940	14941	8665	8538	8543	8349	8491	8629
5	Eastern Ghat High Land	9	Nabarangpur	15547	13280	13707	13507	13342	13345	2463	1453	2398	2378	2392	2381
6	Western Undulating Zone	10	Kalahandi	13051	14427	14489	14394	14257	14259	1731	1956	2249	2298	2302	2275
		11	Nuapada	14714	13137	13394	13310	13161	13162	2068	1731	2169	2128	2134	2119
7	Western Central Table Land	12	Bargarh	13469	13093	13129	13092	12899	12891	1208	2163	2479	2502	2515	2511
		13	Bolangir	12167	13603	13932	13855	13537	13545	1368	1251	1792	1713	1708	1717
		14	Boudh	13302	14717	14936	14946	14582	14585	1546	2068	2862	2732	2721	2736
		15	Subarnapur	12990	12202	12785	12635	12610	12614	2163	1368	2419	2461	2399	2388
			State Total	13753	13915	14067	13929	13781	13780	3166	3149	4009	4037	3491	3449

Source: Odisha Agriculture Statistics 2012-13, 2013-14, District wise AYP 2014-15, 2015-16, 2017-18 Odisha

Yield and cropping intensity are the prime indicators to assess production trends of agriculture. Above table shows agro climatic zone wise variation of yield over six years in project districts. Yield rate of rice shows saw tooth trend from year 2012-13 to 2017-18 with highest decrease in 2015-16. Most of the food grains witness drawdown yield during 2015-16 due to severe drought condition in this year. Oil seed and total fiber yield is decreased gradually from 2012-13. Rice yield rate is highest in Subarnapur district compared to other districts and vulnerable to climate risk. Due to drought condition in 2015-16 yield is reduced by 25% in this district. Ganjam has witnessed lowest yield in rice production during 2013-14 due to mass crop damage in cyclone philin. The agriculture year of 2016-17 shows highest yield in food grains for every district. There is a drastic growth for pulses during 2017-18 which were constant in past years. Kandhamal district shows lowest yield in rice production but highest yield in vegetables and spice production due to hilly terrain geographic feature. In the year 2017-18 the spice yield is 8629kg/ ha which is more than two times of state average. Yield trend of vegetable is stagnant over the past six years in the state. Yield rate of fibers is observed highest in North East Coastal Plain agro climatic zone including three project districts i.e. Balasore, Bhadrak and Jajpur.

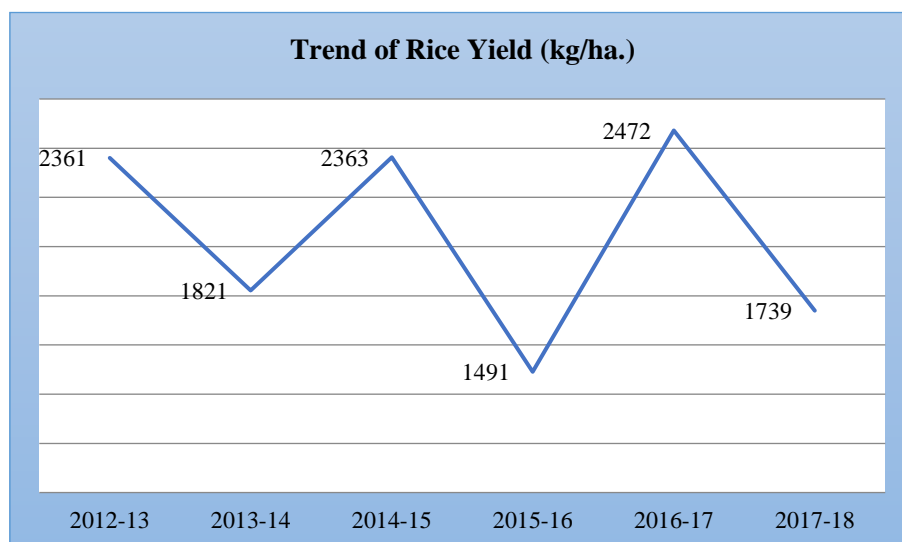


Figure 4 Trend in rice yield

Table 19: Cropping Intensity in Odisha

Year	Net Area Sown (in 000' ha)	Gross Cropped Area (in 000' ha)	Cropping Intensity (%)
2000-01	5829	7878	135
2001-02	5845	8798	151
2002-03	5680	7853	138
2003-04	5796	8637	149
2004-05	5739	8718	152
2005-06	5,691	8,928	157
2011-12	5,292	8,799	166
2012-13	5331	8879	167
2013-14	5424	9054	167
2014-15	5496	9011	164
2015-16	5608	8180	146
2016-17	5631	8180	146

Source: Directorate of Agriculture and Food Production, Odisha

As noted from the table, the net sown area increased to 56.31 lakh ha in 2016-17. The cropping intensity is also one of the indices of the level of agricultural development. The cropping intensity of the State remained same in 2016-17 at 146 as in 2015-16, as shown in the above table. The cropping intensity was higher in 2012-13 and 2013-14 and it was low during 2000-01.

Table 20: Irrigation Potential Created in Odisha (Area in lakh ha)

Year	Irrigation Potential Created (Th. Ha.)			Irrigation Potential Utilized (Th. Ha.)			% of Utilization
	Kharif	Rabi	Total	Kharif	Rabi	Total	
2000-01	2533.83	1071.99	3605.82	1589.88	535.84	2125.72	58.95%
2001-02	2554.26	1117.63	3671.89	1752.27	793.64	2545.91	69.34%
2002-03	2608.59	1123.75	3732.34	1246.81	465.21	1712.02	45.87%
2003-04	2674.12	1161.21	3835.33	1737.49	780.87	2518.36	65.66%
2004-05	2707.27	1266.22	3973.4	1845.79	844.87	2690.66	67.72%
2005-06	2731.50	1294.92	4026.42	1922.70	1042.79	2965.49	73.65%
2006-07	2720.46	1318.52	4038.98	2001.98	1147.47	3149.45	77.98%
2007-08	2765.73	1342.06	4107.79	2027.00	1281.46	3308.46	80.54%
2008-09	2867.01	1407.18	4274.19	2081.13	1096.03	3177.16	74.33%
2009-10	2962.21	1476.81	4439.02	2058.85	979.67	3038.52	68.45%
2010-11	3035.85	1477.97	4513.82	2085.21	1020.70	3105.91	68.81%
2011-12	3089.34	1501.43	4590.77	2078.90	1009.18	3088.08	67.27%
2012-13	3130.51	1573.56	4704.07	2186.86	1178.73	3365.59	71.55%
2013-14	3352.94	1651.79	5004.73	2253.67	1267.35	3521.02	70.35%
2014-15	3457.47	1696.556	5154.026	2327.1	1134.41	3461.55	67.16%
2015-16	3622.296	1754.05	5376.346	2240.9	1053.12	3294.02	61.27%
2016-17	3783.965	1806.519	5590.484	2364.3	1189.13	3553.45	63.55%

Source: www.dowrorissa.gov.in/Irrigation/IrrigationScenario.pdf (11.06.18, IIAM)

The source-wise irrigation potential created so far up to 2016-17 is given in the above table. Irrigation is an important input for crop production. In Odisha, additional 2.14 lakh hectare of irrigation potential was created during 2016-17. Total irrigation potential created was 37.84 lakh ha in Kharif and 18.07 lakh hectare in Rabi season. Irrigation potential are created mainly by major and medium projects (20.48 lakh ha), minor (flow and lift) (22.32 lakh hectare), mega lift (0.07 lakh ha) and other sources (13.04 lakh ha) both in Kharif and Rabi seasons. Utilization of the irrigation potential created is an area of concern for the State, since unutilized potential does not contribute at all to agricultural development. As presented in the above table, the total utilization of irrigation potential created in Odisha was 35.53 lakh hectares, which is about 63.55 percent of total irrigation potential created in 2016-17 for both Kharif and Rabi seasons. It is seen from the above table that the percentage of utilization was 63.55% in 2016-17 and the percentage of utilization was more in 2007-08 (80.54%).

Table 21: Irrigation Potential Created in the State & Project Districts (Area in '000 ha)

Sl. No.	Name of the District	Major & Medium		Minor Flow		Minor lift	
		2017-18		2017-18		2017-18	
		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
1	Balasore	29.53	7.18	15.66	3.62	58.78	32.77
2	Baragarh	91.22	57.06	33.24	3.4	66.57	26.93
3	Bhadrak	92.1	12	3.57	0.17	27.06	15.92
4	Bolangir	15.41	2.78	29.37	3.23	58.07	22.73
5	Boudh	29.53	3.13	15.2	1.2	33.17	14.94
6	Gajapati	0	0	23.63	2.75	7.3	4.2
7	Ganjam	132.7	13.93	114.52	7.86	36.97	20.58
8	Jajpur	61.53	32.92	9.29	1.6	46.54	25.34
9	Kalahandi	111.68	68.84	40.55	5.62	50.27	21.94
10	Kandhamal	2.39	1.2	10.93	3.75	14.35	6.83
11	Keonjhar	28.4	6.09	36.44	5.77	27.67	14.44
12	Mayurbhanj	75.41	36.66	46.87	5.85	54.4	25.04
13	Nabarangpur	4.25	2.25	10.01	0.79	38.89	17.52
14	Nuapada	29.72	8.27	17.29	2.1	24.44	10.47
15	Subarnapur	58.59	25.76	8.64	0.63	45.72	20.7
	Odisha Total	1403.83	643.53	663.46	85.64	1005.72	484.53

Source: District at a Glance, Economic Survey 2018

Challenges in Agriculture and Allied Sectors:

In the current scenario, agriculture and allied sectors have been facing serious challenges, such as:

- Low and stagnant productivity of several crops;
- Deterioration of soil health leading to land degradation and development of problematic soil;
- Poor adoption levels of new technology/risk minimization/mitigation;
- Lack of mechanization & timely inputs;
- Lack of efficient utilization of resources-water;
- Low skill up gradation & poor access to technology and market information;
- Low levels of value addition & poor supply chain; and

One of the major challenges in production of Rabi crops is availability of water for irrigation coverage. Due to lack of irrigation, the culturable lands remain fallow which could have been put to agriculture. The available irrigation sources do not match the crop water requirement and hence, a significant percentage of farmers do not prefer to take up Rabi crops.

Table 22: Strategy and Technological Overview to Address the Challenges

Challenges/ Issues	Strategy to Overcome	Technology / Activity
Low and stagnant productivity	<ol style="list-style-type: none"> 1. Seed replacement; 2. Bridging the gap in adoption of new and improved technology/practices. 	<ol style="list-style-type: none"> 1. Breeder seed production, Foundation seed production and Certified seed production through seed village concept; 2. Ensuring timely weed management practices; 3. INM, ICM practices for Agriculture & Horticulture crops; 4. Rejuvenation of old orchards.
Risk minimization/mitigation	<ol style="list-style-type: none"> 1. Promoting precision farming; 2. Diversifying crops and cropping systems. 3. Promoting low cost and water saving techniques 	<ol style="list-style-type: none"> 1. Crop & cropping systems diversification, intercropping, mixed cropping, 2. Crop diversification towards vegetable and fruit crops; 3. Seed treatment; 4. Protected cultivation.
Deterioration of soil health	<ol style="list-style-type: none"> 1. Soil health management through balanced use of nutrients; 2. Improving fertilizer use efficiency; 3. Improving organic matter in the soil. 	<ol style="list-style-type: none"> 1. Promoting soil test-based fertilizer recommendation; 2. Educating farmers on concept of balanced soil nutrition; 3. Correcting micronutrient deficiency (Zn, Fe, Boron and Manganese); 4. Promoting green manuring; 5. Promoting Bio fertilizers (PSB, Rhizobium and others).
Lack of efficient utilization of water resources	<ol style="list-style-type: none"> 1. Efficient utilization of groundwater resources in potential areas 2. Promoting efficient soil and moisture conservation techniques 	<ol style="list-style-type: none"> 1. Promoting bore well irrigation in potential groundwater areas; 2. Promoting live saving (protective irrigation) concept; 3. Conservation furrow technique for moisture conservation; 4. Deep ploughing by sub-soilers for increased rain water infiltration; 5. Promoting micro-irrigation techniques.
Lack of improved mechanization & inputs	<ol style="list-style-type: none"> 1. Increasing efficiency in production by reducing manpower requirement. 	<ol style="list-style-type: none"> 1. Establishing Custom Hiring Centres for timely availability of implements and machinery to ensure timely operations.
Low skill upgradation & poor access to technology and market information	<ol style="list-style-type: none"> 1. Skill development through training and capacity building programs; 2. Technology know-how and dissemination of technology; 3. Ensuring women's participation. 	<ol style="list-style-type: none"> 1. Imparting need-based trainings and skills on seed production, crop water budgeting for both groundwater and surface water etc.; 2. Promotion of local market and linkage with national / other markets; 3. Exposure visits and Kisan Melas / Farmers' Field Days.

1.9 Fishery

The state government plans to develop the fisheries sector with a multi-pronged strategy. The objectives include: increase of fish production and ensure sustainable development, development of fisheries value chain and boost exports, promote investment to create infrastructure, promote welfare of fishers, and set up institutions to build skills.

The long coastline of 480 km with continental shelf area of 24,000 sq. km along the Bay of Bengal reflects the rich potential of inland, brackish water and marine fishery resources in the State of Odisha. The sector plays a significant role in uplifting economically the poor fisherman community in terms of income and employment generation. The State is interested to double the inland fish production and triple the present level of fish export using a promising policy framework and relevant development schemes.

The inland fisheries can be classified broadly into two categories:

- Fresh water fisheries and
- Brackish water fisheries.

Fish Farmer's Development Agency (FFDA) is a Centrally Sponsored Scheme and implemented in all the 30 (thirty) districts of Odisha for promotion of pisciculture and providing technical and logistic support to fish farmers. By the end of 2016-17, about 71,036 ha of tank area has been developed and 60,341 fish farmers were trained through these agencies. Further, 2624 fish farmers received benefits under this scheme.

In order to meet the growing demand for quality fish seed in the State, greater emphasis has been given for production of quality fish seed in 23 departmental hatcheries, 19 departmental farms (FFDA), 20 OPDC farms, 5 hatcheries of Odisha Pisciculture Development Corporation, and 86 hatcheries in the private sector. About 75.73 crore quality fries have been produced and sold to pisciculturists for stocking in their tanks during 2016-17.

The State Reservoir Fishery Policy has been formulated with a view to introducing scientific and remunerative pisciculture in reservoirs. The policy aims to attract private sector investment for augmentation of fish production from the vast untapped/ under tapped reservoir resources. It permits the transfer of reservoirs having an area of 100 acres and above to the Fisheries and Animal Resources Department, Government of Odisha. The F&ARD Department has been empowered to lease out these reservoirs to Primary Fishermen Co-operative Societies registered under the Odisha Self-Help Co-operative Act 2001. Preference will be given to displaced persons/ project affected persons under the policy.

Odisha has 6 percent of the coastline and 4.7 percent of the continental shelf area of the country. Among six coastal districts, Puri has the longest coastline of 155 km and Bhadrak the shortest with 50 km. About 153.10 TMT of fish were caught from marine sector during 2016-17, of which prawn, catfish and Pomfret are some of the important species. The State has 73 marine fish landing centres. Odisha Maritime Fishing Regulation Act has been implemented in the State to safeguard the coastal water areas of the State. Registration/renewal of trawler licenses and conservation of endangered species of fish and turtles are being taken up. Odisha has the highest number of 813 fishing villages among the coastal States. There were 1,164 Primary Fishermen Co-operative Societies in the State during 2015-16 consisting of 1, 38,341 members.

New Initiatives for Fisheries Development

- Modern hygienic pre-fabricated fish retail kiosks named 'Chilika Fresh' have been set up at 3 localities in Bhubaneswar where varieties of fresh water, brackish water and marine fish with crab and lobsters are being sold. Another 26 retail outlets will be opened in PPP mode within the BMC locality.
- A new Odisha Fisheries Policy, 2015 has been put in place with the objective of increasing the production of fish from inland brackish water and marine resources.

Table 23: Fresh Water Fish Production from Different Sources in Odisha (In 000'MT)

Year	Tanks/Ponds	Reservoirs	Lakes/Swamps/Ponds	Rivers/Canals	Total
2011-12	211.19	13.73	1.94	10.61	237.47
2012-13	230.43	18.57	2.41	10.51	261.92
2013-14	230.94	18.94	2.8	11.18	263.86
2014-15	261.85	21.83	2.94	14.34	300.96
2015-16	289.67	22.67	4.25	19.54	336.22
2016-17	331.18	30.07	4.88	27.59	393.73

Source: Directorate of Fisheries, Odisha

The source-wise fresh water fish production from 2011-12 to 2016-17 is given in the above table. It can be seen that from 2011 to 2017 there is an increase in the trend of fresh water fish production from different sources. This may be due to implementation of Odisha Fishery Policy, 2015.

Table 24: Production and Per Capita Fish Consumption in Odisha (in MT)

Year	Fresh Water	Brackish Water	Total Inland	Marine	Total	Annual Per Capita Consumption (Kg)
2000-01	125114	13442	138556	121086	259642	7.71
2001-02	147400	20660	168060	113893	281953	8.14
2002-03	154237	19964	174201	115009	289210	8.28
2003-04	165594	24477	190071	116880	306951	8.35
2004-05	170091	23776	193867	121929	315796	8.72
2005-06	179740	23495	203235	122214	325449	9.05
2006-07	191632	22951	214583	128141	342724	8.99
2007-08	195747	22969	218716	130767	349483	9.29
2008-09	213003	26332	239335	135487	374822	13.27
2009-10	215803	25508	241311	129332	370643	10.86
2010-11	224956	27750	252706	133479	386185	9.42
2011-12	237470	30062	267532	114296	381828	9.91
2012-13	261920	29910	291830	118310	410140	9.13
2013-14	263860	30010	293870	120020	413890	9.66
2014-15	300960	35370	336330	133210	469540	11.06
2015-16	336220	40310	376530	144750	521280	12.24
2016-17	393720	61270	454990	153110	608100	13.49

Source: Directorate of Fisheries, Odisha

The total fish production of the State during 2016-17 was 6.08 lakh MTs which is an all-time record in Odisha. The State ranks 10th in terms of production of fish and produced 4.50 percent of the total fish production in the country during 2014-15. During 2016 -17, Odisha produced 608.10 TMT of fish of which 455.00 TMT came from inland sources and 153.11 TMT from marine sources. The inland fish production included 393.72 TMT from fresh waters and 61.27 TMT from brackish waters. The value of fish production in the State has increased by 24.42 percent over 2015-16. The value of inland fish increased by 33.98 percent whereas marine fish value declined by 5.34 percent over the year 2014-15. The year 2015-16 and 2016-17 observed a remarkable growth in fish production (freshwater, brackish and marine) as well as in per capita fish consumption. The per capita fish consumption in the State is also showing an increasing trend from 8.70 Kg. during 2004-05 to 13.49 Kg. during 2016-17 as against 11 kg recommended by the WHO. This indicates an improvement of the standard of living and change in dietary pattern of the people of Odisha.

Table 25: Fresh Water Fish Production in Odisha (in MT)

Year	Tanks / Ponds	Reservoirs	Lakes/Swamps	Rivers/Canals	Total
2000-01	92439	8012	2733	21930	125114
2001-02	112845	7094	3997	23464	147400
2002-03	119795	8504	2668	23270	154237
2003-04	133617	10145	2756	19076	165594
2004-05	140459	11528	1791	16313	170091
2005-06	153449	10754	2335	13202	179740
2006-07	164740	12098	2434	12359	191631
2007-08	169638	12449	1544	12116	195747
2008-09	185404	12527	1599	13473	213003

Year	Tanks / Ponds	Reservoirs	Lakes/Swamps	Rivers/Canals	Total
2009-10	190372	12325	1853	11252	215802
2010-11	197589	14608	1651	11108	224956
2011-12	211189	13730	1945	10606	237470
2012-13	230430	18570	2410	10510	261920
2013-14	230940	18940	2800	11180	263860
2014-15	261850	21830	2940	14340	300960
2015-16	289670	22670	4250	19540	336220

Source: Directorate of Fisheries, Odisha

The fresh water fisheries area comprises of 1,31,743 ha of small and big tanks and ponds, 2,00,379 ha of small (area above 10 hectare) medium and large reservoirs, 1,80,000 ha of fresh water lakes, swamps, and ponds and 1,71,186 ha water area of rivers and canals. Similarly, the brackish water area comprises of 79,000 ha of Chilika Lake, 297,850 ha of estuaries, 32,587 ha of brackish water tanks and 8,100 ha of backwater. Different ongoing schemes like production of quality spawn, development of reservoir fisheries and development of highland fisheries are being implemented through FFDAs. During 2016-17, for development of highland fisheries in the State, an amount of Rs. 511.00 lakh was spent for training and subsidy by the Government of India and the State Government.

1.10 Animal Husbandry

Animal Husbandry is related with sustained employment, Income Generating Activities (IGA) and livelihoods of rural people, farming communities in particular. It is seen that about 85 percent of livestock is owned by the landless, marginal and small landholding families. Livestock has a significant role in deciding source of nutrition based diet in the form of milk, egg and meat. Odisha ranks 11th among Indian States in egg production, 13th in meat production and 16th in terms of production of milk as per Basic Animal Husbandry Statistics, 2016,. Odisha contributes about 4.05 percent of total livestock population in the country compared to the highest 13.42 percent in Uttar Pradesh, 11.27 percent in Rajasthan and 10.96 percent in Andhra Pradesh as per livestock census 2012.

Table 26: Animal Population in Project Districts (19th Livestock Census- 2012)

Districts	Cattle		Buffalo	Sheep		Goat	Pig		Poultry
	Indigenous	Cross Bred		Indigenous	Cross Bred		Indigenous	Cross Bred	
Balasore	728340	36580	3937	2394	114	382007	4279	19	1099995
Bargarh	194733	135920	18988	58370	264	162631	3666	4	441685
Bhadrak	485138	27879	4932	1820	125	144109	434	0	483522
Bolangir	293642	67421	41171	90588	1105	256173	948	25	1296488
Boudh	163586	13566	17411	83987	183	101660	283	0	107953
Gajapati	166207	17014	10487	11679	783	109369	8186	8	214822
Ganjam	569462	20108	64428	156078	272	227049	5578	147	1075489
Jajpur	486933	16637	5332	13155	53	181488	2230	124	266008
Kalahandi	277240	33635	43765	79824	115	216924	3724	3	584055
Kandhamal	330559	2307	59628	8053	49	247960	33742	224	385997
Keonjhar	600858	34386	13674	90387	716	544658	9737	140	1241984
Mayurbhanj	791637	39630	14185	290532	621	1132412	23791	904	2654496
Nabarangpur	380251	13895	42316	87512	69	61184	9651	183	478800
Nuapara	192737	5445	23965	32739	0	77631	543	32	278447
Subarnapur	122316	42745	10388	52400	387	95340	1314	13	150066
Odisha	10315499	1305773	726306	1570523	10606	6513087	276052	4264	19890538

Source: Directorate of Animal Husbandry and Veterinary Services, Odisha

District Mayurbhanj ranks first in terms of highest cattle population, highest goat population, highest sheep population as well as the highest poultry population and it also ranks second in pig population. District Kandhamal ranks first in total pig population. District Ganjam is having the highest number of buffalo population and district Balasore the least buffalo population. From the Annexure, it is seen that Odisha had 207.33 lakh livestock population and 198.91 lakh poultry in 2012. The other area of concern is the declining trend of Livestock population in the State since 2003. The State Livestock

population depleted at a faster rate of 10 percent between 2007 and 2012 as compared to 3.3 percent fall at all India level. Only goat population of Odisha increased during the period.

Table 27: Animal Health Care in Project Districts

Name of the District	No. of Hospitals and Dispensaries (2016-17)	No. of Livestock Aid Centres (2016-17)	Name of the District	No. of Hospitals and Dispensaries (2016-17)	No. of Livestock Aid Centres (2016-17)
Balasore	21	129	Kalahandi	21	125
Bargarh	19	123	Kandhamal	20	62
Bhadrak	13	87	Keonjhar	22	122
Bolangir	21	185	Mayurbhanj	42	186
Boudh	7	53	Nabarangpur	17	71
Gajapati	11	47	Nuapara	8	53
Ganjam	38	244	Subarnapur	10	47
Jajpur	18	112	Odisha (Total)	541	2985

Source: Directorate of Animal Husbandry and Veterinary Services, Odisha

From the above table, district Mayurbhanj and district Ganjam are having the maximum number of hospitals and dispensaries. These two districts also have maximum number of livestock aid centers. Apart from these two districts; Balasore, Bargarh, Bolangir, Kalahandi and Keonjhar also have good number of hospitals, dispensaries as well as livestock aid centers.

Table 28: Production of Milk, Egg and Meat in Project Districts

Name of the Districts	Production (2016-17)		
	Milk ('000 MT)	Egg (Lakh No.)	Meat (T.M.T) (Except Poultry)
Balasore	162.03	954.6	4.58
Bargarh	79.49	581.8	3.35
Bhadrak	45.29	190	3.47
Bolangir	79.33	2202.5	2.75
Boudh	24.37	146.9	0.63
Gajapati	33.96	248.5	1.75
Ganjam	120.77	4853.7	6.17
Jajpur	102.28	204	4.66
Kalahandi	54.61	798.5	1.56
Kandhamal	26.58	152	2.46
Keonjhar	42.38	283.3	4.13
Mayurbhanj	95.77	1575.6	3.97
Nabarangpur	24.4	136.8	1.79
Nuapara	33.23	144	0.82
Subarnapur	36.4	289.3	1.03
Odisha Total	2002.22	19744.2	94.17

Source: Directorate of Animal Husbandry and Veterinary Services, Odisha

District Ganjam shows the good production of milk, egg and meat as compared to the above districts. Balasore also produces good amount of milk. Apart from Ganjam, Bolangir have good number of egg production and district Jajpur have good production of meat.

Table 29: Trend in Production of Milk, Meat and Egg in Odisha

Year	Production of milk (thousand MT)	Per capita Availability of Milk (gm/day)	Production of meat (thousand MT)	Per capita Availability of meat (Kg./annum)	Production of eggs (in millions)	Per capita Availability of eggs (no/annum)
2010-11	1670.00	109	138.00	3.29	2357.10	56
2011-12	1718.00	11	138.00	3.29	2300.70	55
2012-13	1784.00	113	141.83	3.29	2322.90	54
2013-14	1861.00	117	153.82	3.52	2360.90	54
2014-15	1903.00	118	162.50	3.66	1924.50	43
2015-16	1938.00	118	167.00	3.71	1927.30	43

Year	Production of milk (thousand MT)	Per capita Availability of Milk (gm/day)	Production of meat (thousand MT)	Per capita Availability of meat (Kg. /annum)	Production of eggs (in millions)	Per capita Availability of eggs (no/annum)
2016-17	2002.00	120	176.00	3.86	1974.47	46

Source: Directorate of Animal Husbandry and Veterinary Services, Odisha

In the year 2014-15 and 2015-16, the production of milk and per capita availability of milk was almost same. As noted above, the production of milk and per capita availability of milk shows an increasing trend from 2010-11. Similarly, the production of meat and per capita availability of meat was almost same from 2010-11 to 2012-13 and then it started increasing from 2013-14. The production of eggs and per capita availability of eggs was high in 2010-11, it remained almost same during 2012-12 to 2013-14 and then it started decreasing from 2014-15.

1.11 Agri-Business

Government of Odisha had adopted an Agricultural policy for the State in the year 2013 for bringing commercialization in the field of Agriculture. The objectives, as stipulated in the policy are;

1. To bring in a shift from the present level of subsistence agriculture to a profitable commercial agriculture;
2. To promote sustainable agricultural development;
3. To enhance productivity of important crops by enhancing seed replacement, availability of quality planting materials, INM, IPM, water management, farm mechanization and technology transfer;
4. To encourage crop substitution particularly in uplands and medium lands;
5. To focus on horticultural crops including dry-land horticulture;
6. To focus on poultry, dairy and fisheries to augment the income of the farmers;
7. To encourage modern farming system approach;
8. To encourage organic farming;
9. To enhance water use efficiency through peoples' participation;
10. To facilitate increased long-term investment in agricultural sectors (on farm as well as off farm) both by private sector, public sector and private & public partnership (PPP), particularly for post-harvest management, marketing, agro-processing and value addition, etc;
11. To encourage contract as well as compact farming;
12. To increase access to credit for small and marginal farmers;
13. To facilitate appropriate market linkages for agricultural produce with respect to which the State has competitive advantages;
14. To improve the marketing facilities and access to market information;
15. To implement integrated watershed development programs in watershed areas for Natural Resource Management (NRM), increased crop production as well as on-farm and non-farm income;
16. To create appropriate institutions / facilities to undertake regulatory, enforcement and quality assurance activities matching to the emergent needs.
17. To redefine the roles and responsibilities of the agricultural extension machinery by suitably restructuring the field extension set up.

The agriculture policy,2013 has exclusive provisions for agri-enterprise promotion such as (1) technical guidance to entrepreneurs in commercial agriculture, horticulture, floriculture, milk production, meat and egg production, fish production etc., (2) enhancement in capital investment subsidy to 40.0 percent or 50.0 lakh, (3) additional incentive to SC / ST / Women entrepreneurs, (4) establishment of agro industrial estates, (5) Interest subsidy on term loans will be provided to the agro

enterprisers. Initially an interest subsidy of maximum Rs. 25 lakhs per unit will be provided subject to a ceiling that the subsidy should not exceed 5% for a period of 7 years. For SHGs/ Scheduled Castes/ Scheduled Tribes and women entrepreneurs, the ceiling may be fixed at Rs. 33 lakhs, (6) Removing VAT levied on the agricultural processing projects, (7) financial assistance up to 50 per cent of the cost incurred for obtaining quality certification mark from an institute organized by the State Government or Central Government, subject to a ceiling of Rs. 5 lakhs (for small scale and tiny agro industrial units).

For agricultural marketing, the policy has specific prescriptions such as;

1. Formation of Rural Producers' Organizations for specific commodities to enable them to have appropriate market linkages through Federations;
2. Upgradation of Cotton Mandis for providing cotton farmers good infrastructural facilities for selling their produce at remunerative prices;
3. Establishing Market Yards under the RMCs covering all the 118 Blocks in the State which do not have Market Yards so far;
4. Physical linkage of production centres to the markets by rural link roads in a phased manner to ensure that the farmers' produce can reach the markets.
5. Marketing facilities for horticultural produce: Terminal Markets (TM) for an alternative marketing structure that provides multiple choices to farmers for sale of produce. The Terminal Market Complex (TMC) would operate on a Hub-and-Spoke Format wherein the Terminal Market (the Hub) would be linked to a number of Collection Centres (the spokes).
6. Facilities for cleaning and drying, grading, weighing and bagging will be provided at Market Yards / Sub-Market Yards/Temporary Procurement Centres engaged in paddy procurement.
7. Production of high value crops will be provided with scope for various subsidies, grants and other concessions including financial support with low interest rates and other attractive opportunity for speeding up commercialization of agriculture through agri-entrepreneurs and agri-business.
8. Setting-up of quality control and testing systems to ensure consistently high quality of the products for domestic markets as well as for export.
9. Establishment of Agri-export Zones (AEZs) in PPP mode for agricultural and horticultural produce having export potential.
10. Products as per the geographical indicators will be promoted and facilities shall be provided with emphasis on networking for quality assurance, packaging and branding in order to increase agricultural exports as per the international standards/norms and facilities for patenting of technologies will be ensured
11. Minimum Support Price (MSP) mechanisms will be implemented effectively across the state so as to ensure remunerative prices for the farm produce.
12. Effective linkages will be promoted with other rural infrastructure development programmes

Further, Odisha Food Processing Policy, 2016 is having the vision "to catalyse the development of competitive Food Processing Industry by facilitating creation of an enabling environment and related

infrastructure for sustainable, equitable and inclusive growth of the sector with a view to add value & reduce wastage and thereby maximizing employment opportunity and increase income of farmers”. The policy specifies the objectives and strategy in the following manner.

Table 30: Objective and Strategy for Food Processing

S N	Objective	Strategy
1	To encourage & enable local entrepreneurs to set up Food Processing enterprises.	<ol style="list-style-type: none"> To create awareness and organise food processing specific entrepreneurship development programmes; To depute the identified potential food processing entrepreneurs for higher learning;
2	To increase the flow of private sector investments across the value chain from farm gate to market.	To organize Road shows / Investors' Meets at strategic locations and participate in Fairs / Summits in the country & overseas.
3	To provide enabling infrastructure by promoting establishment of Food Processing Parks and common facilities in terms of warehouses, cold storages, laboratories, packaging.	<ol style="list-style-type: none"> To set up Food Processing Parks at Deogarh, Bhadrak, Bargarh, Nawrangpur (Maize Park), Sambalpur, Ganjam, Bolangir, Kandhamal and Kalahandi; To facilitate & monitor establishment of Mega Food Parks (under development) at Deras (Khordha) by IDCO & Rayagada by MITS; To facilitate development of common infrastructure near the existing food processing clusters.
4	To encourage value addition, increase shelf-life & reduce wastage, thereby increasing employment and income to the local farmers and entrepreneurs.	<ol style="list-style-type: none"> To provide fiscal & non-fiscal incentives to encourage value addition; To facilitate flow of credit from Banks / NABARD / FIs to the existing & upcoming Agro & Food Processing enterprises; To promote setting up of Cold Chains, Cold Storages & Primary Processing Centres.
5	To support capacity building in terms of skilling of Human Resource required by the Food Processing Industry.	<ol style="list-style-type: none"> To organize need based skill development programmes with the assistance from Odisha Skill Development Authority, Director, Employment & Director, Technical Education & Training.
6	To promote product/process innovation, research and development and encourage technology up-gradation.	<ol style="list-style-type: none"> To provide fiscal incentives to the technical / professional institutions and existing entrepreneurs to promote product / process innovations and R&D; To facilitate assistance to the enterprises from the existing GoI schemes; To provide incentives to encourage technology up-gradation / modernization.
7	To enhance competitiveness of the local food processing industry for both domestic and international markets.	To encourage the enterprises to obtain quality certification from accredited bodies at national & international level.

The Operational Guidelines of Integrated Scheme for Agricultural Marketing (ISAM), Ministry of Agriculture, 2014 have five sub schemes, i.e., (a) Agricultural Marketing Infrastructure (AMI), (b) Marketing Research and Information Network (MRIN) (c) Strengthening of Agmark Grading Facilities (SAGF), (d) Agri-Business Development (ABD) through Venture Capital Assistance (VCA) and Project Development Facility (PDF), and (e) Choudhary Charan Singh National Institute of Agriculture Marketing (NIAM). The objectives of ISAM are;

1. To promote creation of agricultural marketing infrastructure by providing backend subsidy support to State, cooperative and private sector investments.
2. To promote creation of scientific storage capacity and to promote pledge financing to increase farmers' income.
3. To promote Integrated Value Chains (confined up to the stage of primary processing only) to provide vertical integration of farmers with primary processors.
4. To use ICT as a vehicle of extension to sensitize and orient farmers to respond to new challenges in agricultural marketing.
5. To establish a nation-wide information network system for speedy collection and dissemination of market information and data on arrivals and prices for its efficient and timely utilization by farmers and other stake holders
6. To support framing of grade standards and quality certification of agricultural commodities to help farmers get better and remunerative prices for their graded produce.
7. To catalyse private investment in setting up of agribusiness projects and thereby provide assured market to producers and strengthen backward linkages of agri-business projects with producers and their groups.
8. To undertake and promote training, research, education, extension and consultancy in the agri marketing sector.

1.12 Status of MIPs and Tank Management

The State is having 4.152 number of MIPs of which 67.85 percent MIPs are in project districts. Distribution of tanks by its classification in project districts (all 15 project districts) reflects that 60.31 percent MIPs are completed and operational (State: 59.27 percent), 17.89 percent are partially derelict (State: 17.17 percent) and 6.28 percent are completely derelict (State: 7.73 percent). The total MIPs in the project districts are having a designed ayacut of 3.76 Lakh ha. and certified ayacut of 2.78 lakh ha. in Kharif. Designed Rabi Ayacut is about 0.47 lakh ha. and certified Rabi Ayacut is 0.16 lakh ha. Designed Rabi Ayacut is 12.51 percent of the designed Kharif Ayacut and 5.82 percent of the certified Ayacut. Overall, certified ayacut is Kharif is 73.97 percent of the designed ayacut for Kharif (State: 70.46 percent) and certified Rabi Ayacut is 34.39 percent of the designed ayacut for Rabi (State: 31.25 percent). Further, total designed ayacut of the project districts is 62.83 percent of the designed ayacut under MIPs of the State in Kharif and 56.76 percent in Rabi. Certified Ayacut area in Kharif is 65.95 percent of the total certified ayacut area of the State in Kharif and 62.46 percent in Rabi⁵ (refer Table 31).

Table 31: Minor Irrigation Tanks in Project Districts

Project Districts	Number of MIPs							Total of all MIPs (Ayacut in Ha.)			
	CO	PD	CD	RP	OP	TS	Total	Designed Ayacut in ha.		Certified Ayacut in ha.	
								Kharif	Rabi	Kharif	Rabi
Balangir	99	28	4	34	34	2	201	28,028.00	3,301.00	18,162.25	1,838.19
Balasore	48	1	1	1	1	0	52	10,457.00	3,198.00	8,350.38	2,024.57
Baragarh	98	42	12	22	30	0	204	31,989.00	3,572.00	19,464.66	1,092.37
Bhadrak	14	0	0	1	0	0	15	2,606.00	860	2,548.48	214.5
Boudh	56	4	6	1	7	0	74	15,567.00	1,649.00	13,728.58	557.29
Gajapati	88	52	3	3	8	0	154	22,556.00	2,724.00	15,771.70	-
Ganjam	773	196	76	108	28	0	1,181	1,17,604.25	7,659.00	94,897.88	-
Jajpur	49	31	42	1	10	0	133	15,169.00	2,428.00	6,159.76	491.4

⁵With reference to MI Census 2015, Department of Water Resources, Govt. of Odisha

Project Districts	Number of MIPs							Total of all MIPs (Ayacut in Ha.)			
	CO	PD	CD	RP	OP	TS	Total	Designed Ayacut in ha.		Certified Ayacut in ha.	
	Kharif		Rabi		Kharif		Rabi				
Kalahandi	100	28	1	5	39	0	173	28,563.00	4,827.00	22,872.00	4,796.00
Kandhamal	50	1	1	1	6	0	59	9,424.00	3,423.00	5,885.49	507.17
Keonjhar	118	7	9	4	19	1	158	27,876.00	5,535.30	22,411.09	2,551.02
Mayurbhanj	119	73	20	5	22	0	239	36,005.70	3,942.00	28,492.74	684.99
Nabaranagpur	28	14	1	0	30	0	73	11,203.30	861	5,678.35	158.72
Nuapada	34	2	0	0	7	0	43	11,205.00	2,756.00	8,075.29	1,169.00
Subarnapur	25	25	1	0	7	0	58	7,449.00	266	5,390.40	76.85
Total	1,699	504	177	186	248	3	2,817	3,75,702.25	47,001.30	2,77,889.05	16,162.07
Odisha Total	2,461	713	321	276	361	20	4,152	5,98,011.54	82,803.44	4,21,368.57	25,877.53

Source: MI Census, 2015, Department of Water Resources, Govt. of Odisha

Note: CO: Completed & Operational, PD: Partially Derelict, CD: Complete Derelict, RP: Renovation under Progress, OP: Ongoing Project (New), TS: Technically Sanctioned Project

It is evident that the irrigation potential of the MIPs is much less in Rabi (5.82 percent of the certified Ayacut of Kharif) in comparison to Kharif. Further certified ayacut for Rabi is 65.61 percent less than the design Ayacut for Rabi. So, area irrigated in Rabi by these MIPs normally remains low especially when irrigation becomes an utmost necessity for the farmers. In this context, the project envisages to improve the irrigation potential of the MIPs, focusing on meeting the irrigation requirement during Rabi season.

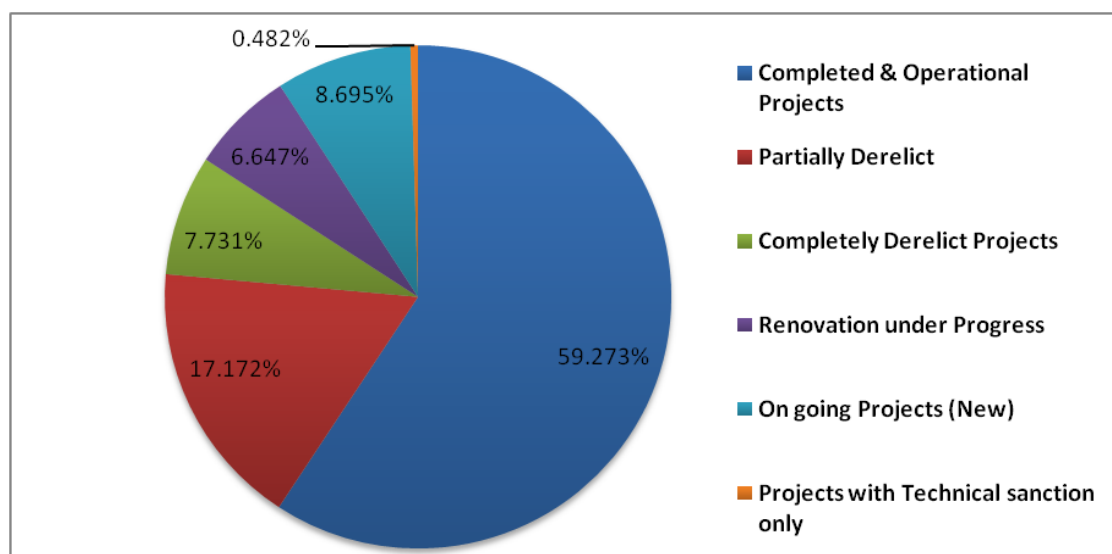


Figure 5: Distribution of MIPs by its Status

Note: Out of 4152 MIP, 145 MIP are considered as Large Dams⁶.

⁶ [As per International Commission on Large Dams (ICOLD) norms Large Dams are defined on the basis of following parameters: (i) Dam Height is more than 15 m or (ii) Dam height is in between 15m with storage of 3Mcum or (iii) Dam Height 10 m to 15 m and length of Dam is either 500m or storage 1Mcum or maximum flood discharge 2000 Cumec or (iv) unusual design or problematic foundation]

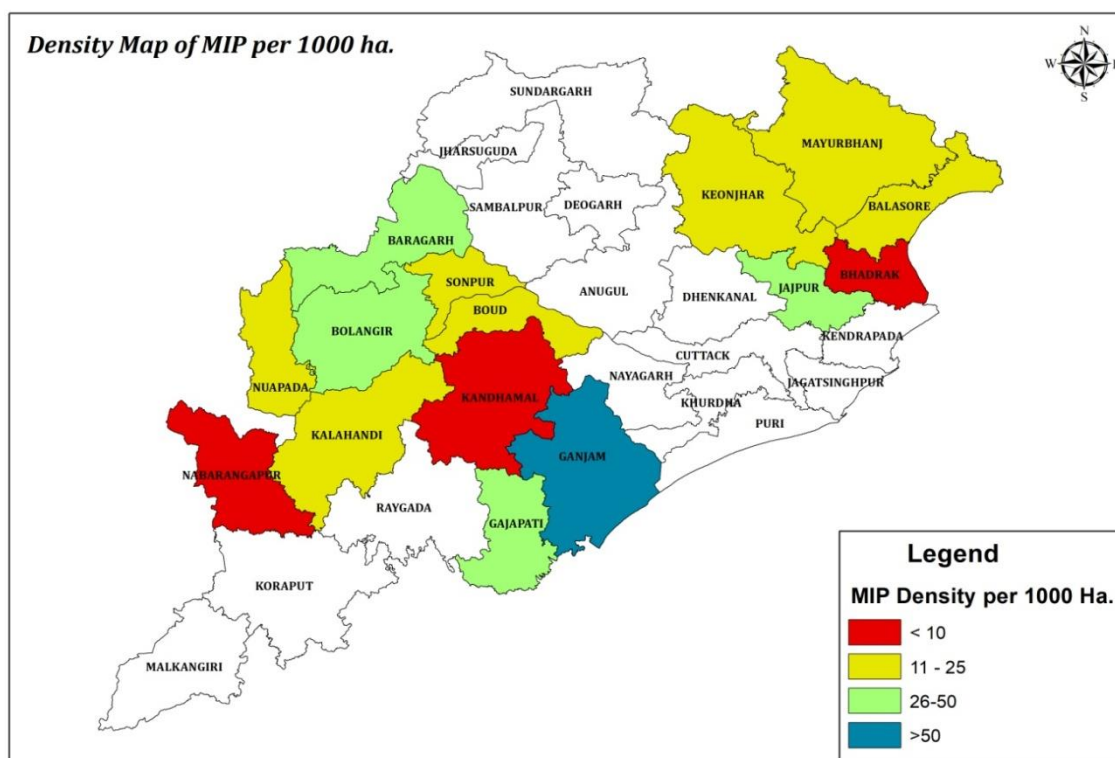


Figure 6: MIPs per Thousand Ha. in Project Districts

Achievement of efficient agricultural operation and the ensuring resilient agrarian economy are identified with the availability of water and its ideal utilisation. In an irrigation system, the Operation and Maintenance (O&M) is the key for availability of irrigation water and its appropriate utilisation by the water users. Tanks, in general, have an important impact on the groundwater resources in their influence zone including the command area. The magnitude of the impact on groundwater potential depends largely upon the volume of the water stored in the tanks for a given period. The recharge varies from tank to tank depending upon the geology, geo-morphology, tank design, storage capacity, etc. Utilization patterns and consumer profiles are also not uniform in all circumstances and are location and region specific. Some tanks, either by design or because of their location in a specific hydro-geological setting, do not show their influence on the aquifer system in the immediate vicinity. The overall efficiency of the tank system depends on the utilization of groundwater resource both in the command and the influence zone of the tank necessitating wise groundwater management in that given unit.

The rapid spread of groundwater irrigation through bore-wells is resulting in a depletion of aquifers. In addition, the decline in tank irrigation and having no recourse to groundwater in the medium term would pose a serious threat to the fragile agricultural economy. Poorer farmers, often found at the tail-end of dilapidated tank systems and lacking resources to access groundwater irrigation amidst low and falling water tables, are the most vulnerable in this scenario.

Reasons for decline in tank irrigation are summarized below:

1. Reduction in inflows to the tank due to
 - i. Insufficient rainfall
 - ii. Upstream abstractions (watershed development and other water harvesting structures)
 - iii. Improper condition of feeder channel
2. Failure of physical system
 - i. Crack in bund

- ii. Improper condition of the bund with unstable side slopes not to standards and non-uniform Top Bank Level (TBL)
 - iii. Poor condition of surplus system which needs repairs to the masonry / concrete structures
 - iv. Inadequate functioning of sluice because of absence of shutters, leakages from shutter or masonry structure
 - v. Reduction in the storage of the tank due to silting, encroachments into the tank bed
3. Poor canal system
- i. Improper design main canal with disfigured cross sections and disturbed bed slope
 - ii. Poor condition of cross masonry and cross drainage structures that increase the distribution losses
 - iii. Improper maintenance of the field channels
4. Poor water use efficiency due to
- i. Mono cropping of water intensive crops like paddy
 - ii. Inequitable distribution of water
 - iii. Improper scheduling of water

The national framework for water resource management is driven by the Pradhan Mantri Krishi Sinchai Yojna (PMKSY). The major objective of PMKSY is to achieve convergence of investments in irrigation at the field level, expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies ('more crop per drop'), enhance recharge of aquifers and introduce sustainable water conservation practices.

Tank Irrigation Systems in Odisha are centuries old. Tank system structures are mostly constructed under the aegis of Kingship (Gadajata system) to support the basic human needs of drinking, bathing, irrigation and especially as a hedging mechanism against drought.

Table 32: Tanks / Ponds in Project Districts, 2013-14

RESOURCES OF TANKS/ POND IN THE STATE UP TO 2013-14 (Area in ha)									
Sl. No.	Districts	GP Tanks		Revenue tanks		Private tanks		Total	
		No	Area	No	Area	No	Area	No	Area
1	Jajpur	1823	835.88	608	205.86	5768	1411.29	8199	2453.03
2	Balasore	3045	1248.76	712	261.31	33202	4678.65	36959	6188.72
3	Bhadrak	2004	533.61	293	101.48	14276	2134.24	16573	2769.33
4	Mayurbhanja	4862	2350.78	1328	4697.75	11725	2446.5	17915	9495.03
5	Boudh	1236	1350.22	150	288.9	972	580.79	2358	2219.91
6	Gajapati	723	1120	145	3698.56	466	175.07	1334	4993.63
7	Ganjam	5949	8365.34	1380	17416	4122	2652.02	11451	28433.33
8	Kalahandi	3730	3938.11	71	1113.51	2686	962.89	6487	6014.51
9	Kandhamal	315	337.07	273	198.15	629	436.76	1217	971.98
10	Nabarangpur	1117	673.01	524	530.61	2652	561.27	4293	1764.89
11	Nuapada	952	655.97	315	1629.77	1436	700.5	2703	2986.24
12	Bolangir	5417	4705.77	61	152.24	923	360.01	6401	5218.02
13	Baragarh	3693	4824.71	122	217.54	3085	1409.99	6900	6452.24
14	Keonjhar	3447	1624.7	788	391.55	7024	1353.88	11259	3370.13
15	Sonepur	2771	3818.09	328	327.22	616	490.24	3715	4635.55
Odisha Total		63292	50309.7	13362	35933.4	162655	37934	239309	124177.2

Source: Disaster Management Plan of Fisheries Department 2014-15, Directorate of Fisheries Odisha, 2014

The State is having 63, 292 of GP Tanks, 13, 362 of Revenue Tanks and 1, 62, 655 of Private Tanks. From the table, it can be observed that the district Balasore has highest number of Private Tanks in the State and it also secures the first rank for having highest number of total tanks. Similarly, districts like Kedrapara, Bhadrak and Puri also have more number of private tanks. More numbers of GP tanks are

present in Ganjam, Kalahandi, Boudh, Gajapati, Bargarh, Jharsuguda, Sambalpur and Sonepur districts. Districts like Ganjam, Mayurbhanj, Kendrapara, Khurda, Cuttack and Balasore have good numbers of Revenue tanks. Balasore is having 15.44% of total tank in the State whereas Kendrapara is having 7.71% of total tank in the State. District Deogarh, Kandhamal and Gajapati have lesser number of total tanks in the whole State.

Table 33: Tanks in the State up to 2014-15

Type of Tanks	Number	Area (Ha)
GP Tank	63292	50309.69
Revenue Tank	13362	35933.42
Private Tank	177729	44990.54
Total	254383	131233.65

Source: Odisha at a Glance, 2016

As noted above, the number of GP Tank and Revenue Tank is remaining the same in 2014-15 but the number of Private Tank has increased to 177,729 in 2014-15 as compared to 162,655 in 2013-14. Also, the area under private tank has increased to 44,990.54 Ha.

Chapter Two: About the Project

Odisha economy which is primarily agrarian, is undergoing rapid transformation. The per capita income of the state has increased by 30 percent between 2012-17 period. However, the most critical sector, agriculture, which is source of livelihood for more than 62 percent of the people, suffers some critical challenges. These include (a) small landholding (b) less diversification (c) erratic monsoon (d) frequent extreme weather events, (e) price realisation of the produced commodities, (f) value addition of agricultural / horticultural commodities etc. To enhance productivity and to address climate variability and change for farm income stability, irrigation and water productivity management play a critical role. A good number of major, medium and minor irrigation projects have been constructed in the state during last six decades, thereby increasing irrigation facilities from 1.83 lakh hectares in 1951 to 38.16 lakh hectares in 2017. However, this has not been able to address the farm distress fully. Further the state government has taken steps to rationalize irrigation development in the state, through convergence of various schemes to provide irrigation facilities to at least 35% of the cultivable land in each block. The state has 314 blocks of which 222 blocks have been covered till 2017.

Government of Odisha, through this proposed Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA), is well-positioned to demonstrate considerable climate co-benefits, as many of its components explicitly address building resilience to current climate variability, and enhancing adaptation and mitigation. GoO believes that market-oriented production system can be a viable and supportive approach to enhance farmer's income, benefiting particularly marginal and small farmers. The crop planning and production system can be designed in the command areas as well as in the non-command areas based on the market demand. It is the reversal of traditional "Production to Marketing" approach to "Demand driven Production" and can benefit the farmers in both enhancing production and marketing. While adopting market-oriented agriculture production system, care is to be taken to address all the three critical components, i.e., (1) bringing Water Use Efficiency (WUE) and Water Productivity (WP), (2) diversification in the present production system and product value addition, and (3) supply chain improvement and its efficient management.

2.1 Guiding Principles

Key **guiding principles** of this project shall be as follows:

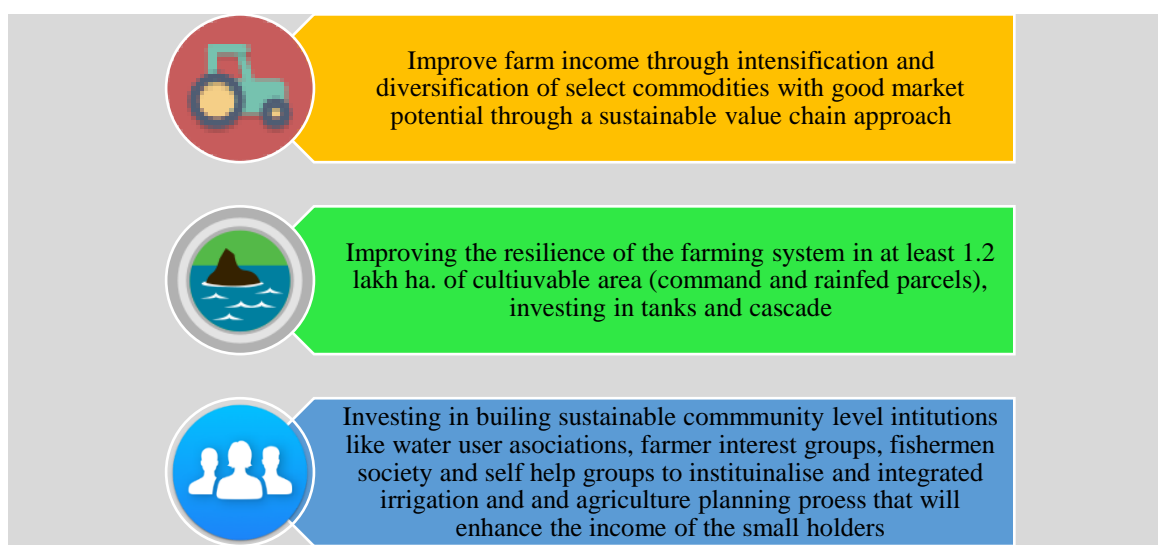


Figure 7 Key guiding principles for the Project

2.2 Project Development Objective

The **Project Development Objective** is to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected districts of Odisha.

2.3 Project Beneficiary

Project beneficiaries include small and marginal farmers, Water Users' Associations (Pani Panchayats), Producer Organizations (POs), and other agri-entrepreneurs (AEs). Targeted investments will be undertaken to address any gender gaps as well as benefit of other vulnerable groups like fisher folk including fisher women, tribal farmers of different holding categories, women self-help groups etc.

2.4 Project Components

The project envisages to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected cascades of Odisha. Further, in order to improve the market share of the produces at producer end, the project intends to promote / strengthen supply chain and value chain of agricultural / horticultural / fisheries produces (feasible commodities only based on scoping study), using Farmer Producer Organizations (FPOs) / Primary Fishers Cooperative Societies (PFCS). Apart from this, the project intends to establish different centres at the OUAT and Agriculture Department to support climate resilience in agriculture and promote agribusiness.



Figure 8: Project Components and Sub-Components

The project has four components to achieve the Project Development Objective (PDO). The project components and sub-components are discussed below.

In addition, there is a **contingent component** for any unforeseen natural disaster which is quite frequent in Odisha and has a probability to affect the state during the project life cycle. This zero-cost, contingent emergency response component (CERC) will finance eligible expenditures in case of natural or man-made crises, disasters, severe economic shocks, or other crises and emergencies in Odisha. Implementation of this subcomponent will follow a detailed Contingent Emergency Response Implementation Plan (CERIP) satisfactory to the World Bank that will be prepared for each eligible crisis.

Component 1: Climate-Smart Intensification and Diversification of Production

The objective of this component is to increase agricultural productivity, strengthen the capacity of organized farmer groups to cope or adapt to climate change stresses affecting crop production, and diversify production in Rabi in response to effective demand as expressed by pre-identified commercial off-takers or gleaned from other reliable market signals. Support under this component is proposed to be organized around two mutually inclusive, overlapping and reinforcing subcomponents.

Sub-Component 1.1: Support to Improved Productivity and Climate Resilience

The objectives of the sub-component in the agriculture sector (agriculture and horticulture) are; (i) Reduce the cost of production; (ii) Enhance productivity and climate resilience through technology adoption; (iii) Crop diversification towards market oriented high value crops and (iv) Promote agribusiness through supply chain management and value chain improvement. In this context, the project plans to take up agriculture and horticulture interventions along with Agri-business interventions. The sub-component objectively looks at promoting agricultural technologies that are sustainable and climate resilient vis-à-vis supports improving income of the farmers.

Specific interventions under the project area, (1) promotion of climate resilient seed varieties, (2) demonstration of climate resilient technologies, (3) strengthening the extension system, (4) Price forecasting of different commodities, (5) establishment of market infrastructures / processing units, (6) organizing and strengthening farmer's groups, and (7) capacity building of different stakeholders. This sub-component will be executed by the Department of Agriculture and Farmers Empowerment (DoA& FE) (the Directorate of Agriculture & Food Production and the Directorate of Horticulture are the implementing agencies for agriculture and horticulture interventions, respectively).

Sub-Component 1.2: Support to Aquaculture Production

The project intends to have an opportunistic approach, in terms of fishery promotion in the project tanks. The project approach is to intervene in providing end to end solution, i.e., from seed production to market linkage where capacity building will be a cross cutting in all the project activities. Based on the feasibility of the tanks, the project will focus on seed promotion augmentation of inland species, improvement of existing hatcheries, fish production and management support and facilitating marketing of the produce by providing facilities to the fishermen folk.

The fishery sector intervention objectively looks at (1) increasing the income of fisher folks by utilizing project tanks / water bodies, (2) propagation of scientific fish farming technologies among the fishers for improved production, (3) strengthening pure line fish seed production and supply chain management, (4) demonstrating intensive and semi-intensive fish farming in the ponds in the project area for higher return to the fishers, (5) strengthening post-harvest management through infrastructure and support to fishers; and (6) support to selected Fishermen Cooperatives and Government Institutions for fishery-based enterprise.

Sub-Component 1.3: Support to Diversification and Produce Marketing

The objective of this sub-component is two-fold: (i) support farmers to reduce the current emphasis on food grains (especially paddy and wheat) and increase the share of high-value agriculture (e.g. fruits, spices and vegetables) in their overall production structure; and (ii) improve produce marketing to reduce price risks associated with diversification, increase incomes, and ensure sustained farmer adoption of Climate Smart Agriculture (CSA) practices. A successful shift in favour of more diversified production would also result into improved nutrition outcomes for farmers and the broader community, help reduce the water footprint of paddy, foster biodiversity, and strengthen resilience of the production systems to climate change.

Under this component, the project would fund Technical Assistance (TA) to the Department of Agriculture and Farmer Empowerment (DAFE) to promote and build productive alliance models for these and other competitive value chains that could emerge during implementation. To support productive alliances, the project will provide funding for (i) increasing farmer awareness of diversification opportunities; (ii) continuous identification of competitive value chains; (iii) farmer experimentation with new crops and training/demonstration of relevant production technologies; (iv) training farmers on production and marketing skills (including on input sourcing, production, aggregation, and new technologies, among others); (v) business plan development; (vi) fostering linkages with the financial sector or other government programs for access to credit; and (vii) financing – on a cost-sharing basis – of selected productive investments identified in the business plans. Project support to crop diversification will be based on agronomic/agro-ecological suitability, comparative advantage of specific cascades, and local, national or international market opportunities.

Component 2: Improving Access to Irrigation and Water Productivity

Access to reliable irrigation is generally critical to enhancing crop productivity, building resilience to climate change, promoting diversification and access to markets. It is important in the targeted project areas that are characterized by frequent droughts and rainfall variability. The objective of this component is “to use water more efficiently, reduce water losses and save water during Kharif season, and transfer these savings to Rabi season.” To realize this objective, the project will support modernization of hydraulic assets, institutional reforms, and capacity strengthening.

Sub-Component 2.1: Support to Water Sector Reforms

Crop diversification and intensification require a higher quality of irrigation service delivery to meet the requirements of grown crops. Traditional arrangements for irrigation management often lack the capacities and incentives to deliver these improved services. The project will pursue institutional reforms and strengthen decentralized irrigation system management along with incentivizing local Pani Panchayats to deliver high performing irrigation and O&M services in a public-private community partnership mode. It will also explore regulatory reform in ground water management.

Under this sub-component (1) project will support the introduction of Integrated Water Resource Management (IWRM) in one catchment on pilot basis, (2)regulation related to ground water extraction for irrigation will be reformed, (3) support the establishment of a PP support unit within the DoWR, (4) conduct a study into options for PPP in irrigation management to increase the efficiency of water use and improve the quality of irrigation service delivery.

Sub-Component 2.2: Support to Investments in Cascades

Under this sub-component, the project will invest in the modernization of hydraulic assets. To that end, a comprehensive water assessment will be conducted in the Project cascades to identify opportunities for reducing water losses and for transferring the savings water for Rabi season. For each of these opportunities, the implications on downstream water use will be identified through preparation of a pre and post-project tank / cascade-wide water balance. Investments include strengthening of canal bunds, modernizing hydraulic canal structures, installation of field channels

and sub-surface pressurized pipes, and developing groundwater extraction in safe zones. Self-practicing tool kit for cascade approach will be developed within 2 years of project cycle.

Component 3: Institutional Capacity Strengthening

The objective of this component is to improve overall capacity of the GoO for inter-departmental planning, coordination and implementation of cross-sectoral programs in agriculture, horticulture, fishery and water resource sectors. In this respect, the project will support in building a secretariat within the office of the Agriculture Production Commissioner (APC) for the purposes of planning, convergence, coordination, oversight, monitoring, analytics, policy formulation, and partnerships building. Besides ensuring better project outcomes, a strengthened office of the APC would help guide the state's long and short-term vision for water and agriculture development, build the state's capacity to deliver programs, and help forge strategic long-term partnerships for improved performance of relevant sectors.

At the district level, the project will finance the establishment, staffing and operation of a Monitoring Cell within the office of the PD-ATMA to be charged with monitoring all activities in the agriculture, fisheries, and water sectors, including those funded under the project. In addition, based on capacity assessment, the project will support capacity building of departmental staff on technical and managerial aspects. Along with this, the project component will also support in strengthening the capacity of the community institutions / organizations, such as Pani Panchayat, Water User Associations, Farmer Producer Organizations, Primary Fishers Cooperative Societies etc.

Component 4: Project Management

This component will strengthen capacities for project management, monitoring and evaluation (M&E) (including, inter alia, the areas of procurement and financial management) through the provision of goods, consultant services, training, and financing of incremental operating costs. This component will also develop a comprehensive management information and data collection and reporting system on key performance outputs and impact indicators through baseline surveys, participatory assessments, mid-term reviews and final evaluations. Staffing of the State Project Monitoring Unit (SPMU) will include a number of technical, financial management, M&E and safeguards (social and environmental) experts. Detailed implementation arrangements will be spelled out in the Project Operational Manual (POM). Regular training of SPMU staff will be organized to strengthen their capacities to implement the project.

Support to Integrated Production System for Strengthening Livelihoods

Small ruminants and poultry are well integrated in to the production system and overall livelihood of rural communities, especially among the landless, small and marginal farmers in Odisha. For the landless, goat rearing and poultry are the essential means of generating livelihood income. Small ruminants and poultry not only contribute to food and nutritional security at the household level, also generate income and employment. They also play a greater role in agricultural waste management. In the context of climate change, Integrated Production and Management System (IPMS) appears to be a promising adaptation package both in drought, flood and disaster-prone/ affected areas. Systematic development of these allied activities not only diversifies the livelihood, also bring resilience in the production system.

In view of the recent cyclonic storm and its impact on the life and livelihood of the people, the project envisages to take up additional measures to support farmers, more particularly marginal and small farmers in the tank command and non-command areas of cyclone affected district/s. In this context, the project will take up two most affected districts, i.e., Puri and Khurdha to improve adaptation ability and strengthen recovery mechanism. The project will take up 15 tanks in Puri and 10 tanks in Khurdha as a part of the intervention. The newly added 25 tanks will be additional to the project jurisdiction or it will be adjusted within the overall scope of intervention of the project.

The project will have specific interventions in these districts from climate change and adaptation perspectives. The interventions will include the followings;

6. Promotion of climate resilient agricultural practices / climate smart technologies in the tank command and non-command areas;
7. Support to fishery activities in the selected tanks, involving fishermen cooperatives (PFCS);
8. Strengthening livelihood of vulnerable farmers (mostly marginal and small farmers) in reestablishing animal husbandry supply chain, focusing on small ruminants and poultry;
9. Supporting farmers with agricultural and horticultural inputs, more particularly with climate resilient seed varieties;
10. Strengthening community level institutions for a greater collaboration with other project interventions.

Promotion of Climate Resilient Agricultural Practices: The project will support the farmers of different holding categories in tank command and non-command areas to adopt climate resilient agricultural technologies and practices. Technology transfer will support the farmers to prevent / minimize the crop loss in climate stress situations in a longer term. The transfer of climate resilient agricultural technologies and practices will be taken up through demonstrations, organizing farmer's field schools, in-situ hand holding and guidance, training and exposure of the farmers.

Fishery Promotion: Feasible tanks will be taken up for fish farming, in collaboration with local PFCS and other government / non-government institutions / organizations. The project will support the fishers in strengthening their fishery activities with the supply of fish seeds, feeds, value addition activities and linking with overall fish supply chain.

Poultry Promotion (including backyard Poultry): Poultry and small ruminants will be promoted in selected tank villages in two project districts (Puri and Khurhadistrict affected by cyclone *Fani*). Promotion and establishment of poultry / small ruminant based supply chain will be taken up in village saturation mode. As a part of inclusive strategy of the project, landless households, women, marginal and small farmers, scheduled caste and scheduled tribe families will be given high priority. While detail modalities of support system will be finalized in the later stage, the project will strategize the intervention in a cluster development approach, exploring PPP mode of operation. Possible convergence approach will be explored with existing schemes / programs / market mechanisms for wider coverage and remunerative return to the growers.

Promotion of Climate Resilient Seed Varieties: Climate resilient seed varieties, developed by OUAT, CRRRI and other institutions will be promoted for adoption in the project areas. The project will support in providing subsidized seeds to the farmers, focusing on marginal and small holders, including women and SC/ST farmers.

Strengthening Community Level People's Institutions: Along with different support provisions, the project will strengthen the community level institutions such as water user associations, producer organisations, farmer interest groups etc. to take up different activities in collaboration and synergy with other line departments and its efficient management. Trainings, exposure and hand holding support will be provided under the project to improve their functioning and service delivery capability.

2.5 Project Design Framework:

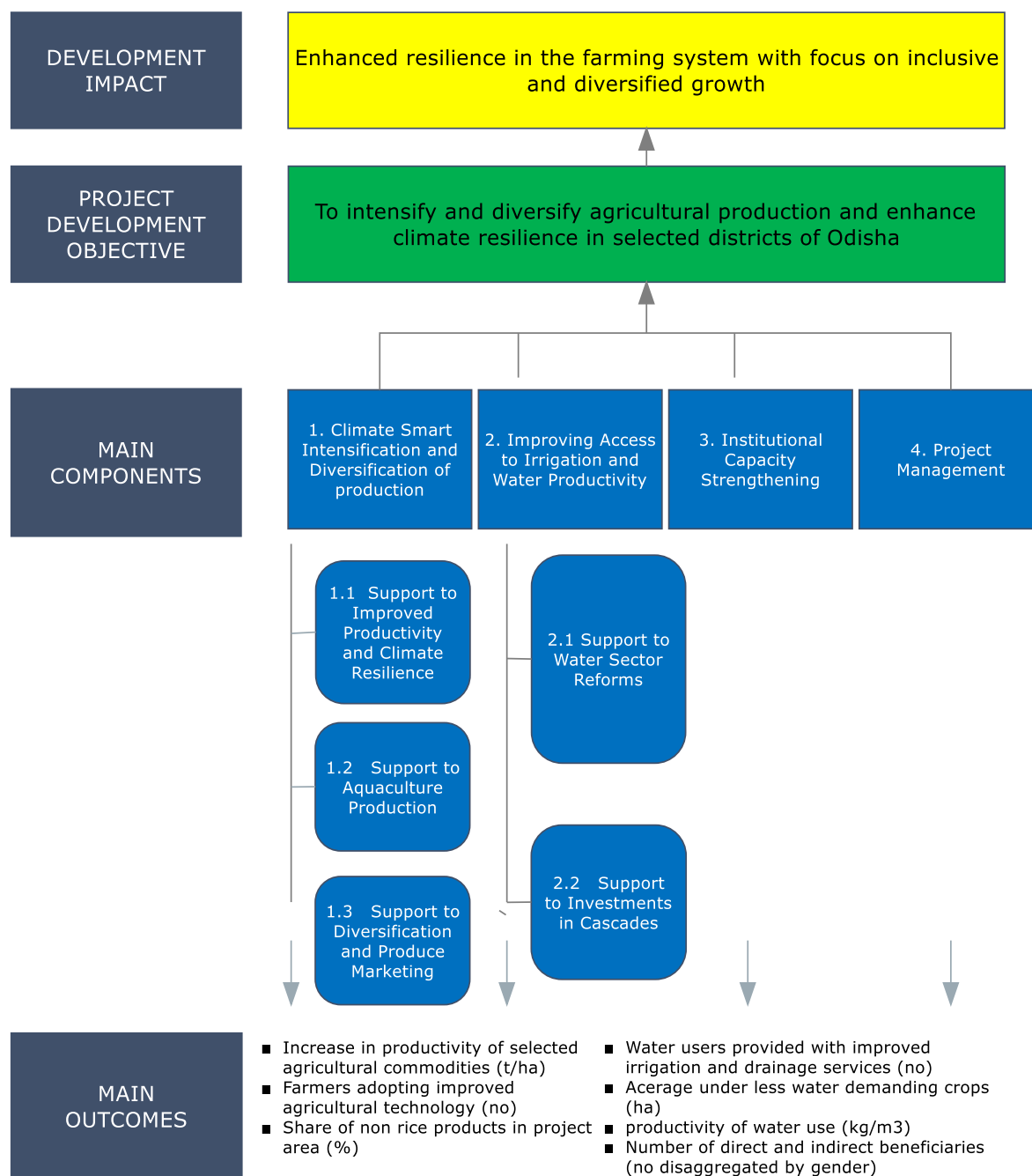


Figure 9: Project Design

2.6 Geographical Coverage

The project will cover 15 districts in the state with intensive focus for agricultural development and increase in the irrigation potentiality. The framed project activities will be implemented over a period of six years in a phased manner. The detailed district wise coverage has been given in Table 34 and Table 35.

Table 34: Coverage of Block, GPs and MI Tanks in Project Districts

SN	Project District	No of Blocks	No of GPs	No of MIP tanks
1	Balangir	10	17	21
2	Balasore	5	6	6
3	Bargarh	4	19	24
4	Bhadrak	5	12	13
5	Boudh	1	8	10
6	Gajapati	1	3	3
7	Ganjam	18	166	251
8	Jajpur	3	3	5
9	Kalahandi	10	30	36
10	Kandhamal	4	6	6
11	Keonjhar	11	39	49
12	Mayurbhanj	20	81	107
13	Nabarangpur	3	3	3
14	Nuapada	2	2	2
15	Subarnpur	1	1	2
Grand Total		98	396	538

Table 35: Designed CCA in Kharif & Rabi in Project Districts

SN	Project Districts	No of MIPs	Designed CCA (Kharif)	Designed CCA (Rabi)
1	Balangir	21	4809	623
2	Balasore	6	456	0
3	Bargarh	24	2226	279
4	Bhadrak	13	1356	60
5	Boudh	10	755	0
6	Gajapati	3	351	121
7	Ganjam	251	18149.7	722
8	Jajpur	5	598	150
9	Kalahandi	36	3555	424
10	Kandhamal	6	452	50
11	Keonjhar	49	12015	3057
12	Mayurbhanj	107	11266	1049
13	Nabarangpur	3	125	8
14	Nuapada	2	86	0
15	Subarnpur	2	94	0
Grand Total		538	56293.7	6543

2.7 Project Implementation Arrangement

The project implementation arrangement has been given below:

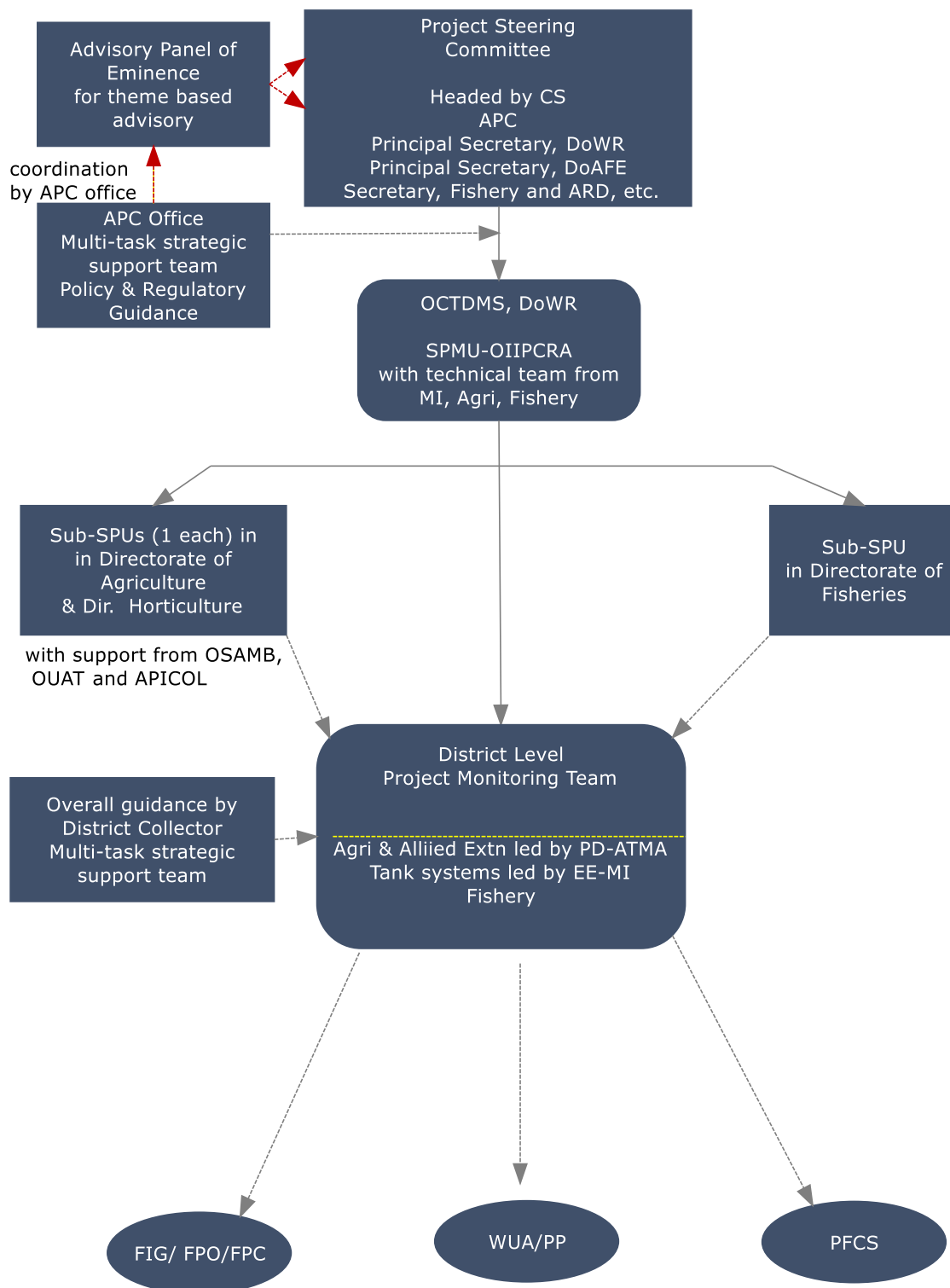


Figure 10 Project Implementation Arrangement

2.8 Project Financing

The total cost of the project estimated to be USD 234.70 million, of which IBRD will finance USD 164.40 million and Government will finance USD 70.30 million of the total cost of the project (refer Table 36).

Table 36: Project Financing

Project Components	Project Cost (USD)	IBRD Financing (USD)	Counterpart Funding
1. Climate Resilient Intensification and Diversification of Production	74.44	52.10	22.30
2. Improving Access to Irrigation and Water Productivity	137.42	96.20	41.20
3. Institutional Capacity Strengthening	9.6	6.70	2.90
4. Project Management	12.83	9.00	3.80
5. Contingent Emergency Response	0.00	0.00	0.00
Total Project Cost	234.30	164.00	70.30
Front end fees	0.40	0.40	
Total financing required	234.70	164.40	70.30

Chapter Three: Component 1: Climate Smart Intensification and Diversification of Production

The overall objective of the Component 1, entitled “**ClimateSmart Intensification and Diversification of Production**” is (i) to intensify production, (ii) strengthen farmers’ capacity to adapt to climate change stresses affecting crop and aquaculture production, and (iii) diversify production, especially in Rabi in response to effective market demand.

Key Guiding Principles for Component 1

1. The project will support transformative agricultural interventions which is directly influenced by the minor irrigation systems, inculcating climate resilient technologies and practices;
2. The project will focus on improving production, productivity and diversification, especially in Rabi season, which has been a challenge in the state;
3. Project will extend cross cutting support to kharif crops, e.g. paddy-based systems in traditionally paddy dominated areas;
4. Bringing feasible minor irrigation tanks under fish farming, involving Primary Fishers Cooperative Societies (PFCS) and demonstrating intensive / semi-intensive pisciculture;
5. All the intervention of this project is aimed at improving the profitability of the farmers by making suitable investments in various parts of the supply chain and supporting agribusiness / agri-enterprise along with commodity specific value addition.

Component 1 has three sub-components, i.e., (1) **Sub-Component 1.1:** Support to Improved Productivity and Climate Resilience; (2) **Sub-Component 1.2:** Support to Aquaculture Production; and (3) **Sub-Component 1.3:** Support to Diversification and Produce Marketing.

Sub-Component 1.1: Broad objectives of the sub-component (Sub-Component A.1: Support to Improved Productivity and Climate Resilience) is “to increase the productivity and production of selected crops in demand vis-a-vis to enhance resilience of agriculture production systems to climate shocks and to reduce the GHG emissions”. This sub-component will support in enhancing farmers’ awareness, access to, and adoption of climate-smart technologies and practices. Under this, capacity of existing extension services will be strengthened through capacity building of frontline staff on CSA and provision of support for demonstration of climate resilient practices for higher order of adoption. With respect to improving farmers’ access to high yielding resilient seed varieties, the project will support in building farmers’ awareness on resilient crop varieties and its adoption.

Sub-Component 1.2: This sub-component (Sub-Component A.2: Support to Aquaculture Production) will enhance the capacity of the fishers, strengthen their cooperatives and improve their income from fishery activities. Broad objectives of the sub-component are; (1) enhancing inland fish production, (2) improving post-harvest management and market linkage, and (3) enhancing the capacity of the fishers, strengthen their cooperatives and improve their income from fishery activities.

Under this sub-component, the project will support in climate resilient aquaculture promotion in rehabilitated tanks, taking advantage of the improved water situation as a result of irrigation modernization and management in the tanks / cascades. This sub-component will target the landless and women who are the members of the fishers’ cooperatives to take up fish production and its value addition. The sub-component will support in fish seed production, fish feed production, fish production, processing and market linkage.

Sub-Component 1.3: This sub-component (Sub-Component A.3: Support to Diversification and Produce marketing) is objectively designed to improve income of the farmers by supporting them to increase the share of high value horticulture crops (vegetables) in their overall production structure. This sub-component will support in improving produce marketing to increase income and reduce price risks associated due to current market mechanism.

The objectives of this sub-component are (i) support farmers to reduce the current emphasis on food grains (especially paddy) and increase the share of high-value agriculture in their overall production structure; and (ii) improve produce marketing to reduce price risks associated with diversification, increase incomes, and ensure sustained farmer adoption of CSA practices. A successful shift in favor of more diversified production would also result into improved nutrition outcomes for farmers and the broader community, help reduce the water footprint of paddy and strengthen resilience of the production systems to climate change. This sub-component will support for market intelligence, post-harvest management and aggregation infrastructure on a cost-sharing basis. In addition, the project will train and strengthen the capacity of the Agri entrepreneurs to provide input and output marketing services. The project will also support and facilitate to link the producers with e-NAM, for accessing national markets.

3.1 Sub-Component 1.1: Support to Improve Productivity and Climate Resilience

3.1.1 Introduction

Paddy is the predominant food crop in the state. The crop is supported with Minimum Support Price (MSP) and farmers are also well versed with its cultivation, hence, farmers prefer to go for paddy cultivation when irrigation is assured. This is one of the major barriers in crop diversification from paddy to other crops in the state. Absence of price support, improper market linkage, lack of storage infrastructure, non-availability of improved high yielding seed varieties of non-paddy crops, etc. are the other reasons attributed to monocropping of paddy. As per the Economic Survey 2018 of Odisha state, the crop diversification index in the state has declined rapidly from 0.740 in 1994-95 to 0.380 in 2010-11 and further to 0.340 in 2014-15. In this context, promoting non-paddy crops based on the market demand appears to be the best option to ensure crop diversification and increase farmer income.

Market led agriculture production is the emerging concept of orientation of agriculture production in response to market (consumer) demand so as to enable the farmer to realize more profits. There is a need to diversify the production to match with the changing consumer preferences. In doing so, the challenge lies with sustaining the increased production in the context of emerging climate change impacts. However, it could be possible with enhancement of crop productivity by adopting climate resilient improved technology and by bringing crop diversification to high value crops in demand. Building the capacities of the farmer is also equally important to achieve the objectives.

In this context, in order to bring resilience in the production system and to increase the income of smallholder farmers in selected project districts in the state, OIIPCRA project proposes to promote market led agriculture production and value chain development, and also linking the farmers to market.

3.1.2 Specific Objectives

The specific objectives of the project in the agriculture sector (agriculture and horticulture) are; (i) Reduce the cost of production; (ii) Enhance productivity and climate resilience through technology adoption; (iii) Crop diversification towards market oriented high value crops and (iv) Promote agribusiness through supply chain management and value chain improvement. In this context, the

project plans to take up agriculture and horticulture interventions along with Agri business interventions. The project component aims to promote the technology that is sustainable and climate resilient vis-à-vis improving farmers' income.

After a detailed market assessment with secondary data, baseline study report, market research¹, in consultation with traders, Dept. of Agriculture, Dept. of Horticulture and also consulting the consultants assisting in the preparation of the project implementation plan, the following crops have been prioritised for investment. This was also reconfirmed by a quick research study on market assessment done for project districts, conducted exclusively for this purpose. The crops proposed for support under the scope of the project area are; **(1) Oilseed (groundnut) (2) Pulses (Black Gram, Green Gram & Bengal gram) (3) Vegetable baskets (cabbage, cauliflower, brinjal, bitter gourd) and (4) Marigold.** These crops are preferred by the farmers due to the existing good market demand (especially groundnut, pulses & marigold), project area feasibility, less water requirement of crops, suitability of cultivation in Rabi season, suitability to grow in rice fallows, selected vegetables being less perishable, and are also well fitted in to the project objective of crop diversification in Rabi, preferably in rice fallows as an alternative to Rabi rice crop. In addition, the project may intervene in some short duration, climate resilient paddy varieties along with the resilient production practices (SRI/DSR).

The intention of restricting the project support to above identified crops is to enable intensive working on the entire value chain of these promising commodities. Focusing on few selected crops ensure creation of bulk of produce that enable to establish sustained market linkages. Such an approach also promotes crop diversification, collective marketing, price realization, assured market, elimination of middle man in markets etc. Further, transfer of technology is also focused and made easy.

3.1.3 Project Approach

The project has the following intervention strategy or approach for core investment:

1. **Enhancement in Cropping Intensity and Crop Diversification:** The target of the project would be to increase the cropping intensity in command area and to some extent adjacent non-command area in the project districts by increasing the Rabi acreage along with crop diversification in Rabi (other than paddy);
2. **Promotion of Climate Resilient Seed Varieties:** Keeping the focus on climate resilient, the project will try to orient farmers to use climate resilient varieties of seeds to address climate variability and change;
3. **Demonstration of Climate Resilient Technologies:** The project will demonstrate climate resilient technologies (e.g. demonstration of climate resilient crop varieties, agronomic practices, cropping systems, direct seeded rice, crop residue management SRI, efficient nutrient & pest management, shade net, poly houses etc.) for the pre-identified sets of commodities, so that the farmers are convinced about their viability and profitability aspects;
4. **Strengthening the Extension System:** There have been issues regarding the effective outreach of the agriculture extension system. The project will work with PD-ATMA in the project districts and organize Farmer Field Schools (FFS) with the technical support of ICRISAT / OUAT / KVKs / technical resource persons etc. The trained farmers of FFS after acquiring knowledge with respect to improved crop management practices may act as local resource persons and local extension agents in disseminating the learned technology. The services of these local farmer resource persons/farmer extension agents may also be extended to educate and motivate the farmers in the neighbor villages;
5. In addition, project will work with OUAT and OSAMB on "price forecasting" and market intelligence aspects;
6. All these activities will be carried out in about 1.2 lakh ha., covering both tank command (about 56,000 ha.) and non-command area (72,000 ha.) in a village saturation model.

The approach to achieve the objectives of the project is by organizing the farmers in to farmer interest groups/producer groups, building their capacity to adopt improved crop production technologies and linking the farmer groups to market and processors.

The primary focus of the project activities is not only to restore the gap command through tank systems improvement but also to improve the adaptive capacity of the farmers to climate variability impacts, along with enhancing productivity, production and economic return to the farmers of the project villages. Such a holistic development is possible by planning agriculture development on a “village-based approach” that include both tank command area as well as non-command area in a village (villages falling under the sub-basin), involving the entire farming community.

The project will be implemented, covering a total registered command area of 56,294 ha and a non-command area of about 72,000 ha. However, the project investments will preferably be made up to the saturation of total command area in project districts (56,294 ha) and the left-over investments will go to the remaining non-command area. For the planning purpose, tank command and non-command area in project districts will be considered as the unit for grounding the agriculture and horticulture interventions under the project. Project planning & implementation modalities are discussed here under.

1. Integrated Irrigation & Agricultural Plan (IIAP) will be prepared by the implementing agency, through a consultancy firm exclusively hired for the purpose and by involving Support Organizations (SOs)/Pani Panchayats (PPs)/FPOs/FIGs and in consultation with the technical institutions like ICAR/SAU/KVKs/IMAGE/DOA/DOH along with the guidance of other expert institutions / agencies;
2. Integrated Irrigation & Agriculture Plan (IIAP) is a comprehensive plan for the entire project period (6 years). A total of 15 consolidated plans will be prepared for 15 project districts, compiling all the tank level IIAPs. The IIAP will be formally approved by a committee headed by Agriculture Production Commissioner (APC). The IIAP will also have a year wise District Annual Action Plan in the plan document, which is also approved by the District Level Project Monitoring Team (DLPMT), chaired by respective district collectors;
3. Apart from IIAP, it is also suggested to prepare an ‘Investment Plan’, exclusively designed for the development of prioritized crops. Investment plans will be prepared after an intensive diagnostic study of the entire value chain of these crops in the project districts. Such a planning will help in analyzing the present crop situation and identify the gaps where the actual project investment is required. Competent Agri Business Support Organization (ABSO) will be hired to prepare district specific “Investment Plan”, exclusively for agribusiness / agri-enterprise promotion. The interventions suggested in the investment plan will be prioritized and the same will be integrated/incorporated with the District Annual Action Plan and approved by respective district collector. Such an approach ensures rational utilization of project funds;
4. The ABSO prepare the investment plan for each prioritized commodity, broadly focusing on gap identification in terms of technology, Infrastructure, marketing and finance;
5. As per the plan of action projected in the District Annual Action Plan, project funds the proposed interventions through ATMA, from there to grassroot level implementers viz., PPs/FIGs/FPOs etc. Project discourages direct funding to individual beneficiary. In case, if such situation arises when it becomes essential to support individual households, the community-based organizations, intern may transfer the fund to identified individual beneficiary;

6. The Directorate of Agriculture and the Directorate of Horticulture are the implementing agencies for agriculture and horticulture interventions, respectively. At the state level, an exclusive Sub Project Management Unit will be established with the Department of Agriculture and Farmer's Empowerment to execute the project;
7. These directorates, along with the farmer organizations (FPOs/ FIGs) and Pani Panchayaths will execute all the activities, including technology demonstrations, training and capacity building of all the key activities, Farmer Field Schools etc. in all the project districts. Services of the ATMA and (or) KVKs are also envisaged in this regard.
8. Agriculture/horticulture interventions are aimed at improving productivity with climate resilient practices, transfer of climate resilient technology and its adoption, improving productivity and bringing in efficiency in irrigation and input management. Skill / capacity building of the farmers in the tank villages will be one of the strategies employed for the realization of the overall objective.
9. Project support is envisaged to organize the farmers for technology transfer purposes (through Farmer Field Schools), frontline demonstration, timely seed distribution, strengthening of knowledge base through provision of advisory services etc., training and capacity building of all the key stake holders.
10. Project also supports piloting of innovative ideas/technologies relevant to the objectives of the component mentioned above.

The project envisages strengthening of technology dissemination and extension services in partnership with research organizations and other public / private institutions, such as ICRISAT, IRRI, ICARDA, ICAR Institutes, OUAT, KVK, ATMA, IMAGE, Seeds Corporation and other reputed NGOs. Project implementation will be built on the experience of these agencies and complementing resources. As project interventions will be implemented keeping resilience as the keystone, there will be substantial inter-departmental coordination between the implementing departments.

The interventions under the sub-component A.1 will be focusing on the following critical areas;

1. Technology transfer through demonstrations to minimize the gap in adoption of climate resilient technologies;
2. Promoting adaptive sustainable agriculture practices / Improved Crop Management practices;
3. Farm mechanization;
4. Crop diversification and cropping system diversification to promote low duty agriculture crops (Irrigated Dry crops) and high value horticulture crops;
5. Promoting efficient water/moisture utilization techniques;
6. Protected cultivation to promote off season vegetables, mushrooms farming etc.;
7. Building the capacity of the farmers in order to harness the potentials and to mitigate the challenges in agriculture / horticulture sectors.

3.1.4 Interventions under Sub-Component 1.1

This sub-component aims at promoting market lead agriculture production by diversifying the crop production system, promoting agricultural practices that are sustainable and climate resilient vis-à-vis supportive in enhancing income of the farmers, especially small and marginal holders through diversification. Broadly, the sub-component looks at (1) technology transfer for sustainable climate resilient agriculture system promotion, (2) increase production per unit of land by adoption of climate

resilient practices/technologies, (3) reducing the cost of production, (4) support in promoting adoption of climate resilient seed varieties, and (5) capacity building of farmers and service providers. In this context, to reach the objective, the project plans to take up interventions in agriculture and horticulture sectors for enhanced resilience to climate variabilities. The interventions are expected to increase productivity and farmer income in both command and non-command areas of the project villages. The intervention will cover the “village as the unit” in a tank cascade system. The project also emphasises equally to pilot and experiment innovative thoughts that fit into the framework of the sub-component objectives. The interventions proposed under sub-component are categorized in to two focused area viz., (a) Agriculture Production Interventions, and (b) Horticulture Development.

3.1.5 Interventions for Agriculture Production Enhancement

The interventions are designed in such a way that, by the end of the project period, agriculture based social capital will be formed with improved knowledge and skills to overcome the limitations in the present extension system, particularly the shortfall of skilled manpower. Further, promoting climate resilient agriculture technology is expected to enhance the productivity and production of agriculture crops and bring the agriculture production system resilient to climate change. Details about the interventions are discussed below;

3.1.5.1 Preparation of Integrated Irrigation and Agriculture Plan (IIAP)

(Cost Table Reference: WR-20 / C4-B)

Water and agriculture together play a greater role in achieving the food sufficiency and poverty elevation. Appropriate allocation of irrigated water is very important to achieve greater efficiency in use of irrigation water and irrigation infrastructure. Further, there is also a need to bring the resilience factor in to the agriculture production system against the climate change and climate variability through appropriate mitigation and adaptation measures in order to sustain the increased production. Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA) is designed to address the constraints in providing assured irrigation as well as increasing efficiency and productivity of current water use, in order to increase the agriculture production in resilience to climate variabilities. Such an integrated approach also resulted in efficient utilization of water, land and financial resources and sustain the agriculture growth and increase the rural economy.

For the preparation of IIAP, on annual basis, consulting firms will be engaged by the project. The SPMU of OIIPCRA will select and engage experienced firms for the preparation of IIAP. The consultancy firm will work in collaboration with PD-ATMA / other district level departments / agencies. The consulting agencies will be selected based on certain criteria, to be fixed by the SPMU-OIIPCRA, covering (1) years of existence of the firm, (2) experience of the firm in irrigation management, (3) experience in climate resilient agriculture promotion, and (4) data collection, analysis and planning.

Project proposes to prepare an “Integrated Irrigation and Agriculture Plan (IIAP)” for the entire command of the tank / cascade. With IIAP, the project envisages to prepare a detail plan of action for the best utilization of available resources such as water, cultivable land and finances within the command in an integrated manner. Further, the planning process will be supportive in crop planning (in Kharif and Rabi) based on water availability and improving water productivity and its efficient use. Besides, the plan will also have analysis of ongoing as well as new schemes and programmes to foster convergence. Apart from irrigation and agriculture plan, the IIAP will also have command specific plan for execution of all the project activities.

Objectives

1. Improving irrigation coverage through structural and distribution measures following command saturation principles;
2. Enabling optimum utilisation of available water resources for enhanced cropping intensity;
3. Facilitate water budgeting and crop planning during Kharif and Rabi;
4. Strengthening local contingency planning and improve irrigation support system during dry spells;
5. Improve water productivity, water use efficiency and promote equity in water distribution and management;
6. To evolve an action plan for achieving sustainable agricultural growth that is responsive to climate variability, suitable cropping system, improving farmers' income and ensuring food security.

Key Guiding Principles

1. Each project cascade / tank will have an Integrated Irrigation and Agriculture Plan.
2. Planning will be done for the designated command and adjacent non-command area under the project, for Kharif and Rabi
3. The irrigation and agriculture planning exercise will be dynamic in nature and to be conducted and finalise before the onset of agricultural seasons (Kharif and Rabi) in each of the project year;
4. The total cost of preparation of IIAP will be borne by the project;
5. Preparation of Integrated Irrigation & Agricultural Plan (IIAP) will be the responsibility of implementing agency (DoWR, Govt. of Odisha). Department of Water Resources (SPMU) may hire a facilitating agency for the preparation of IIAP and its annual updation.
6. In the process of preparation of IIAP, local people's institutions like Pani Panchayats (PPs)/Water User Associations / FPOs/FIGs/ PFCs, etc. will be involved along with Support Organization (SO). During preparation of IIAP, consultation meetings may be organised with the technical institutions like ICAR/SAU/KVKs/IMAGE/DOA&FP/DOH along with the guidance of other officials / experts;
7. The IIAP should take in to account the current situation of irrigation coverage, agricultural practices, identify the critical gaps and would support in improving irrigation coverage and preparation of crop plan by each plot in the command;
8. Actual ground planning will be done by the PP / WUA in consultation with the associated departments, facilitated by the hired consultancy firm. The dedicated team of experts at consultancy firm will prepare a plan in consultation with various stakeholders through participatory and a risk analysis approach. Requirements will be prioritized and effectively managed through actions and investments;
9. The IIAP will be formally approved by the PP / WUA general body for implementation;

The IIAP will comprise two major components, i.e., Irrigation Improvement Plan (IIP) and Livelihood Improvement Plan (LIP). The IIP would basically cover water provisioning through different sources / means to the cultivated area whereas livelihood improvement plan would cover all the project measures that are intended to improve agriculture, horticulture and fishery.

The Livelihood Improvement Plan (LIP) will cover livelihood sectors that the project intends to intervene, such as agriculture, horticulture, fishery, and agribusiness promotion. The LIP will be a part of the overall IIAP. The IIP and LIP will be prepared by each PP / WUA at the tank / cascade level, in consultation and with the support of the SOs and technical staff from relevant line departments. The IIAP will be prepared taking in to account the existing production systems, socio-economic conditions, water availability and distribution. Feasibility aspects of the activities planned in the process is to be examined and suitable activities that are implementable and having potential to

contribute to the overall project objective should be considered. During prioritization and finalization of activities, available resources should be considered and plan should be finalized accordingly.

The plan will include, along with IIP and LIP, a brief profile of the cascade / tank area and the tank stakeholders. The identified interventions will be segregated in the following categories:

1. Land / Water Resources Management Activities;
2. Segregated Sector Plans (agriculture, horticulture, fishery, agribusiness etc.);
3. Social / Environmental Management Activities;
4. Institutional Development and Management Aspects; and
5. Capacity building.

The proposed interventions will also be segregated into categories based on the resources to be used to implement them. The resources to be used are like:

1. Project resources;
2. Convergence / linkage with other program / scheme; and
3. Credit / donations etc.

The planning process of IIAP is a logical sequence of decision-making steps or activities that can be followed to achieve some desired outcome. Steps in the process include:

1. Gathering information;
2. Identifying and prioritizing issues;
3. Setting goals and objectives;
4. Identifying measures capable of achieving the goal / Objective;
5. Evaluating the planned measures;
6. Defining a plan of action;
7. Implementing the plan of action;
8. Monitoring implementation progress;
9. Evaluating progress and updating the plan.

In the context of irrigation and agriculture planning, it can be used as a framework to ensure a systematic and thorough decision-making process. Integrated Irrigation and Agriculture Planning should be viewed as an ongoing activity and not as a one-time effort. It must become a routine part (for Kharif and Rabi) to be effective in the long run.

Step 1: Information Collection

The first step in the planning process includes information gathering and organising it in a way that is helpful in problem-solving along with bridging information gaps and uncertainties. The information that are needed are like;

Physical Setting: Understanding the local hydrology and climatic situation and identify the factors which affect water supplies and irrigation demands. Data that would be useful include (1) hydrology, (2) water availability and (3) climate information such as precipitation and temperature.

Lands and Crops: Understanding the agricultural details (cropping systems) is key to develop a sound management plan. Data that should be collected include (1) acreage under each crop during Kharif and Rabi (household and plot specific information), (2) irrigation coverage and methods, and (3) soil, topography, and drainage

Government Policies: The plan will involve alignment to the existing policies of the Government which covers (1) water delivery procedures / mechanism, (2) water pricing structure, (3) water allocation etc. It would also include operation of irrigation sources, main canal operations, timing of use of different sources, groundwater extraction policies, flood control policies, facilities maintenance etc.

Water Resources Inventory: The infrastructure and water supply currently in place will be the most important factors in determining where water use efficiencies can be improved. Records of flow amounts will be key to estimating losses and potential savings. The types of data that may require are (1) irrigation sources and distribution system, (2) groundwater extraction capacities and actual extraction, (3) storage capacities, storage and release records, and evaporation data, (4) delivery records including deliveries during Kharif and Rabi etc.

Other Water Uses: It covers non-agricultural water uses such as domestic, cultural or pisciculture including recreational and environmental uses.

Existing Water Management and Conservation Measures: Measures that have already been taken for irrigation improvement / management and agriculture promotion. This would include use of micro irrigation system, training / capacity building of farmers in water management, community water regulation mechanism, water sharing norms etc. Lessons from different irrigation and agriculture planning process and its execution will be valuable inputs for planning.

Step 2: Identifying and Prioritizing Issues

Issues are the reasons or justifications for performing actions which may result from specific requirements of the community. Water management planning issues are often thought to relate only to water supply issues. However, issues can involve different aspects of irrigation and agriculture, including water management and use. Areas to be considered should include (1) cropping pattern / crop production, (2) availability of facilities and its capabilities, (3) finances, (4) information collection and its management, (5) legal, institutional, and/or environmental requirements, (6) operation and maintenance, (7) policy environment, (8) soil erosion and soil characteristics, (9) water supply or water availability and (10) water use. Local irrigation and agricultural issues can be identified in a participatory manner (involving PP / WUA and departmental officials) based on day-to-day observation and experience of people / water users. Another important way to learn about irrigation and agriculture is by analyzing the collected data.

Setting Priorities: Identification of issues will follow setting priorities. Priorities will emphasize issues that are perceived to be important to the greatest number of people in the command area. The process of prioritizing the issues will identify critical issues that should be given immediate attention. The lower priority issues will require less immediate attention and some may be of so low a priority that no attention is required.

Step 3: Setting Goals and Objectives

In addition to addressing specific issues, some other areas also required to be focused, such as (1) leadership in solving irrigation and crop planning issues (institutional arrangement), (2) coordination with farmers and other stakeholders, and (3) enhancing the water productivity and efficiency in the tank command. The goal and objective for irrigation and agriculture plan can be framed taking in to account all these aspects. The goal of the IIAP could be addressing actual issues faced by the farmers with regard to availability of water during Kharif and Rabi. The objective of the planning process is to identify and take appropriate actions to address irrigation and water availability issues.

Step 4: Listing Out Action Points

At this point in the planning process, all that are required to do is to select all those measures that have the potential in achieving the planning goal / objectives. More than one measure might be required to completely achieve the goal of improving irrigation and agriculture. Consultation with PP / WUA will help to evolve different measures which are more location specific and would be useful for the farmers in general. The action points could be (1) improvement in water supply and its measurement, (2) changes in the cropping pattern / crop varieties during Kharif and Rabi, (3) changes in water pricing and billing methods, (4) education and training programs, (5) improvement in operational facility to reduce water losses, (6) improvements in water delivery and scheduling, (7) incentives for improving on-farm water management, (8) development of contingency plans for shortage periods, (9) ways of water sharing among the farmers (among high and low water demanding farmers), (10) use of water saving instruments etc.

Step 5: Evaluating the Measures

This phase of the planning activity involves investigating how well each option or measure might contribute in achieving the overall planning goal. Usually this will refer to assessments of costs, water savings or other benefits, community acceptability etc. of each of the suggested measures. In evaluation of measures, certain possibilities might be kept aside and certain measures may be modified to the acceptable norms. With this process, most promising options will be selected in the planning for execution.

Step 6: Defining A Plan of Action

Based on critical examination, most suitable option/s for irrigation and agricultural improvement will be selected. It will cover selection of different crops based on water availability, sharing of water among the farmers, availability of quantum of water for different crops etc. Various management improvement measures may also be clubbed at the tank command level, with the consent of the farmers like reducing high water consuming crops in Kharif / Rabi, promotion of micro irrigation system, ground water draft based on its availability (safe, semi-critical) etc. In order to make irrigation and agriculture plan a reality, detail schedule will be prepared taking all the planned measures in to account.

Step 7: Implementing the Plan of Action and Monitoring:

Once the action plan is prepared and agreed by all concerns, it will be executed as per the plan. PP / WUA will play a critical role in ensuring the follow up of the execution and monitoring the overall process.

Role and Responsibilities

The overall outline / design of the planning process will be prepared by the selected external agency, to be associated in the preparation of the IIAP. The planning process and tools developed by the external agency will be reviewed and finalised by the SPMU officials at the State level. Collection of primary and secondary data, conducting household survey, conducting survey of land ownership at the command area, organising consultation meetings with the PP / WUA and other stakeholders, data compilation and its analysis, preparation of plan document will be the responsibility of the external agency. The external agency will be supported by project associated departments at the district / sub-district level in terms of providing required data / information. They will also be associated directly in the planning process and provide their inputs for developing an implementable plan. The plan document will be reviewed at the district level by PD-ATMA, EE-MI and DLPMT members and will be approved by the Collector and DM. The SPMU will review and finalise the plan, in consultation with the external agency and departmental officials. Prepared plan will be shared with the Director, Agriculture; Director, Horticulture; and Director, Fishery by the SPMU for linking the overall plan with the existing schemes / programmes of the department.

External Agency: Designing the planning process, developing assessment tools, conducting field survey / studies, collection of required and relevant data for planning, conducting consultation meetings with the PP / WUA / FIG-FPO / PFCS and other stakeholders, consolidation and analysis of data, preparation of detail plan, sharing the plan with stakeholders, presenting the plan to PD-ATMA, EE-MI, DLPMT members and SPMU, and finalising the plan in consultation with the SPMU.

PD-OIIPCRA (SPMU): The Project Director, with the support of the SPMU experts, will provide necessary guidance to the external agency for the preparation of plan, coordinating with different project associated entities, providing available and required information to the external agency, ensuring participation of SPMU experts / officials in the planning process, reviewing the overall planning process, review of the plan document, appraising / sharing the plan document with respective directorates (Director, Agriculture; Director, Horticulture; Director, Fishery etc.) and aligning the plan with the annual action plan of the project.

Line Departments-District Level: Providing required information to the external agency for planning, participate in the planning process, providing required technical inputs, review the plan document and suggest for required modification, if any, and approval of the plan and making the plan part of their annual action plan working schedule.

DLPMT: Monitoring the overall planning process, participate in the local level planning, consult with external agency from time to time on planning progress, review the plan document, appraising the plan to Collector and DM, approval of the plan by the Collector and DM of the concerned district.

Line Departments-State Level: Review the plans and aligning the plan with the existing schemes / programmes of the Department for greater convergence.

3.1.5.2 Crop Diversification and Demonstration

(Cost Table Reference: WR-20 / CI.1-C)

“Seeing is believing” is the basic principle of conducting technology demonstration. This is the most promising extension methodology to promote new crops/ varieties/ production technology etc. amongst the farmers. Demonstrations will be conducted in farmers’ fields under the technical guidance of scientists / Resource Persons. Training to selected farmers in the village/village cluster, including demonstrating farmers is a key requisite of conducting demonstrations. At the time of maturity, field day will also be organised at demonstrated site, inviting scientists, all the farmers in the village and neighbour villages. Farmer-scientists interaction on the field day will further make it more effective in transfer of technology in its true spirit. Conducting frontline demonstrations would be helpful to get first hand feedback on the performance of the demonstrated activity. Participating farmers, after learning the technical know-how of new technology, can also serve as local extension agents and assists in dissemination of that particular technology. Demonstrations would also be helpful in generating data on factors contributing higher crop yields and constraints of production under various farming situations.

Selection of Farmers for Demonstration

1. Farmers who are willing to provide critical resources (land/water/labour, any input not supported by the project);
2. She / he should be a progressive farmer and member of the concerned PP/FPO/FIG;
3. Should have good contacts/relations with other farmers of the PP/FPO/FIG and neighboring village farmers;
4. Preference should be given to the socio-economically backward/SC/ST/small & marginal farmers/women farmers of the PP for coverage under demonstration;
5. Farmers cultivating other’s land on share cropping or on leased-in basis will also be eligible;

6. The identified plot for demonstration should be easily approachable by other farmers & extension workers;

Project Support

1. Project will provide inputs support to the selected farmers through PP / WUA (other than land, water, labour) required for technology demonstration;
2. Hand holding support and on-field technical guidance will be rendered throughout the demonstration period;
3. Training on the aspects relevant to demonstrated theme;
4. Conducting field day at the end along with farmer-scientist interaction in the field.

Beneficiary Contribution

1. Farmer to share land, water, labour and any other inputs not supported by the project;
2. Day to day supervision of the demonstration site;
3. Timely taking of crop management practices like weeding, pest and disease management, fertilizer application etc. as advised by the agricultural scientists.

Approach & Strategy for Technology Demonstration

Frontline Demonstration approach will be followed to demonstrate crops/varieties/technology with respect to prioritized crops grown in that area, along with full package of practices. Selected farmer's field would be utilized to demonstrate the potentiality of the technologies to participating farmers, neighboring farmers and any other relevant agencies. The approach would encompass training, capacity building and demonstrations as an integral system. The project will adopt participatory approach from planning to implementation. Project also encourages women farmers to get involved in the demonstrations.

The area specific crop and stress tolerant varieties of the prioritized crops or any other improved technology to be demonstrated would be identified by Dept. of Agriculture/ATMA in consultation with scientists of ICRISAT/IRRI/ICARDA/OUAT/ICAR Institutes. The Dept. of Agriculture & ATMA at state and district level respectively will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR Institutes/KVK would provide on-field technical guidance. At field level, the demonstrations may be established with all logistics, exclusively by the village level extension worker (Krushak Saathi on hired basis) together with other farmers of the PP/FPO/FIG, under the supervision of Agri. Facilitator of Support Organization. While, the project will play the role of a facilitator, in terms of providing required inputs, other logistics and coordination with line departments, including KVKs, ATMAs, research institutions and other university for technology flow. Synergizing effect would be the responsibility of line department.

Key Guiding Principles

1. Demonstration will be taken up largely in command area and few in adjacent non-command area (where water for irrigation, including ground water is assured);
2. In command area, demonstrations will be taken up by the PP, while in non-command area it will be taken up by the members of the FPO / FIG. Hence, the demonstrating farmer should be a member of PP and / or FPO/FIG;
3. Entire cost of demonstration, except land, water and labour cost will be funded by the project. Farmer has to contribute land, water, labour and day to day supervision;
4. In cases, where demonstrations are carried out in the tank command area, it will not restrict any farmer from the non-command area / nearby villages to learn from demonstration. All farmers, including farmers from the nearby villages, irrespective of holding size, should be

allowed to participate in the farmer's field day by which they would be benefited by visiting the demonstration plots;

5. The site of demonstrations should be at a place of easy accessibility and at central point to attract large number of audience/farmers for wider impact and easy monitoring;
6. The crop and variety / technology selected for demonstration should be based on the need and preference of the farmers. Technology demonstrations will be carried out for different crops in selected locations;
7. For better and visible impact, the demonstrations may be conducted in cluster approach of at least 10 ha. The area of demonstration can even be larger for big tanks having higher command area. The size of plot at individual farmers should be between 0.4ha to 1.0 ha.;
8. Other equal size plots of the demonstrating farmers or the equal size plot of neighboring farmers in the same farming situation should be considered as control plots for comparison of the results;
9. Prior to demonstration, an assessment should be conducted to assess the existing level of adoption of different technologies and crop productivity;
10. Orientation training may be organized for half a day for all the participating farmers / persons about all aspects of demonstration (variety/ technologies);
11. All the important farm operations should be carried out by the demonstrating farmers under the close supervision of officials of dept. of Agriculture and under the guidance of scientist;
12. A display board mentioning about the key details of the variety/technology demonstrated should be erected at the demonstrated plot;
13. Farmers will be taken to the demonstration site at least twice; one at the mid of the crop season and the second at maturity;
14. At maturity, just before harvesting, "Field Day" may be organized where farmers from neighboring villages and extension workers are invited. A farmer-scientist interaction session would be organized on the event. On the Field Day, crop yield in 1m² plot to be done in front of farmers, covering both demonstration and control plot/s;

Roles and Responsibilities

Different institutions / organisations will play a vital role in demonstration, including ATMA, SO, PP and FPO/FIG. While selection of target farmers for demonstration and types of demonstrations to be conducted is the primary role of the department of Agriculture, technical support will be rendered by the scientists of International Institutes /State Agriculture University/ ICAR Institutes/KVK and other associated institutions. Demonstrations will be executed and monitored by ATMA/DLPMT. Mobilization of farmers, day to day supervision of demonstration sites, conducting trainings and field day will be taken up by the Support Organization (SO) with the help of PP/FPO/FIG. Services of the existing village level para-workers, named *KrushakSathies* as a village level facilitator, will be taken on time to time on hire basis based on the requirement. *KrushakSathies* will be assisting the PP/FPO/FIG in implementation of demonstrations.

PP / WUA: Selection of beneficiaries as per the set criteria in consultation with SO and PD-ATMA. A list of selected farmers will be prepared by the PP / WUA and will be submitted to the project authority for demonstration support.

PD-ATMA: The office of PD-ATMA will be involved in scrutiny of the list of the beneficiaries as prepared by PP / WUA, consult with the selected beneficiaries and render project related support for demonstration.

Technical Support Agencies: Technical support agencies like OUAT, local KVK and other associated institutions will extend required guidance and technical support in technology demonstration. They will support the farmers in adopting appropriate technologies in the demonstration fields.

DLPMT: The members of DLPMT will monitor the demonstration activities, consult with the farmers involved in demonstration, and prepare monitoring reports.

Sub-SPU: The officials of sub-SPU (S-SPU) will conduct periodic monitoring to the demonstration sites, consult with farmers and PD-ATMA and document the learning lessons.

PD-OIIPCRA (SPMU): The agriculture expert of SPMU will monitor the demonstration activities from time to time, consult with PD-ATMA on progress of demonstrations, visit the demonstration sites and discuss with farmers, document the learning cases, dissemination / sharing the learning with other stakeholders.

Details of the listed resilient technologies to be demonstrated in the OIIPCRA project along with the role and responsibilities of the implementing agencies, with expected output and output indicators against each of the listed demo themes are discussed in the following sections.

3.1.5.2.1 Demonstration of Climate Resilient Crop Varieties

Priority has been given in the state agriculture policy to enhance Seed Replacement Rate (SRR) of the state by promoting climate resilient stress tolerant varieties. Field demonstrations are an effective way to raise farmer awareness about new varieties along with improved crop management practices which would help to convince farmers to adopt it. Cultivation of varieties tolerant to various abiotic stresses is crucial in the context of changing climate. Abiotic stress such as droughts, cyclones, floods, heavy and unseasonal rains, extreme heat and cold waves are the major factors limiting the crop production. In this context, developing high yielding stress tolerant varieties and bringing such varieties in to cultivation in farmers' fields is highly required. In spite of availability of new improved crop varieties and efficient crop production technology, farmer adoption of the same is not up to the mark in the state. The gap in adoption could be due to lack of knowledge or non-availability of improved seed varieties or efficient production technology. In this context, there is a need to motivate the farmers towards varietal replacement with new improved varieties to realize better crop yields and adapt the efficient production system to sustain the impacts of climate vagaries.

Objectives

1. To demonstrate promising stress resistant varieties of selected crops along with recommended improved package of practices on the farmers' fields.
2. To promote adoption of demonstrated improved varieties for varietal diversification by participating farmers and neighbor farmers within the cluster.
3. To promote crop diversification in rice fallows with pulses or oil seeds.

The climate resilient rice varieties to be demonstrated would be identified by Dept. of Agriculture/ATMA in consultation with scientists of OUAT/ICAR Institutes. The agriculture department/ATMA at state and district level will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR would provide technical guidance.

Role and responsibility of different institutions by sub-activity is presented in Table 37.

Table 37: Expected Outputs and Indicators; Crop Varietal Demonstration.

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP / FPO /FIG	DOA / ATMA	SO / PP / FPO / FIG	Farmers gained knowledge and learnt about the benefits of demonstrated climate resilient varieties and suitable varieties for their area.	<ul style="list-style-type: none"> • No. of demonstrations and locations within project district (block & village) for demonstration finalized; • No. of crops (including variety) taken up for demonstration; • No. of farmers involved in demonstration.
Finalization of area for demonstration	DOA / ATMA	SO / PP / FPO /FIG	Suitable area for demonstration finalized in consultation with the farmers / DOA / Scientists.	<ul style="list-style-type: none"> • Area (in ha) planned for coverage under demo by crop types; • No. of clusters with average area for demonstration finalized; • No. of farmers with average demonstration area finalized.
Project Support (inputs)	DOA / ATMA	PP / FPO / FIG	Inputs to be supplied and quantity to each farmer finalized.	<ul style="list-style-type: none"> • No. of farmers supported by the project to take up the demo; • Farmer wise & Input wise quantity of each input provided documented.
Training / Orientation / Exposure to demonstration sites	DOA / ATMA	SO	Training / orientation / exposures organized for farmers, irrespective of their holding category.	<ul style="list-style-type: none"> • No. of farmers oriented / trained / exposed to such demonstration sites, by their holding categories; • No. of training / orientation / exposure programs organized; • No. of farmers from nearby area visited for learning and adoption.
Demonstration	DOA / ATMA	SO / PP / FPO / FIG	Different aspects of demonstration, as finalized based on the assessment, are demonstrated (variety / technology).	<ul style="list-style-type: none"> • No. of technologies (package of practices) demonstrated by crop types; • Data (growth, yield, cost of cultivation) recorded for case analysis, for comparison with control plot; • No. of farmers benefited.
On-field technical guidance to farmers	ATMA / DOA / DOH	SO / Other Technical Agencies	Issues identified and addressed. Scientists visited the demo field.	<ul style="list-style-type: none"> • Challenges faced by the farmers in taking up of new variety addressed.
Conducting field day	ATMA / DOA / DOH / PP	SO / FPO / FIG	Field day will be conducted and also farmer-scientists interaction is	<ul style="list-style-type: none"> • Field day conducted and results documented; • No. of farmers participated in the field day;

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
			arranged. Crop cutting exercise is taken up to assess yield.	<ul style="list-style-type: none"> • Scientists participated in field day.
Overall Monitoring Learning	ATMA / DLPMT	PP / FPO / FIG	Relevant measures taken, based on periodic monitoring and key learnings are documented for sharing / dissemination	<ul style="list-style-type: none"> • No. of monitoring visits conducted by departmental officials and scientists; • Key areas of inputs provided based on the field observation and its follow-up; • No. of learning cases documented and disseminated for adoption / replication.
Documentation	SO	ATMA / DLPMT		<ul style="list-style-type: none"> • Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield).

Note: DOA: Directorate of Agriculture; ATMA: Agricultural Technology Management Agency; DLPMT: District Level Project Monitoring Team; SO: Support Organisation; PP: Pani Panchayath; FPO: Farmer Producing Organization; FIG: Farmer Interest Group.

3.1.5.2.2 Aerobic Rice (SRI/ DSR) Demonstration

Managing water resources is key for sustaining droughts that are expected to be more frequent in coming days due to climate change. Unlike conventional paddy, System of Rice Intensification (SRI) and Direct Seeded Rice (DSR) are the two promising technologies for sustaining rice productivity in water scarce area.

Objectives of Demonstrating SRI / DSR

1. To improve the understanding and knowledge base of the farmers on the importance of SRI / DSR for greater adoption;
2. To equip the farmers with latest technologies and package of practices that are climate resilient and environment friendly;
3. To demonstrate farmers on economic benefit and climate co-benefit of adopting SRI / DSR along with its climate resilient dimensions.

System of Rice Intensification (SRI): The System of Rice Intensification is a new and promising resource saving method of growing rice under irrigated or rainfed conditions. Young seedlings (15 days old, with 2 leaves) will be transplanted in square planting method, at wider spacing (25 cm x 25 cm or 22 cm X 22 cm) @ one seedling per hill. Transplanted field should be kept moist rather than continuously flooded. Timely weeding (3 weeding at 10 days interval from transplanting) is very crucial in SRI.

Consumes less quantity of seed @ 2kg/acre. Studies in a number of countries have shown a significant increase in rice yield, with substantial savings of seeds (80-90%), water (25-50%) and cost (10-20%) compared to conventional methods. SRI responds well to organic sources of nutrients and

organic pesticides that cost less, which results in low investments in chemical pesticides and synthetic fertilizers. Weeding is done with Konoweeder and incorporation of weeds into the soil improves soil aeration for better growth and production.

Direct Seeded Rice (DSR): In case of delay in monsoon or shortage of water, DSR gives the farmer flexibility to take up direct sowing of paddy with a suitable duration variety to fit into the left-over season. Seeds are sown directly in the main field instead of transplanting rice seedlings in water stagnated fields. Direct Seeded Rice cultivation is done in two ways; Dry seeding method is by drilling the seed at a depth of 2-3 cm into the well-prepared fine seed bed. Wet seeding method is by sowing of pre-germinated seeds (48-72 hrs) in to the levelled field which is harrowed and then puddled (flooded). The field is left for 12-24 hrs after puddling. Drum Seeders are used for wet seeding. Sowing will be done at the start of monsoon. Weed management is very crucial factor in dry seeding. Timely application of herbicides along with 1 or 2 manual weeding provide effective control. For getting better yields, selection of suitable stress resistant variety, appropriate time of sowing and adoption of recommended package of practices is essential.

The DSR has several benefits for the farmers and also to the environment, such as (1) requires less water, (2) less physical labour and hence less drudgery, (3) low production cost, (4) early crop maturity, (5) can be grown as an intercrop between the trees, (6) aerobic rice cultivation reduces emission of green-house gases (Methane), (7) better soil conditions for the growth of succeeding crops, (8) saving on labour, and (9) saving of energy and time.

The rice varieties to be demonstrated under SRI/DSR would be identified by the Dept. of Agriculture/ATMA in consultation with scientists of OUAT/ICAR Institutes. The agriculture department/ATMA at state and district level will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR would provide technical guidance. Role and responsibility of different institutions by sub-activity is presented in Table 38.

Table 38: Expected Outputs and Indicators; SRI/DSR Demonstration.

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP/FPO/FIG	DOA/AT MA	SO / PP/FIG/CIG	Farmers gained knowledge and learnt about the benefits of demonstrated climate resilient rice production technology (SRI/DSR)	<ul style="list-style-type: none"> No. of demonstrations under SRI & DSR and location within project district (block & village) for demonstration finalized; Rice variety for demo under SRI/DSR finalized; No. of farmers involved in demonstration Area (in ha) covered under demo for SRI & DSR finalized No. of farmers supported by the project to take up the demo Farmer wise & Input wise quantity of each input provided documented No. of farmers oriented / trained / exposed to such demonstration sites Data (growth, yield, water requirement, cost of cultivation) recorded for case analysis, for comparison with control; No. of farmers demonstrating
Finalization of area for demonstration	DOA/AT MA	SO/PP/FIG/C IG		
Providing project support (inputs)	DOA/AT MA	PP/FPO/FIG		
Training / Orientation / Exposure to demonstration sites	DOA/AT MA	SO		
Demonstration	DOA/AT MA	SO / PP/FIG/CIG		

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
On-field Technical guidance	DOA/AT MA	SO		SRI & DSR <ul style="list-style-type: none"> Challenges faced by the farmers in taking up of new variety addressed
Conducting field day	DOA/AT MA	SO/ PP/FPO/FIG		<ul style="list-style-type: none"> Field day conducted and results documented No. of farmers participated in the field day Scientists participated in field day
Overall Monitoring, Learning	ATMA/D LPMT	PP/FPO/FIG		<ul style="list-style-type: none"> No. of monitoring visits conducted by departmental officials and scientists Key areas of inputs provided based on the field observation and its follow-up No. of learning cases documented and disseminated for adoption / replication
Documentation	SO	ATMA/DLP MT		<ul style="list-style-type: none"> Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield)

3.1.5.2.3 Demonstration of Integrated Farming System (IFS)

The integrated farming system approach introduces a change in the farming techniques for maximum production in the cropping pattern. The approach supports optimal utilization of available resources for environmental and economic gain of farmers. Farmers normally concentrate on only crop production which is subjected to a high degree of uncertainty in income and employment and vulnerable to climatic factors. In this context, integrated farming system will be helpful to the farmers, mostly the marginal and small farmers, for augmenting their agricultural income. Integration of various agricultural enterprises viz., cropping, animal husbandry, trees etc. have great potentialities in the agricultural economy. Cropping may be monocropping, mixed/intercropping, multi-tier cropping of cereals, legumes (pulses), oilseeds, forage etc. Animal husbandry component may be cattle, goat, sheep, poultry etc. and tree components may include timber, fuel, fodder and fruit trees etc.

Objectives

1. To increase the productivity of the farming systems
2. To supplement the income to the farmers
3. To create additional family labour employment
4. Farm wastes are better recycled for productive purposes

Advantages of Integrated Farming System

1. Higher production to meet household demand and marketable surplus
2. Increased farm income through proper residue recycling and allied components
3. Sustainable soil fertility and productivity through organic waste recycling
4. Integration of allied activities will result in the availability of nutritious food enriched with protein, carbohydrate, fat, minerals and vitamins
5. Integrated farming will help in environmental protection through effective recycling of waste from animal husbandry activities like poultry, small ruminants rearing

6. Reduced production cost of components through input recycling from the by-products of allied enterprises
7. Regular stable income through the products like egg, milk, mushroom, vegetables, honey etc from the linked activities in integrated farming
8. Availability of fuel and fodder from agro-forestry models in integrated farming system
9. Cultivation of fodder crops in intercropping and boarder cropping systems will result in the availability of adequate nutritious fodder for animal like milching cow, goat / sheep
10. Minimized soil loss due to erosion by agro-forestry and cultivation technologies
11. Generation of employment opportunities in agriculture and allied sectors

The area specific proven IFS models to be demonstrated would be identified by dept. of Agriculture in consultation with scientists OUAT/ICAR Institutes. The agriculture department at state and district level will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR would provide technical guidance. At field level, the demonstrations may be established with all logistics exclusively by the village level extension worker (project staff) together with other farmers in the PP group, under the supervision of Agri. Facilitator at Support Organization. While, the project plays facilitative role by providing required inputs, other logistics and coordinate with line departments, KVKs, ATMAs, research institutions and university for technology flow and synergizing effect of the line department activities. The project adopts participatory approach from planning to implementation. Role and responsibility of different institutions by sub-activity is presented in the Table 39.

Table 39: Expected Outputs & Indicators; IFS Demonstrations

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP/FPO/FIG	DOA/ATMA	SO / PP/FPO/FIG	Farmers gained knowledge and learnt about the benefits of demonstrated IFS models.	<ul style="list-style-type: none"> • No. of IFS models selected for demo • No. of demonstrations under IFS and demo location within project district (block & village) for demonstration finalized; • Different components/practices under IFS for demo finalized; • No. of farmers involved in demonstration
Finalization of area for demonstration	DOA/ATMA	SO/PP		<ul style="list-style-type: none"> • Area (in ha) covered under different components of IFS for demo finalized
Project Support (inputs)	DOA/ATMA	PP/FPO/FIG		<ul style="list-style-type: none"> • No. of farmers supported by the project to take up the demo • Farmer wise & Input wise quantity of each input provided documented.
Training / Orientation / Exposure to demonstration sites	DOA/ATMA	SO		<ul style="list-style-type: none"> • No. of farmers oriented / trained / exposed to such demonstration sites
Demonstration	DOA/ATMA	SO/PP		<ul style="list-style-type: none"> • Data (growth, economic yield from each component, benefit: cost ratio of IFS model) recorded as a case analysis, for comparison

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
On-field technical guidance to farmers	DoA/ATMA	SO / Other Institutions		with control; • No. of farmers participated in IFS demo • Challenges faced by the farmers in taking up of new variety addressed
Conducting field day	DoA/ATMA	SO / PP		• Field day conducted and results documented • No. of farmers participated in the field day • Scientists participated in field day
Overall Monitoring and Learning	ATMA/DLP MT	PP/FPO/FIG		• No. of monitoring visits conducted by departmental officials and scientists • Key areas of inputs provided based on the field observation and its follow-up • No. of learning cases documented and disseminated for adoption / replication.
Documentation	SO	PD-ATMA/DLPMT		• Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield).

3.1.5.2.4 Demonstration of Inter-Cropping/Bund Planting, Involving ID Crops

Practice of monocropping is predominant in the state, particularly monocropping of rice in areas where water is assured. Monocropping is risky and often results in low yields or sometimes even total crop failure due to erratic monsoon rainfall and impaired distribution. In such areas intercropping is a feasible option to minimize risk in crop production, ensure reasonable returns at least from the intercrop and also improve soil fertility with a legume intercrop.

A cereals/legumes/oilseeds/vegetables combination in intercropping system are most suggested combinations to get maximum benefits of Intercropping and is a key drought coping strategy.

Objectives

1. To bring crop diversity and stability in yields
2. To increase the productivity of cropping system as a whole
3. To minimise the total crop failure in adverse conditions
4. To increase farmer income

Advantages of Intercropping System

1. Minimizes fertilizer use
2. Reduces pest and disease incidence
3. Reduces cost of production

4. Produces balance food
5. Ensures household level nutritional security
6. Provides protein rich legume fodder for cattle
7. Take full advantage of growing season

The area specific recommended crops to be demonstrated would be identified by Dept. of Agriculture in consultation with scientists OUAT/ICAR Institutes. The agriculture department at state and district level will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR would provide technical guidance. Role and responsibility of different institutions by sub-activity is presented in Table 40.

Table 40: Expected Outputs and Indicators; Inter Cropping System

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP/FPO/FIG	DOA/ATMA	SO	Farmers gained knowledge and learnt about the benefits of intercropping system and bund planting.	<ul style="list-style-type: none"> • No. of demonstrations under intercropping/bund planting and location within project district (block & village) for demonstration finalized; • Crops and crop varieties for demo are finalized; • No. of farmers involved in demonstration.
Finalization of area for demonstration	DOA/ATMA	SO / PP/FPO/FIG		<ul style="list-style-type: none"> • Area (in ha) covered under demo finalized.
Project Support (inputs)	DOA/ATMA	PP/FPO/FIG		<ul style="list-style-type: none"> • No. of farmers supported by the project to take up the demo; • Farmer wise & Input wise quantity of each input provided documented.
Training / Orientation / Exposure to demonstration sites	DOA/ATMA	SO		<ul style="list-style-type: none"> • No. of farmers oriented / trained / exposed to such demonstration sites.
Demonstration	DOA/ATMA	SO / PP/FPO/FIG		<ul style="list-style-type: none"> • No. of technologies (package of practices) demonstrated by crop types; • Data (growth, yield, cost of cultivation) recorded for case analysis, for comparison with control; • No. of farmers demonstrating.
On-field guidance to farmers	DOA/ATMA	SO/ Other Tech. Institutions		<ul style="list-style-type: none"> • Challenges faced by the farmers in taking up 2-3crops in intercropping systems.
Overall Monitoring and Learning	DOA / ATMA/DLPMT	PP/FPO/FIG		<ul style="list-style-type: none"> • No. of monitoring visits conducted by departmental officials and scientists

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Documentation	SO	ATMA/DLPMT		<ul style="list-style-type: none"> • Key areas of inputs provided based on the field observation and its follow-up; • No. of learning cases documented and disseminated for adoption / replication. • Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield).

3.1.5.2.5 Demonstration on Cropping System Involving Irrigated Dry Crops

The term cropping system refers to the crops and crop sequences and the management techniques used on a particular field over a period of time. Project proposes to promote low water consuming crops (Irrigated Dry crops) in kharif uplands and stabilizing rice fallow (during Rabi season) with ID crops and providing with one or two life-saving (protective) irrigations will not only increase the productivity of the cropping system also increases the income of the farmers. In this context, cropping system demonstration is proposed in order to encourage farmers to take up Irrigated Dry crops, viz., pulses, oil seeds and vegetables in upland kharif and rice fallow (in Rabi).

Objectives

1. To discourage conventional rice cultivation in uplands in kharif and following rice in rabi
2. To promote low duty Irrigated Dry crops in uplands and rice fallows to save water

Project Support

Project assistance will be provided in terms of input to all the demonstrating farmers who have replaced rice crop with low water requirement crops in kharif uplands and pulses/oil seeds/vegetables in rice fallow in Rabi season. Besides, a training program on cropping systems and on-farm technical guidance is also proposed.

Role and responsibility of different institutions by sub-activity is presented in the Table 41.

Table 41: Expected Outputs & Indicators; Cropping System Demonstration

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP / FPO / FIG	DOA / ATMA	SO	Farmers took up second ID crops in rice fallow lands during rabi, based on suitability and earn an additional income.	<ul style="list-style-type: none"> • No. of demonstrations under cropping system and location within project district (block & village) for demonstration finalized; • Crops and crop varieties for demo are finalized; • No. of farmers involved in demonstration.
Finalization of	DOA /	SO / PP /		• Area (in ha) covered under demo

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
area for demonstration	ATMA	FPO / FIG		finalized.
Project support (inputs)	DOA / ATMA	PP / FPO / FIG		<ul style="list-style-type: none"> No. of farmers supported by the project to take up the demo; Farmer wise & Input wise quantity of each input provided documented.
Training / Orientation / Exposure to demonstration sites	DOA / ATMA	SO		<ul style="list-style-type: none"> No. of farmers oriented / trained / exposed to such demonstration sites; Knowledge base of the farmers on intended practice increased.
Demonstration	DOA / ATMA	SO		<ul style="list-style-type: none"> No. of crops (along with package of practices) demonstrated by crop types; Data (growth, yield, cost of cultivation) recorded for case analysis, for comparison with control. No. of farmers demonstrating.
On-field guidance to farmers	SO / DLPMT	DOA / ATMA		<ul style="list-style-type: none"> Challenges faced by the farmers in taking up second ID crops addressed through guidance and on-field support.
Supervision of demo & Conducting of field day	SO & PP / FPO / FIG	ATMA / DLPMT		<ul style="list-style-type: none"> Field day conducted and results documented No. of farmers attended the field day Scientists participated in the field day
Over all Monitoring and Learning	ATMA / DLPMT	PP / FPO / FIG		<ul style="list-style-type: none"> No. of monitoring visits conducted by departmental officials and scientists Key areas of inputs provided based on the field observation and its follow-up No. of learning cases documented and disseminated for adoption / replication. Expenditure incurred in promotion of second ID crops during Rabi season.
Documentation	SO	ATMA /DLPMT		<ul style="list-style-type: none"> Record of total data base such as details of demonstration sites, No. of farmers, training programs and results of the demonstration obtained etc.

3.1.5.2.6 Integrated Crop Management Practices (INM/IPM) Demonstration

The project intends to promote Integrated Crop Management (ICM), which is a combination of the traditional methods with appropriate modern technology, balancing the economic production of crops with positive environmental management. Through the process of ICM, project intends to promote better use of on-farm resources, reduction of external farm inputs, such as chemical fertilizers and chemical insecticides or pesticides without significant loss of yields and partial substitution of inputs which can be achieved using organic inputs. This would help in reduction of production cost, minimizing food contamination and negative environmental impact. The major components of ICM strategy would be Integrated Nutrient Management (INM) and Integrated Pest Management (IPM).

A package of agricultural practices is used to improve the growth, development, and yield of agricultural crops. Integrated nutrient management has great potential to offset the growing heavy nutrient demands that go towards achieving maximum yields and to sustain crop productivity on a long-term basis. INM encourages the use of organic wastes, which also helps in keeping the environment clean and tidy. In INM, the residual effects of applied materials are to be considered so that the last crop in the sequence can be supplied with just enough quantities of inorganic fertilizers, which will not only supply the major nutrients but also bring down the cost of cultivation. It will, furthermore, improve the physical condition of the soil for sustainable crop production. Hence, INM is chosen as one of the intervention areas for demonstration to solve the soil nutrient problem and to enrich the soils with organic matter.

Integrated Pest Management (IPM) offers a multi-dimensional approach in agriculture pest management through a combination of cultural, physical, biological and chemical pest control methods that are cost effective and environmentally safe. Its aim is to suppress pest populations below the economic injury level. State Agriculture Universities and ICAR Institutes have developed crop specific IPM packages which need to be taken to farmer's fields. Frontline demonstrations are the most effective method to promote IPM practices in project area.

Approach & Strategy

The ICM demonstrations will focus on high payoff interventions from land preparation to harvesting of a crop and reducing carbon and water footprint of cropping systems. Trainings and capacity-building activities will be organized for farmers and extension functionaries on the latest crop production technologies. Adoption of the demonstrated technologies will be systematically tracked and documented.

Frontline demonstration approach may be followed to demonstrate ICM (INM/IPM) with selected crops and crop varieties recommended in that area, along with full package of practices, demonstrating on selected farmer fields with a view to demonstrate the potentiality of the technologies to participating farmers, neighboring farmers and any other relevant agencies. The approach has training, capacity building and demonstrations as an integral system.

The crops to be demonstrated under ICM (INM/IPM) would be identified by Dept. of Agriculture in consultation with scientists ICRISAT/OUAT/ICAR Institutes. The agriculture department at state and district level will play an important role in supervision and facilitation of the overall process. Scientists from OUAT/ICAR would provide technical guidance. Role and responsibility of different institutions by sub-activity is presented in the Table 42.

Table 42: Expected Outputs and Indicators; Integrated Crop Management Practices Demonstration

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Discussion with PP / FPO /FIG	DOA / ATMA	SO	Farmers adopt environment friendly management practices for different crops, including IPM and INM, which reduces cost of cultivation and improves	<ul style="list-style-type: none"> • No. of demonstration planed • Types of crops taken up under IPM&INM; • Type of package of practices taken up.
Finalization of area for demonstration	DOA / ATMA	SO / PP / FPO / FIG		<ul style="list-style-type: none"> • Area (in ha) planned for coverage under demo by crop types; • No. of clusters with average area for demonstration finalized; • No. of farmers with average demonstration area finalized.

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Extension of project support to the farmers	DOA / ATMA	PP	efficiency.	<ul style="list-style-type: none"> No. of farmers supported by the project, and area (in ha) covered under IPMINM; Types of inputs provided to the farmer.
Training / Orientation / Exposure to demonstration sites	DOA / ATMA	SO		<ul style="list-style-type: none"> No. of farmers oriented / trained / exposed to such demonstration sites, by their holding categories; No. of training / orientation / exposure programs organized; No. of farmers from nearby area visited for learning and adoption.
Demonstration	DOA / ATMA	SO		<ul style="list-style-type: none"> No. of demos organized, and no. of farmers oriented on IPM&INM; Data (growth, yield, cost of cultivation) recorded for case analysis, for comparison with control plot; No. of farmers benefited.
On-field technical guidance to farmers	SO & PP / FPO / FIG	DoA / ATMA		<ul style="list-style-type: none"> Challenges faced by the farmers in taking up of new variety addressed.
Conducting field day	DOA / ATMA	SO / PP / FPO / FIG		<ul style="list-style-type: none"> Field day conducted and results documented; No. of farmers participated in the field day; Scientists participated in field day.
Monitoring and learning	DOA / ATMA	DLPMT		<ul style="list-style-type: none"> No. of beneficiary farmers who have accessed required technical support and guidance during monitoring / supervision; No. of monitoring visits conducted by department officials and scientists; Key areas of inputs provided based on the field observation and its follow-up; No. of learning cases documented and disseminated for adoption / replication.
Documentation	SO	DOA / ATMA / DLPMT		<ul style="list-style-type: none"> Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield); Process and output / outcomes documented and shared with other farmers for learning and replication.

3.1.5.3 Alternate Energy System for Agriculture (Solar Pump):

(Cost Table Reference: C1.3-C)

Though farmers have functional bore wells in their farms, are facing difficulty in irrigating their fields due to frequent power failures, timely unavailability of electricity and high cost involved. In this context, solar pump sets emerge as the reliable, eco-friendly, low cost and sustainable power source of irrigation. Promoting solar pump sets will reduce the dependency on grid supplied electricity, there by reduces the cost of irrigation. Secondly, it will be supportive to improve the irrigated area in the tank command and non-command area by which farmers can take up Rabi crop and can provide protective irrigation during Kharif.

Objectives

1. Enhancing irrigation coverage with the support of pumping and irrigation instrument that runs with alternative source of energy;
2. Promoting solar energy to irrigate the farmer's field, so as to increase the irrigation potential and cropping intensity in project districts;
3. To promote solar energy in areas where electricity is un-served or underserved.

Advantages with Solar Pump sets

1. No fuel cost, more economical than diesel pump sets in long run;
2. Maintenance is low and affordable;
3. Timely irrigation provision is possible, increases area under irrigation;
4. Providing critical irrigation is possible in rainfed areas or drought prone areas;
5. Solar energy is environment friendly.

Beneficiary Selection

1. Farmers having minimum 0.5 acres of cultivable land;
2. Both command area and non-command area farmers are eligible for availing the facility;
3. Preference will be given to SC/ST and women farmers based on availability of water sources;
4. Farmers cultivating as share crop holders are also eligible to avail the subsidy.

Project Assistance

Solar pump sets of 0.5 to 2.0 HP capacity will be supported to eligible farmers at 90 % subsidy.

Key Guiding Principles

1. The project will conduct ground water assessment in the project locations, in consultation with the CGWB and other technical agency engaged for the purpose;
2. Areas with shallow water table, as assessed by the project in consultation with CGWB will only be supported with solar pumping system;
3. Certification of use of shallow wells / tube wells, based on the assessment by EE-MI is mandatory before extraction of water from shallow wells and installation of solar pumps;
4. The given pump sets should be primarily utilized for irrigation purpose;
5. Cluster approach will be followed in selecting the PP/FPO/FIG. The clusters will be identified based on dependable ground water and solar pumps one or more numbers will be given to PPs/FPO/FIGs;
6. Project will give the subsidized pump sets to PP/FIGs, provided PP/FPO/FIG should assure the maintenance aspect;

7. PP/FPO/FIG intern can distribute the pumpsets to individual beneficiary within the PP/FPO/FIG group as per the framed selection criteria;
8. Beneficiary should be a member of PP/FPO/FIG. Most desperately required farmer will be given the solar pump;
9. No maintenance cost will be provided by the project.

Role and Responsibilities

Community Organisations (PP / WUA): Finalization of area to be irrigated through solar pumps in the tank command, selection of farmers as per the set criteria for project support, monitoring ground water utilization by the supported farmers and create awareness for ground water conservation and its management.

PD-ATMA: Will provide project support as per the finalized list of PP/WUA/beneficiaries, based on the assessment findings and certification by EE-MI. Office of PD-ATMA will monitor the ground water utilization during different cropping seasons for specific crop types and record additional area put under irrigation, in consultation with EE-MI.

EE-MI: Will certify the shallow tube wells / wells for installation of solar pumping system, with reference to the ground water assessment findings. Office of EE-MI will monitor from time to time on area covered under irrigation through solar pumping system and record the additional area put to irrigation in Kharif / Rabi.

DLPMT: The members of DLPMT will conduct periodic monitoring of the intervention, review the use of solar pumping system, monitor the benefits in terms of irrigation improvement, enhancement in gross cropped area and cropping intensity; assess the ground water status periodically and discuss during review meeting, if any such issues are there for amicable solution.

PD-OIIPCRA (SPMU): The officials of SPMU will conduct periodic monitoring to the project locations, assess the project benefits, discuss with the farmers and document the learning cases for wider dissemination. SPMU will also take up periodic assessment of ground water status in collaboration with CGWB.

Role and responsibility of different institutions by sub-activity is presented in the Table 43.

Table 43: Expected Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Selecting the PP/FIG/FPO	DOA / ATMA	SO	Improved area under irrigation coverage with energy efficiency, timely irrigation and cost incurred by the farmers towards irrigation reduced.	<ul style="list-style-type: none"> • Clusters identified; • No. of PPs/FOPs/FIGs identified in a cluster; • No. of solar pump sets to be issued to each group finalized.
Discussion in the farmer group/PP for identification of beneficiary farmers	PP/FPO/FIG & SO	DOA/ATMA		<ul style="list-style-type: none"> • No. of farmer beneficiaries identified for distribution of solar pump sets.
Project support	DOA/ATMA	PP/FPO/FIG & SO		<ul style="list-style-type: none"> • No. of solar pump set units provided; • No. of farmers benefited.
Training/ orientation to beneficiary farmers on installation,	DOA/ATMA	PP/FPO/FIG & SO		<ul style="list-style-type: none"> • No. of training/orientation programs conducted; • No. of farmers participated in training/orientation program.

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
operation and maintenance.				
Supervision, Monitoring and Maintenance	Beneficiary farmer	PP/FPO/FIG		<ul style="list-style-type: none"> No. of farmers who have accessed required technical support and guidance during monitoring / supervision.

3.1.5.4 Organic Waste Converter

(Cost Table Reference: C1.3-C)

Aerobic composting is the best method to handle the crop waste/residues, otherwise would normally subjected to burnt and cause air pollution. Compost contain good amounts of nutrients and when applied to soil improves soil texture, soil fertility, increases water holding capacity, improves aeration, builds soil beneficial bacterial population. Organic waste converters are now available in the market that are specially designed to make composting easy and convenient. Available in compact and fully automatic model. Equipped with intuitive technology which maintains the right temperature, air flow and moisture. For proper composting and hasten the process of composting, the material is inoculated with a special bacterium culture which is heat, salt and acid resistant. When organic waste is filled in converter, increase in moisture level is detected by sensor which subsequently starts the heating system. As the temperature increases it activates the bacteria which breaks down organic waste into fertile compost. At the same time moisture in waste is converter into water vapor which is vented through blower into drain. The constant temperature and air flow prevent odor and pest problem. The machine needs to be emptied only once a week and the compost can be used for field application. Organic waste converters are available in various capacities. May be purchased as per the requirement.

Objective

1. To convert organic waste/crop residues in to useful compost;
2. To apply compost to soil under INM practice;
3. To improve soil health with compost application to soil.

Advantages with Organic Waste Converter

1. Smart and fully automatic;
2. Processes almost of all type of organic waste;
3. Noiseless and no foul odour is created during operating;
4. No pathogens or harmful gases are generated;
5. Easy to handle. No specialized skills are required;
6. Electricity requirement is also less;
7. High durability and user safety, maintenance cost is also less.

Beneficiary Selection

1. Beneficiary should be a trained and registered Agri Entrepreneur or a member of PP/FPO;
2. Preference will be given to those having minimum 0.5 acres of cultivable land;
3. Both command area and non-command area farmers/individuals are eligible for availing the facility;
4. Preference will be given to SC/ST and women members;
5. He should have good rapport with fellow farmers;
6. He should able to spare full time dedicatedly.

Project Assistance

Organic waste converter will be given to PP/FPO at 90% subsidy cost / as per the assistance norm of govt. Given at one per block / cluster of villages. Pani Panchayath/FPO intern can give it to an Agri Entrepreneur/ interested individual to operate the same in a business mode by offering paid services to farmers to convert their crop residue to get quality compost. Project will also provide training /orientation on operational of the machine. The selected entrepreneur / beneficiary will contribute 10.0 percent of the cost of the machine. Maintenance and operational will be borne by the entrepreneur / beneficiary. Further, beneficiary has to take the total responsibility of generating his own business to run in profit.

Key Guiding Principles

1. The given Organic Waste Converter should be primarily utilized for the purpose it meant for;
2. Cluster approach will be followed in selecting the PP/FPO. The clusters will be identified based on cropped area, quantity of crop residues generate, availability of electricity, connectivity with neighbor villages etc. Organic waste converters one or more numbers will be given to PPs/FPOs as per the demand generated;
3. Project will give the subsidized Organic Waste Converter to PP/FPOs, provided PP/FPO should assure the maintenance aspect;
4. PP/FPO intern can distribute the equipment to individual beneficiary within the PP/FPO group or Agri Entrepreneur as per the selection criteria framed;
5. Beneficiary should be a member of PP/FPO or registered and trained Agri Entrepreneur. Most desperately required person will be given the Organic Waste Converter;
6. No maintenance cost will be provided by the project.

Role and Responsibilities:

Farmer / Agri Entrepreneur (AE) / CBOs:

1. Apply to PD-ATMA to take up Organic Waste Converter as a business venture;
2. Participate in assessment to be conducted by PD-ATMA with the support of SO;
3. Prepare / develop a bankable business plan for credit linkage (if so required);
4. Invest in establishing the unit, apart from proposed project support;
5. Maintenance of records on business transactions;
6. Preparation of monthly / quarterly reports on business transactions and submission to PD-ATMA;
7. Timely repayment of credit to the financial institutions / cooperative / NBFC

PD-ATMA / Deputy Director, Agriculture:

1. Finalisation of selection criteria for farmers / AEs / CBOs;
2. Selection of Farmers / Agri-entrepreneurs / community organisations;
3. Support the farmer / AE / CBO in preparation of a business plan and its linkage with formal financial institutions / other credit providing institutions (like cooperatives / NBFCs etc.);
4. Developing standard operating procedure, including operation and maintenance of the asset;
5. Support the selected farmer / AE / CBO with organic waste converter;
6. Orientation of farmer / AE / CBO on operation, management and maintenance of the asset;
7. Periodic monitoring and assessment of performance;
8. Documentation of learning / case studies.

Support Organisation:

1. Community / farmer awareness / sensitization on organic manure and its importance for soil health;
2. Support PD-ATMA in assessment of the farmer / AE / Community Organisations;
3. Assessment of agricultural / organic waste which can be converted to organic manures;
4. Support PD-ATMA in preparation of business plan and orientation of farmer / AE / CBOs;
5. Time to time visit to the unit and consultation with the farmer / AE / CBO on unit performance;
6. Support PD-ATMA in documentation.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Review the progress in achieving physical and financial targets;
2. Helping and guiding PD-ATMA in preparing a business plan around Organic Waste Converter;
3. Monitoring visits to the established units and discussion with the farmer / AE / CBO on performance;
4. Assessment of profitability of business and income of the farmer / AE / CBO;
5. Documentation and dissemination of learned lessons;

Role and responsibility of different institutions by sub-activity is presented in the Table 44.

Table 44: Expected Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Selecting the PP/FIG/FPO	DOA / ATMA	SO	Income generated to operating member, Quantity of compost generated, area applied with compost, increased soil fertility, increased water use efficiency	<ul style="list-style-type: none"> • Clusters identified for supporting organic waste convertor/s; • No. of PPs/FOPs identified in a cluster; • No. of organic waste converter issued to each group finalized. • No. of farmer beneficiaries identified for distribution of organic waste converters. • No. of organic converters provided; • No. of farmers benefited. • No. of training/orientation programs conducted; • No. of beneficiary individuals participated in training/orientation program. • No. of beneficiaries who have accessed required technical support and guidance during monitoring / supervision.
Discussion in the farmer group for identification of beneficiary farmers	PP / FPO / FIG & SO	DOA / ATMA		
Project support	DOA / ATMA	PP / FPO & SO		
Training/ orientation to beneficiary farmers on installation, operation and maintenance.	DOA / ATMA	PP / FPO & SO		
Supervision, Monitoring and Maintenance	Beneficiary farmer/ individual	PP / FPO / FIG		

3.1.5.5 Moisture Meter

(Cost Table Reference: WR-20 / C1.3-C)

Soil moisture meter is developed, and field tested by Sugarcane Breeding Institute, ICAR. It indicates the soil moisture instantly and is very effective in scheduling of irrigation as per the actual crop requirement. Scheduling irrigation as per the soil moisture status not only enables timely application of the water in required quantity, also saves time and electricity, thereby minimizing the cost of irrigation and water wastage. Further, discriminate use of water prevents waterlogging and saves the nutrients leaching out of the root zone. Soil moisture meter has a probe when inserted into the soil displays moisture levels by glowing coloured light indicators. Based on the moisture level indicated, irrigation will be scheduled. Studies have shown that the soil moisture meter is suitable for different soils and different crops (both agri and horticulture crops), and nurseries.

Table 45: Interpretation of Soil-Moisture Meter Reading

Colour of LED Bulb	Soil Moisture Status	Inference
Blue	Ample moisture	No need for irrigation
Green	Sufficient moisture	Immediate irrigation may not be required
Orange	Low moisture	Irrigation advisable
Red	Very low moisture	Immediate irrigation is required

Objective

1. To increase water use efficiency and water productivity;
2. To protecting the rainfed crop by providing critical irrigation.

Beneficiary Selection

1. Beneficiary should be a member of FFS;
2. Farmer should have irrigation facility;
3. Both command area and non-command area farmers are eligible for availing the facility;
4. Farmers cultivating as share cropper are also eligible to avail the subsidy;
5. Farmer should be interested in crop diversification in low land areas in Rabi season and in uplands in kharif season.

Project Support

Moisture meters will be provided to participating farmer of FFS at free of cost. Moisture meters will be provided to the beneficiary only once and one per farmer, even though the farmers are attending more than one FFS.

Key Guiding Principles

1. Moisture meters will be provided at free of cost to the beneficiary farmer;
2. The given moisture meter should be primarily utilized in cultivated land;
3. Each qualifying farmer of FFS will get the moisture meter along with the kit provided at the end of FFS;
4. Project will provide moisture meters to FFS farmers through PPs/FIGs;
5. No maintenance cost will be provided by the project.

Role and Responsibilities:

Farmer:

1. Installation of moisture meter on the field and taking reading periodically;

2. Recording of reading of moisture meter and communicating to the PP accordingly for irrigation scheduling;
3. Using alternative source of irrigation (ground water) in case of requirement;
4. Operation and maintenance of moisture meter.

Community Organization (PP / FPO):

1. Selection of beneficiary farmers after due consultation with the member farmers;
2. Preparation of list of farmers and its submission to PD-ATMA directly or through SO;
3. Support PD-ATMA in consultation with the identified beneficiaries;
4. Receiving moisture meters from PD-ATMA and its distribution to farmers;
5. Review of moisture meter data and using it for irrigation scheduling
6. Periodic monitoring and reporting to EE-MI / PD-ATMA

PD-ATMA:

1. Review the list of beneficiary farmers, as prepared by the CBOs (PP / FPO);
2. Consultation with identified / listed farmers;
3. Supply of moisture meters to PP / FPO as per the plan;
4. Orientation to the beneficiaries on the use of moisture meter and its application in irrigation scheduling;
5. Periodic monitoring and assessment of use of moisture meter and its benefits.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Review the physical and financial progress of the activity;
2. Monitoring visits and discussion with the farmer / CBO on benefits of moisture meters;
3. Assessment of reduction in water loss / improved irrigation efficiency / water productivity;
4. Documentation and dissemination of learned lessons;

Table 46: Expected Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Consultation with PP / Farmers	DOA / ATMA	SO	Moisture meters installed by selected farmers and farmers takes measures as per the reading	1. No. of PPs consulted and no. of farmers selected for the installation of moisture meter; 2. No. of demonstrations conducted on O & M of Moisture Meters and number of farmers trained; 3. IEC material prepared and provided to farmers for reference; 4. No. of farmers taking required measures based on the moisture meter reading; 5. Farmers supported during monitoring and learning cases documented.
Selection of Farmers	PP	DOA / ATMA		
Demonstration on Moisture Meter	DOA / ATMA	SO		
Guiding Note / IEC material on O&M of Moisture Meter	DOA / ATMA	SO		
Monitoring and Documentation	DOA / ATMA	DLPMT		

3.1.5.6 Farm Guard

(Cost Table Reference: C1.3-C)

Farm guard is developed, and field tested by ICAR-National Research Centre for Integrated Pest Management. It serves like an on-site mini bio-control lab. It is a water proof device installed in the

field to multiply the beneficial insect population viz., predatory wasps that feed on the pests of cereals (paddy for rice case worm, leaf folder, hispa & stem borer), pulses (for pod borer), oil seeds (groundnut for Tobacco caterpillar) and vegetables (cabbage & cauliflower for diamond back moth; tomato/brinjal/cucumber/okra for fruit and shoot borer) etc. Host parasite larvae are reared in the devices to which the beneficial wasps are attracted, and their population is built. The wasps that produced in the device chamber will spread in the field and attack the larval pests and parasitize them. Farm guard appears to be a good option in situations of pest resurgence and pesticide resistance.

Objective

1. To control the pests by biological means under IPM;
2. To reduce the use of chemical pesticides;
3. To minimize the cost of cultivation with reduction in input cost.

Advantages of Farm Guard

1. Pest population will be under control;
2. Reduces the use of chemical pesticide;
3. Reduction in cost of cultivation, enhances farmers' income;
4. Maintains biodiversity in the ecosystem;
5. Eco-friendly and restore the ecosystem;
6. Handling is simple, doesn't require any special skills;
7. Durable and lasts for several years;
8. Maintenance of device and multiplication of beneficial wasp parasite is simple and affordable.

Project Support

Farm guards will be provided at free of cost to the PP of the command area, i.e., one per hectare land in the tank command area. The devices will be provided only once and its maintenance would be the responsibility of concerned PP.

Key Guiding Principles

1. Farm Guard will be installed in the tank command area, in saturation mode;
2. One farm guard will be installed in each ha. of cultivated land;
3. The actual place of installation within the command area will be decided in the PP meeting;
4. Project will provide farm guard through PP only. Pani Panchayat has to take the responsibility of installation in the common area;
5. It is the responsibility of the farmer for its maintenance and recurring cost of operation (cost of food grains required to multiply the predator population). Modalities in this regard will be discussed and decided by PP in the meeting;
6. No maintenance cost will be provided by the project and concerned land holder has to bear the maintenance cost.

Role and Responsibilities:

Farmer:

1. Installation of farm guard in the field with the support of CBO (PP / FPO);
2. Monitoring pest / disease attack / control;
3. Operation and maintenance of farm guard.

Community Organization (PP / FPO):

1. Selection of beneficiary farmers after due consultation;
2. Preparation of list of farmers and its submission to PD-ATMA;
3. Support PD-ATMA in consultation with the identified beneficiaries;
4. Receiving farm guard from PD-ATMA and its distribution to farmers / field installation;
5. Periodic monitoring on benefits of farm guard and reporting to PD-ATMA / DDA / DDH.

PD-ATMA:

1. Review the list of beneficiary farmers, as prepared by the CBOs (PP / FPO);
2. Consultation with identified / listed farmers;
3. Supply of farm guards to PP / FPO as per the plan;
4. Orientation to the beneficiaries on the use of farm guard;
5. Periodic monitoring and assessment of use of farm guard and its benefits.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Review the physical and financial progress of the activity;
2. Monitoring visits and discussion with the farmer / CBO on benefits of farm guard;
3. Assessment of reduction in pest / disease occurrence during Kharif / Rabi;
4. Documentation and dissemination of learned lessons;

Table 47: Expected Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Consultation with PP / Farmers	DOA / ATMA	SO	Farm guard installed by selected farmers in cultivated land and pest incidence is managed through farm guard	1. No. of PPs consulted and no. of farmers selected for the installation of farm guard; 2. No. of demonstrations conducted on O & M of farm guards and number of farmers oriented; 3. IEC material prepared and provided to farmers for reference; 4. No. of farmers conforming reduction in pest attack and reduction in cost of pesticides; 5. Farmers supported during monitoring and learning cases documented.
Selection of Farmers	PP	DOA / ATMA		
Demonstration on Farm Guard Operation	DOA / ATMA	SO		
Guiding Note / IEC material on O&M of Farm Guard	DOA / ATMA	SO		
Monitoring and Documentation	DOA / ATMA	DLPMT		

3.1.5.7 Farm Mechanization

(Cost Table Reference: CI.3-C)

Timely access to farm machinery from sowing to harvesting is an important component of adaptation strategy to deal with climatic variability and scarce agricultural labour force. The sowing window in rain-fed areas most of the time is very short and at the same time small farmers’ access to farm machinery is poor. As a result, many farmers are not able to sow the crop on time, hence they incur significant yield losses. Lack of access to improved implements and farmers’ inability to procure improved implements are some of the reasons for non-adoption of improved agronomic practices or technology that involve mechanization. Therefore, the project plans to provide improved implements through “Custom Hiring Centre” at the community level. The PP or the local FPO will manage the implements and earn hiring charges from farmers.

Advantages of Custom Hiring Centres

1. Providing access to small and marginal farmers to farm machineries;
2. Facilitates timeliness in farm operations and efficient use of inputs;
3. Promotes adoption of climate resilient practices and technologies by farmers because of availability of appropriate machines at reasonable hiring charges;
4. Promotes increase in cropping intensity wherever feasible;
5. Facilitates crop residue recycling and prevents burning of residues;
6. Reduction in cost of cultivation;

Objective of Custom Hiring Centre (CHC)

The overall objective of establishing custom hiring centre at the tank / cascade level, covering all the tank commands and project villages, is to improve the farm mechanization rate by making available farm equipment at the local level for enhanced farm production and productivity. Specific objectives of promoting CHCs are;

1. Improving area under farm mechanization and reducing manual labour dependency;
2. Improve efficiency in terms of output per unit of time invested in farmyards; and
3. Drudgery reduction of farmers in general, and women farmers in particular.

Approach and Strategy

Under this activity, the project will establish CHCs and support for procuring farm implements by which small and marginal farmers can avail of these benefits by paying nominal hiring charges. It will enable small and marginal farmers to take up farm operations on time. The CHCs will meet the agricultural operations from sowing to harvest. Such CHCs will be established on cluster approach to cover approximately 400 ha.

Machinery and implements tentatively arranged at CHC will have groundnut digger, ferti-seed drill, zero-till drill, seed drills, multi crop planters, power weeders, Konoweeder, rotary weeder, combine harvesters, threshers, power tillers, sprayers, rotovators for residue incorporation, diesel pump sets, chaff cutting machine, line marker, other need-based small farm implements, etc. The project will also support in procuring crop specific (paddy crop) relevant machinery such as drum seeders, seed drills, transplanters, combined harvesters, etc. These are some of the important farm implements and machines which will be available at the custom hiring centre. However, before the procurement of machineries, there will be consultation with the local PP and FPOs on their requirement and area specific demand for different machineries.

A committee of farmers will be nominated by the PP / FPO to manage the custom hiring centre. Based on the feasibility, and considering the capacity of the PP / FPO, CHC management may be delegated to them. It will help these local institutions to generate revenues and manage / maintain the CHCs smoothly. The rates for hiring the machines/ implements are to be decided by the PP/FPO itself. Every farmer in the village (non-command farmers also) can hire the machines from these centers on a 'first come first serve' basis. The modalities of utilizing custom hiring centre will be decided by the committee members themselves and amended from time to time as per the local situation and needs. The organization / institution having the CHC management responsibility will use the revenue generated from hiring for repair and maintenance of machinery and implements.

Key Guiding Principles

1. Custom hiring centers will be established in the selected tank / cascade villages within the project area only. Project proposes to establish one CHC per block;
2. Priority will be given to the villages having low farm power availability and large area under small and marginal holdings;

3. Each CHC will have the capacity to cover minimum area of 10 ha/day and at least 400 ha in a cropping season. Implements/small machines can be hired for all the operations from land development to residue management;
4. Each custom hiring centre will have small crop-specific machinery suitable for local requirement for mechanized farming under small and marginal holdings;
5. The following parameters may be chosen for selection of village for setting up of custom hiring centers:
 - a. Low ratio of farm power availability;
 - b. Low number of tractor population;
 - c. Small & marginal operational holdings;
 - d. Less productivity of food grains but potential to enhance productivity.
6. Agriculture department will identify/invite applications from PPs / FPOs to set up CHCs;
7. Available government land / GP land, without any encroachment / legal litigation will be utilized for setting-up of CHC infrastructure. There would not be any private land acquisition for CHC infrastructure construction;
8. The concerned PP / FPO may also provide land for establishing CHC, if they have land in their name which is free from any litigation;
9. The CHCs shall have farm machineries that are women farmer / women agricultural workforce friendly.

Role and Responsibilities:

Community Organizations (PP / FPO):

1. Selection of area for establishment of CHC along with PD-ATMA / DDA / SO;
2. Applying to PD-ATMA / DDA for the establishment of CHC;
3. Submission of required documents, including land records for CHC establishment;
4. Discussing / suggesting PD-ATMA / DOA on priority list of machineries / equipment;
5. Prepare a business plan that is bankable and implementable;
6. Taking steps for credit linkage with financial institutions (if credit is required after project support);
7. Construction of sheds / CHC unit;
8. Finalizing the hiring cost of different machineries in consultation with PD-ATMA / DDA;
9. Scheduling requirement of farmers (farm machinery based) and renting out machineries;
10. Collection of rental charges from the farmers and depositing in bank account;
11. Timely maintenance of the assets / machineries from the generated revenue;
12. Reporting the performance of the CHC to PD-ATMA / DDA / DLPMT members.

PD-ATMA and DDA:

1. Assessment of current farm mechanization status in the project area;
2. Discussion with the CBOs (PP / FPO) on establishment of CHC;
3. Capacity and feasibility assessment of CBOs (PP / WUA / FPO) for project support;
4. Finalization of area for establishment of CHC as per the assessment;
5. Review & verification of land record of CBO (PP / FPO) before establishing CHC;
6. Procurement of farm machineries / equipment and handing over to selected CBO (PP / FPO);
7. Facilitate in preparing a bankable business plan and support in credit linkage (if credit is required);
8. Developing standard operating procedures for the CHCs;
9. Orientation to the CBO (PP / FPO) on operation, management and maintenance of the CHC;
10. Conducting periodic monitoring and review the revenue generation and financial management;
11. Documentation of learning lessons.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Support PD-ATMA / DDA in procurement of certified farm machineries as per the Govt. guidelines;
2. Review the physical and financial progress of the activity;
3. Periodic monitoring and discussion with the farmer / CBO on benefits of CHC;
4. Assessment of area increment under farm mechanization during Kharif / Rabi, reduction in cost of cultivation, reduction of drudgery, reduction in manual labour dependency etc.;
5. Assessment of accessibility of farm machineries by women farmers, tribal farmers, marginal and small farmers;
6. Documentation and dissemination of learned lessons;

Table 48: Expected Outputs and Indicators; Custom Hiring Centre

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Assessment of farm mechanization at the tank / cascade level during planning	PD-ATMADDOA	PP/SO	Area under mechanized operation increased, with reduction in manual labour dependency and drudgery	No. of tanks / cascades covered under feasibility assessment;
Selection of tanks cascades / clusters having poor farm mechanization rate	PD-ATMADDOA	PP/SO	Tanks / cascades finalized as per the criteria laid out for establishment of CHC	No. of tanks / cascades / project villages finalized for farm mechanization improvement;
Discussion with local PP/ FPO on CHC and its operational mechanism	PD-ATMADDOA	SO	Local PP / FPO consulted on need of machineries & related aspects. Operational plan of CHC also discussed and finalized	No. of PP / FPO consulted and no. of CHCs having operational plan and revenue generation models.
Identification of suitable location and construction of CHC	PD-ATMADDOA	PP / WUA	Suitable locations are finalized in cultivation with PP / FPO and CHC established in litigation free land.	No. of CHCs established.
Procurement of machineries with ISI mark / certified.	PD-ATMADDOA	-	List of farm machineries by CHC is prepared, based on the need and consultations, and machineries procured as per the procurement guidelines.	Required / listed out machineries / instruments are procured, as per the prescribed and required standards, for the CHCs and inventory is prepared.
Setting the operational modalities and revenue generation model and monitoring and supervision	PD-ATMADDOA	PP / WUA	Operation & revenue generation modalities of CHCs finalized along with PP / FPO and operational efficiency attained through periodic monitoring.	Amount of revenue generated by CHCs and no. of CHCs functioning as per the set benchmark.

3.1.5.8 Capacity Building

(Cost Table Reference: C1.1-D)

3.1.5.8.1 Farmer Field School

Farmer Field School (FFS) is an informal education system conducted by the farmers on their own fields. Farmers were organized, trained and facilitated to learn basic crop management (pest & nutrient management) skills and educate them to take right decision. It is a research based, season long, two-way interactive learning system between the farmers and the facilitator (extension staff/scientist). The participatory approach adopted to disseminate and fine tune the location specific production technology based on available resources with farmers in such a way that, adoption rate becomes high. Project proposes to promote Integrated Crop Management practices through Farmer's Field Schools- cum- demonstrations approach which is a very effective means of transferring IPM/INM technology to the farmers' field. Project proposes to conduct FFS on IPM and INM in need-based crops among the prioritized crops viz., rice, pulses, oil seeds and vegetables only. As all the agronomic practices are timely followed with appropriate inputs, there is no reduction of the yield.

Objectives

1. To involve farmers and strengthen their role in research and extension particularly in situations where farmers have no access to regular and reliable technical support from extension agencies;
2. To increase farmer's knowledge and skills in improved crop management practices particularly INM and IPM practices.

Approach & Strategy

Farmer's Field School provides opportunities for learning by doing. It is a season long programme which is organized in farmer's field by meeting once in a week or 10 days. It is season long so that it covers all the different developmental stages of the crop and their related management practices. Farmers themselves conduct a research study and compare the results with the adjacent neighbor control field. In each Farmer's Field School, 50 farmers were trained 5-6 times depending upon the crop duration, during the entire cropping season, starting from land preparation to post harvest technology. Women farmers should also be included in FFS. The Support Organization will execute the entire process with the logistic support provided by ATMA at In FFS approach, the school provides farmers with tools which enable them to analyze their own production practices. Support Organization will play the role of overall facilitator, who will technically lead the group members through the hands-on exercise and facilitate to take decision on crop management practices to be taken, trainings and demonstrations. Support Organization trainings with the technical support of scientists of OUAT/ICAR Institutes/ICRISAT/KVKs/DOA personnel. Besides, ICRISAT, ICARDA and IIRI will provide location specific climate resilient seeds. For effective communication, both audio and visual aids (demo films etc) will be used in the training program.

Farmers will be trained on Integrated crop management practices from sowing to harvest by giving special emphasis on the Integrated Pest Management (pest and disease surveillance, their habit and habitat, nature of damage, time of occurrence, life cycle, control measure, including method and result demonstration of seed treatment & bio-control agents, adverse effects of injudicious pesticide use etc) and Integrated Nutrient Management (Soil sampling, soil testing-soil health cards, identifying soil related problems, soil test based nutrient recommendations, soil nutrients, fertilizers & manures, various bio-fertilizer usage, seed treatment/soil inoculation with biofertilizers, calculating nutrient requirement/dose, identifying nutrient deficiency based on symptoms produced and corrective measures etc.).

Selection of Village:

1. Before selecting the village, situation analysis of the village should be carried out to assess area under cultivation of selected crop, no. of farmers cultivating, pest problems and pesticide usage in previous crops, soil problems and fertilizers usage in previous crop, status of irrigation facilities, social and economic status of the farmers, women farmer population, assessing approachability etc. to enable village selection;
2. Easy approachable village, assured season long irrigation facility should be preferred;
3. Villages having maximum pest problems and high pesticide/fertilizer to be preferred;
4. Village should have good acreage of the area under selected crop. At-least 30-50 farmers in the village should be interested to grow the crop chosen;
5. Willingness of farmers associated with PP / FPO / FIG to take up demonstrations.

Selection of Farmers for Demonstration:

1. Farmers who are willing to provide critical resources (land/water/labour / any other input not supported by the project);
2. She / he should be a progressive farmer and member of the concerned PP/FPO/FIG;
3. Should have good relation with other farmers of the PP/FPO/FIG and neighbouring village farmers;
4. Preference should be given to the socio-economically backward/SC/ST/small & marginal farmers/women farmers of the PP for coverage under demonstration;
5. Farmers cultivating other's land on share cropping or on leased-in basis are also eligible;
6. The identified plot for demonstration should be easily approachable by other farmers & extension workers;

Key Guiding Principles

1. The FFS will be conducted for specified crop among the prioritized crops in the village. As the FFS is crop specific, depending on the demand and farmers interest, there may be more than one FFS in a village;
2. In each of the project tank command area, FFS will be conducted on 4 most potential crops among the prioritized crop list at its maximum and conducted for 3 subsequent years in different locations within the tank command area;
3. Crop specific and location specific, climate resilient crop management practices (seed, cropping system, agronomic practices, INM and IPM practices etc.) will be demonstrated in the farmers' field. Other field adjacent to demonstration field will be taken as control field for comparison of results. The crop and variety / technology selected for demonstration should be based on the need and preference of the farmers;
4. Crop wise technologies to be demonstrated will be packaged by DOA/ATMA under the technical guidance of SAU/ICAR/IRRI/ICARDA&KVK with involvement of project personnel, technical officers from Agriculture Department and ATMA.
5. Entire cost of running FFS that included both demonstration cost and training classes will be borne by the project. Farmer has to contribute land, water, labour and day to day supervision;
6. Demonstration will be carried out preferably in command area under assured irrigation facility and few demonstrations may also be carried in adjacent non-command area where irrigation through ground water is assured. However, farmers from both command and non-command area can be member of FFS, provided s/he should be a member of FIG/CIG and growing the same crop;
7. In cases, where demonstrations are carried out in the tank command area, it will not restrict any farmer from the non-command area / nearby villages to learn from demonstration. All farmers, including farmers from the nearby villages, irrespective of holding size, should be

allowed to participate in the farmer's field day by which they would be benefited by visiting the demonstration plots;

8. The site of demonstrations should be at a place of easy accessibility and at central point to attract large number of audience/farmers for wider impact and easy monitoring;
9. The demonstrations may be conducted in cluster approach of at least 1-2 ha as per the availability. The size of control plot in adjacent area within the same farmers or neighbour farmer should be of same size as that of demonstration plot;
10. Prior to demonstration, situation analysis should be conducted to assess the existing level of adoption of different technologies and crop productivity;
11. All the important farm operations should be carried out by the demonstrating farmers under the close supervision of officials of dept. of Agriculture and farmers empowerment and under the guidance of scientist;
12. A display board mentioning about the key details of the variety/technology demonstrated should be erected at the demonstrated plot;
13. Farmers will be taken to the demonstration site (every week to 10 days duration) to assess the crop growth, pest incidence etc. and discuss the same to arrive at a decision to tackle the problems;
14. At maturity, just before harvesting, "Field Day" may be organized where farmers from neighbouring villages and extension workers are invited. A farmer-scientist interaction session would be organized on the event. On the field day, crop yield in 1m² plot to be done in front of farmers, covering both demonstration and control plot/s.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Consultation with farmers on FFS and its benefit details;
2. Selection of beneficiaries as per the set criteria (accessibility, land holding, irrigation provision etc.) in consultation with PD-ATMA / DDA and with the support of SO;
3. Preparing a list of selected farmers and submission of list to PD-ATMA / DDA;
4. Encouraging other farmers to visit the FFS and learn about application of practices / technologies.

PD-ATMA / DDA:

1. Review the list of farmers prepared and submitted by the CBOs (PP / WUA / FPO);
2. Consultation with the CBOs and selected farmers on FFS, implementation mechanism etc.
3. Orientation to the selected farmers (if found required);
4. Prepare detail plan for technology and input support at different stages of crop growth;
5. Providing input and technical support as per the plan;
6. Periodic visit to the field by technical staff and guiding the farmers;
7. Facilitate in organizing "field day" and orienting farmers on practices / interventions taken up;
8. Documentation of learning and its dissemination.

Technical Support Agencies (OUAT / KVK etc.):

1. Periodic visit to the demonstration / FFS sites and assesses the quality;
2. Extend required guidance and technical support;
3. Support the farmers in adopting appropriate technologies in the demonstration fields;
4. Orientation of farmers in field day and educate them on the importance of package of

DLPMT:

1. Periodic monitoring by the members of DLPMT to the FFS sites;
2. Discussion with the farmer involved in demonstration / FFS;
3. Assess the package of practices adopted and its benefits;
4. Preparation of monitoring report and its sharing with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Periodic monitoring to the demonstration sites;
2. Consultation with farmers and PD-ATMA / DDA;
3. Assess the benefit of the FFS by consulting the beneficiary and other farmers;
4. Document the learning lessons and dissemination.

Table 49: Expected Outcome and Responsibilities

Sub-Activity	Responsibility		Expected Outcome	Indicator
	Primary	Secondary		
Village selection & situation analysis	DAO/ATMA	SO	1. Farmers gained knowledge and learnt about the area and crop specific management practices with a special focus on INM/IPM practices;	<ul style="list-style-type: none"> • No. of villages selected for demonstration; • Crop wise no. of FFS groups finalized; • No. of farmers in each group finalized; • No. of farmers with average demonstration area finalized.
FFS Planning meeting in the village	PP/FPO / FIG	DAO/ATMA / SO		
Demonstration	DOA/ATMA	SO /FPO / FIG	2. Farmers empowered to take appropriate decision with respect to efficient crop management;	<ul style="list-style-type: none"> • Area (in ha) planned for coverage under each demo by crop types; • No. of technologies (package of practices) demonstrated by crop types; • Data (growth, yield, cost of cultivation) recorded for case analysis, for comparison with control plot; • No. of farmers supported by the project to take up the demo; • Documentation of farmer / demo. Plot wise quantity of each input provided; • No. of farmers oriented / trained / exposed to such demonstration sites, by their holding categories; • No. of training / orientation / exposure programs organized; • No. of farmers from nearby area visited for learning and adoption; • Challenges faced by the farmers in crop management addressed; • No. of Trainings organized in each FFS; • No. of farmers participated in the training programs/meeting.
Project Support (inputs)	DOA/ATMA	PP/FPO/FIG		
Training / Orientation	DOA /ATMA	SO	3. Number of farmers adopting recommended climate resilient crop management practices.	<ul style="list-style-type: none"> • Field day conducted and results documented; • No. of farmers participated in the field day; • Scientists participated in field day. • No. of monitoring visits conducted by departmental officials and scientists; • Key areas of inputs provided based on the field observation and its follow-up; • No. of learning cases documented and disseminated for adoption / replication.
Group facilitation and On-field technical guidance to farmers	SO/ATMA/KVK	DoA / Other Research Institutions		
Conducting field day	DOA / ATMA	SO / FPO / FIG		
Overall Monitoring Learning	DOA / ATMA	DLPMT/ SO/FIG / FPO		

Sub-Activity	Responsibility		Expected Outcome	Indicator
	Primary	Secondary		
Documentation	DOA / ATMA	SO / Research Institutions		<ul style="list-style-type: none"> Record of data base such as details of demonstration sites, farmer details, training programs conducted, results obtained (yield); Post demonstration adoption, constraints and opportunities documented for sharing and adoption.

3.1.5.8.2 Farmers Training on Climate Resilient Agricultural Practices

Capacity building of farmers on Climate Resilient Agricultural Practices is key for sustaining interventions under OIIPCRA. Project will take required capacity building measures for the farmers in the tank for adoption and replication of climate resilient package of practices. Training modules on climate resilient practices will be developed to impart training to the farmers. Along with the farmers, the associated project personnel / staff / experts would also be given training so that their learning can percolate down to the farmers during field orientations, guidance and awareness initiatives.

Climate resilient agriculture includes a broad set of practices of crop production that sustainably increase productivity and resilience, reduce and/or remove greenhouse gas emissions wherever possible and adapt the crop production to adverse impact of climate change to enhance the achievement of food security and development goals.

Objective

1. To impart knowledge to farmers on climate change, its impact on agriculture, feasible adaptation strategies to climate variability and mitigation measures of climate change
2. To equip farmers, irrespective of their holding category, on climate resilient agricultural practices
3. To strengthen the knowledge base of farmers through practical demonstration, sharing research findings and learnings from national and international practices

Project Assistance

The project will bear the entire cost of training and capacity building of farmers / other stakeholders, as per the project design.

Key Guiding Principles

1. Project village will be considered as the unit, covering both command and non-command farmers;
2. Capacity building of farmers will cover training, exposure, hand holding, escorting etc. as per the identified capacity building needs;
3. Key capacity requirements, as per the capacity need assessment will be identified before finalizing capacity building plan. Training modules would be developed, encompassing the identified thematic areas for capacity building;
4. Separate capacity building plan would be developed for women and tribal farmers;
5. Capacity building measures will be taken up in a phased manner, keeping in mind the agricultural season and engagement of farmers;
6. Based on the need of the women farmers, trainings may be organized locally, at the village level or in a suitable place which is easily approachable by the women farmers;
7. Training on climate resilient technologies, package of practices specific to crop types, IPNM, IPM, agro-enterprise promotion etc. may be taken up, if so, identified as a capacity building need;

8. Necessary training modules / manuals / IEC materials would be designed and circulated to farmers;
9. As a part of capacity building, field demonstrations and in-situ guidance will be provided along with exposure to some of the demonstration sites;

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Mobilizing farmers to participate in the CNA process;
2. Discuss with PD-ATMA / DDA / DDH from time to time on capacity building initiatives;
3. Participate in capacity building programmes;
4. Create awareness among farmers and follow-up for adoption of climate resilient practices;
5. Coordinate with PD-ATMA / DDA / DDH / SO in coordinating capacity building programmes.

PD-ATMA / DDA / DDH:

1. Consultation with the farmers on their current agricultural practices (crop specific);
2. Conducting Capacity Need Assessment (CNA) of the farmers in both command and non-command areas, taking village as the unit, using the designed tool for CNA;
3. Identifying capacity gap through CNA by different land holding categories;
4. Designing a capacity building framework / plan on climate resilient agricultural practices for the farmers, based on the identified gap and taking in to account the agro-climatic condition of the area;
5. Preparing a detail report on CNA, including capacity building plan and finalizing with SPMU-OIIPCRA;
6. Preparing modules / manuals for capacity building of the farmers;
7. Piloting the modules / manuals and its adoption for capacity building;
8. Finalisation of resource persons, and if required, taking support of S-SPU / SPMU
9. Organising capacity building programmes as per the finalized capacity building framework / plan;
10. Follow-up of the capacity building inputs and organizing refresher courses, if required;
11. Educate, aware and motivate farmers to adopt climate resilient practices.

Support Organization:

The Support organization will support PD-ATMA / DDA / DDH in the following areas;

1. Piloting of the capacity need assessment tool and suggest for modification, if any required;
2. Execution of CNA tools and collection of required data, with the support of PP / WUA and other community organizations;
3. Identifying critical capacity gaps in relation of climate resilient agricultural practices;
4. Preparation of capacity building framework / plan;
5. Facilitate in organizing capacity building events;
6. Preparation of training reports and its submission to PD-ATMA / DDA / DDH;
7. Follow-up with the farmers for adoption of climate resilient practices.

DLPMT:

1. Participate in capacity building programmes and observe / witness the approach and process adopted for capacity building of farmers;

2. Suggest, if any modification required in capacity building approach or process adopted or delivery methodology;
3. Prepare monitoring report on capacity building and share during district level DLPMT meeting.

S-SPU and SPMU (PD-OIIPCRA):

The technical team of SPMU / S-SPU will support PD-ATMA / DDA / DDH in following areas;

1. Designing the capacity need assessment tool/s and its modification, if any, after piloting;
2. Designing capacity building framework / plan;
3. Finalization of CNA report and issuing required guidelines for conducting capacity building events;
4. Designing modules / manuals as per the identified capacity gaps;
5. Participate in piloting of the modules / manuals and making necessary correction / change in the modules / manuals;
6. Monitoring capacity building events and suggest, if any modification is required in delivery mechanism / methodology, capacity building approach or related aspects;
7. Document capacity building learning (in terms of adoption of practices by the farmers) and its dissemination.

Table 50: Outputs, Role and Responsibilities

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Conducting Capacity Need Assessment (CNA)	PD-ATMADO A	SPMU	Capacity requirement of farmers, including women and tribal farmers identified.	Report on CNA highlighting capacity gap areas and capacity building needs of farmers, including women and tribal farmers; Key capacity building areas identified to develop prepare capacity building plan and training modules.
Preparation of Capacity Building Plan	PD-ATMADO A	SPMU	Detailed capacity building plan prepared based on the identified needs, covering women farmers and tribal farmers.	Capacity building plan document prepared for capacity building.
Development of training modules / manuals / learning materials	PD-ATMADO A	SPMU	Different training modules / manuals developed (in English and Odia), covering identified areas of capacity building	No. of training modules / manuals / learning materials prepared and circulated to farmers for reference and understanding;
Execution of Capacity Building Plan (Organizing training / workshops etc.)	PD-ATMADO A	SO	Farmers participated in different capacity building events and gained knowledge on different thematic areas. Improved knowledge of farmers with respect to climate change, its impact on crop production, climate resilient agriculture practices as an adaptation	No. and trainings / workshops / exposures organized and no. of persons enrolled; Report on Training / workshop / exposure etc.

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Follow-up and organizing refresher, if required	PD-ATMADO A	SPMU	and mitigation measures. Knowledge base of farmers further strengthened on different agricultural aspects.	No. and days of follow-up trainings organized if any

3.1.5.8.3 Training of KrushakSathis

KrushakSathies are the village level facilitator/s for promotion of agriculture, who support farmers in different ways. The project will take measures to train them on various aspects to deliver better services at the grassroots level. The project implementing entity ATMA will train the KrushakSaathi for the mentioned purpose. Training programs to KrushakSaathis may be organised on following topics;

1. Induction training on OIIPCRA project activities & role and responsibilities assigned to KrushakSaathi
2. Training on group dynamics and formation of CIG/ FIG including their role in providing hand hold support to FIGs/CIGs
3. Training on activity wise support services that are to be rendered to the farmers.

Role and Responsibilities:

PD-ATMA / DDA:

1. Consultation with the KrushakSathis (KS) on their current role and responsibilities in promotion of agricultural / horticultural activities;
2. Conducting Capacity Need Assessment (CNA) of the KS using the designed tool for CNA;
3. Identifying capacity gap of KS through CNA;
4. Designing a capacity building framework / plan based on the identified gap;
5. Preparing a detail report on CNA, including capacity building plan and finalizing with SPMU-OIIPCRA;
6. Preparing modules / manuals for capacity building of the KS;
7. Piloting the modules / manuals and its adoption for capacity building;
8. Finalization of resource persons, and if required, taking support of S-SPU / SPMU
9. Organizing capacity building programmes as per the finalized capacity building framework / plan;
10. Follow-up of the capacity building inputs and organizing refresher courses, if required.

Support Organization:

The Support organization will support PD-ATMA / DDA in the following areas;

1. Piloting of the capacity need assessment tool and suggest for modification, if any required;
2. Execution of CNA tools and collection of required data;
3. Identifying critical capacity gaps, including project aspects for facilitating agriculture promotion;
4. Preparation of capacity building framework / plan;
5. Facilitate in organizing capacity building events;
6. Preparation of training reports and its submission to PD-ATMA / DDA.

DLPMT:

1. Participate in capacity building programmes and observe / witness the approach and process adopted for capacity building of KS;
2. Suggest, if any modification required in capacity building approach or process adopted or delivery methodology;
3. Prepare monitoring report on capacity building and share during district level DLPMT meeting.

S-SPU and SPMU (PD-OIIPCRA):

The technical team of SPMU / S-SPU will support PD-ATMA / DDA in following areas;

1. Designing the capacity need assessment tool/s and its modification, if any, after piloting;
2. Designing capacity building framework / plan;
3. Finalization of CNA report and issuing required guidelines for conducting capacity building events;
4. Designing modules / manuals as per the identified capacity gaps;
5. Participate in piloting of the modules / manuals and making necessary correction / change in the modules / manuals;
6. Monitoring capacity building events and suggest, if any modification is required in delivery mechanism / methodology, capacity building approach or related aspects;
7. Document capacity building learning (in terms of adoption of practices by the farmers) and its dissemination.

Table 51: Outputs, Role and Responsibilities

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Selection of KrushakSathis in consultation with PP / FIG / FPO	DOA / ATMA	PP / SO	Selected KrushakSathis trained on climate resilient agricultural practices / project supported technology transfer and deliver quality services as per the need of the farmers	1. Training needs of KrushakSathis identified for capacity building; 2. Training modules / manuals developed, as per the identified needs and finalized for adoption; 3. No. of KrushakSathis trained on climate resilient agricultural practices.
Assessment of Training Needs	DOA / ATMA	PP / SO		
Designing Training Module / Manual, pilot testing and finalization	DOA / ATMA	SPMU		
Organizing inhouse and Field Training	DOA / ATMA	SO		
Refresher Course (if required)	DOA / ATMA	SO		

3.1.6 Interventions in Horticulture Production

Along with agriculture, the project will support horticultural activities in the project districts, involving farmers of different land holdings and social strata who have been involved in horticulture activities or intend to adopt horticulture crops. Promotion of climate resilient practices in horticulture will be the cross-cutting area in the overall intervention. The project will facilitate in expansion of area under horticultural crops, support mushroom cultivation to supplement income of marginal and small farmers / share croppers / women farmers, reduction in cost of cultivation and promoting organic farming through vermicomposting, promotion of water saving drip irrigation system, encouraging protected cultivation for specific crops (floriculture), initiating appropriate post-harvest management measures etc.

3.1.6.1 Area Expansion Under Horticulture:

(Cost Table Reference: C1.1-C)

The objective of area expansion is to bring more area under horticultural crops, achieve sustainable production for longer periods with the use of quality plant material and timely application of required doses of fertilizer and other inputs along with adoption of recommended practices. This activity is to be implemented in clusters in a contiguous area, instead of doing it in scattered and unplanned manner. This approach will help in providing both backward and forward linkages and enable Directorate of Horticulture to discharge effective extension services. Such approach will also help in increasing yield and net return because of quality planting material and timely technical advisory, moreover, bulk production also enables good market.

Horticulture crops will be promoted in project districts where that particular crop is predominantly grown. The activity will be taken up as per the GOI / GOO guidelines. The activity will be taken up as per the existing norms of Mission for Integrated Development of Horticulture (MIDH) GOI guidelines.

Objective

The overall objective is to bring additional area under horticultural crops viz., high value vegetables particularly cabbage, cauliflower, brinjal and bitter guard and floriculture (particularly the marigold) with their improved varieties/hybrids and by adopting improved crop management practices. Further, the intervention also ensures crop diversification from paddy to high value horticulture crops.

Rationale

Out of a total area covered under paddy during kharif season, upland paddy constitutes about 20% - 30% and medium land constitutes 40%. Some of these upland paddy areas and some medium land under irrigated ayacuts may be suitably diversified for high value horticulture crops and vegetable cultivation.

Depending on the financial capacities, farmers can be motivated for hybrid vegetable cultivation, and floriculture to get higher income from unit area. Besides, vegetable cultivation also ensures nutritional security at house hold level.

Beneficiary selection

1. Interested farmers in the command area and non-command area, whoever is interested to cultivate horticulture crops, having assured irrigation facility in rabi season, power supply and farm soil suitability will be selected;
2. Beneficiaries will be selected preferably from both command area and non-command area within the tank village;
3. Beneficiary can be an owner, share cropper and those cultivating on leased-in mode;
4. Preference will be given to small and marginal farmers under SC/ST and women farmers followed by small and marginal and women farmers of other than SC/ST category;

Horticulture crops selected for area expansion under the project are as mentioned below;

1. High value vegetable cultivation
2. Floriculture (Marigold & Tuberose)

Project Assistance

It is proposed to take up area expansion of horticulture crops with project assistance; Project will support for input as per the existing norms followed by Department of Horticulture. Project share of support differ with vegetables cultivation and marigold cultivation.

Key guiding principles

1. Farmers from tank command and non-command area will be involved in area expansion programme;
2. Project support will be available for all the farmers, involved in the process, irrespective of their land holding in command and non-command area (village as the unit);
3. Beneficiary will be selected based on the suitability of farm soil, assured irrigation sources, interest and capability of the farmers to maintain the plantation;
4. In selection of beneficiary, farmers from ST communities and women farmers are to be preferably included;
5. Horticultural crops will be promoted in project districts where that particular crop is grown predominantly;
6. Minimum area per block should be 5 ha for area expansion;
7. Maximum limit for each beneficiary is 4 ha under establishment of new gardens;
8. New clusters & new beneficiaries shall be selected under the activity as per area specific and climate specific crops, preferably adjacent to the existing clusters;
9. Micro irrigation should be integrated for better survival of plantations.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Consultation and mobilizing farmers for area expansion activities;
2. Selection and finalization of interested farmers for area expansion;
3. Prepare a detail list of farmers and its submission to PD-ATMA / DDH;
4. Appraising PD-ATMA / DDH from time to time on progress and coverage of farmers;

PD-ATMA / DDH:

1. Review the list of farmers prepared and submitted by the CBOs (PP / WUA / FPO);
2. Consultation with the CBOs and selected farmers;
3. Orientation to the selected farmers (if found required);
4. Prepare detail plan for area expansion under horticultural crops on cluster approach;
5. Providing input and technical support as per the plan;
6. Periodic visit to the field by technical staff, guiding the farmers and assessing progress;
7. Documentation of learning and its dissemination.

DLPMT:

1. Periodic monitoring by the members of DLPMT to the farmer's field;
2. Discussion with the farmer involved in area expansion activity;
3. Assess the package of practices adopted and its benefits;
4. Preparation of monitoring report and its sharing in DLPMT meeting and also with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Periodic monitoring, including visit to the field of beneficiary farmer;
2. Consultation with farmers and PD-ATMA / DDH on progress;
3. Assess the benefits of the area expansion by consulting with the beneficiaries;
4. Document the learning lessons and dissemination.

Table 52: Outputs and Responsibilities

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Consultation with farmers going on area expansion under horticultural crops	DOH / ATMA	PP/FPO / FIG & SO	Area under different horticultural crops increased, fetching higher income to the farmers.	<ul style="list-style-type: none"> No. of horticultural clusters developed and additional area (in ha) planned for coverage under horticulture.
Finalization of clusters and no. of farmers to be involved	DOH / ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> No. of villages going for prioritized vegetables/marigold; No. of farmers with total area covered under expansion plan.
Support to farmers for area expansion	DOH / ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> No. of farmers supported under the project for area expansion
Orientation/Training programs on new crops	DOH / ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> No. of orientation/training programs organized; No. of farmers participated / trained in the orientation/training programs
Monitoring and guidance	DOH / ATMA	DLPMT / SO		<ul style="list-style-type: none"> No. of farmers who have availed the benefit of technological knowhow for horticultural crops and its management / maintenance
Documentation	DOH / ATMA	SO		<ul style="list-style-type: none"> The process and learning cases documented and shared widely for improved adoption by other farmers and increased area coverage.

3.1.6.2 Horticulture Investment for Vulnerable Group:

(Cost Table Reference: C1.3-C)

In order to improve the resilience of the poor holding families / vulnerable segment / women headed households in the intervention area and equip them to adapt with the situation, the project will take up certain horticultural activities that support their livelihood and improve their food security and nutritional status.

Rationale

In order to strengthen the livelihoods of low income vulnerable weaker sections of the community, project will take up horticulture-based livelihood activities, i.e., Backyard Nutritional Garden (Papaya, Banana, Drumstick, K. lime, Guava, Yam) for food security and supplementing income, Lemon Grass cultivation and / or its processing and Mushroom cultivation to get higher income. Such an initiative also ensures nutritional security at house hold level.

Marginal farming community or landless households particularly women members of the selected households in the village will be encouraged to take up Mushroom cultivation for income generation. Mushrooms have high nutritive value and are high in antioxidants, hence, meet the nutritional needs of the family. Odisha leads the country in terms of production of straw and oyster mushrooms for 10 months a year (February-November), involving poor farmers. Cultivation can be taken up as an indoor and outdoor activity mostly by women entrepreneurs.

Beneficiary selection

1. The intervention will be taken up by households in the project villages, whether they are landless or having cultivable land;

2. Interested households with large backyards, having water facility, soil suitability and interested in fruit tree planting in backyards or mushroom cultivation will be selected as beneficiary;
3. Preference will be given to small and marginal farmers under SC/ST and women headed households followed by small and marginal and women headed households of other than SC/ST category;

Interventions: Horticulture activities planned to support low holding / vulnerable families are;

1. Backyard Nutritional Garden (Papaya, Banana, Drumstick, Klime, Guava, Yam) cultivation
2. Lemon Grass Cultivation
3. Mushroom Cultivation (Production Unit)

Project Assistance

It is proposed to take up area expansion of horticulture crops with project assistance. Project will support for input as per the existing norms followed by Department of Horticulture. Project share of support differ with fruit crops for planting in backyards, lemongrass cultivation and establishing mushroom production unit.

Key Guiding Principles

1. Low income group, marginalized households in the project village (village as the unit), as identified during planning process can avail the project support on priority basis;
2. In nutritional garden promotion, beneficiary will be selected based on availability of suitable patch of land, assured water sources, interest and capability of the households to maintain the plantation;
3. In selection of beneficiary, farmers from ST communities and women farmers are to be preferably included;
4. Women SHGs / Women SHG Producer Groups / Women SHG Federations will be given priority for mushroom cultivation and Lemon Grass Cultivation;
5. Detail business plan will be prepared for each mushroom farming unit and lemon grass cultivation along with cost benefit analysis;
6. The project will provide required forward and backward linkages in case of lemon grass (cultivation, oil extraction, value addition and marketing) and mushroom cultivation;
7. Micro irrigation may be integrated for better survival of plantations, in accordance to the area covered under backyard plantation / nutritional garden.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Community consultation and identification of vulnerable groups / households;
2. Selection and finalization of interested families / women members;
3. Prepare a detail list of households and its submission to PD-ATMA / DDH;
4. Appraising PD-ATMA / DDH from time to time on progress and coverage;

PD-ATMA / DDH:

1. Review the list of households prepared and submitted by the CBOs (PP / WUA / FPO);
2. Consultation with the CBOs and selected households;
3. Prepare detail plan for project support;

4. Training / orientation to the selected households on activities (mushroom farming, lemon grass cultivation and nutritional garden);
5. Prepare a business plan for mushroom farming and lemon grass cultivation / processing;
6. Providing input and technical support as per the plan;
7. Periodic visit to the field by technical staff, guiding the groups / households and assessing progress;
8. Documentation of learning and its dissemination.

DLPMT:

1. Periodic monitoring by the members of DLPMT to the mushroom units / nutritional garden etc.;
2. Discussion with the vulnerable groups / households involved in such activities;
3. Assess the benefits harvested by the beneficiary groups / households;
4. Preparation of monitoring report and its sharing in DLPMT meeting and also with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Support PD-ATMA / DDH in preparation of business plan for mushroom units and lemon grass farming / processing;
2. Periodic monitoring, including visit to the beneficiary groups / households and consultation on benefits of such initiatives;
3. Consultation with PD-ATMA / DDH on progress and review of records;
4. Assess the economic benefit of the activities and return to the vulnerable groups / households;
5. Providing required guidance for improving the investment outcome;
6. Document the learning lessons and dissemination.

Table 53: Activity Output and Responsibilities

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Consultation with vulnerable, low income households	ATMA	SO	Increased income of landless households / marginal farmers.	<ul style="list-style-type: none"> • No. of horticultural clusters developed and households selected for coverage under activity.
Finalization of clusters and no. of households to be involved	ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> • No. of villages going for prioritized vegetables/marigold; • No. of households with No. of fruit trees planted/total area covered under lemon grass/mushroom production units.
Support to households for income generation activity	ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> • No. of households supported under the project for fruit tree planting in back yards, lemon grass cultivation and mushroom production units
Orientation/Training programs on new crops including mushroom cultivation	ATMA	PP/FPO / FIG & SO		<ul style="list-style-type: none"> • No. of orientation/training programs organized; • No. of individuals participated / trained in the orientation/training programs
Monitoring and guidance	ATMA	SO		<ul style="list-style-type: none"> • No. of farmers who have availed the benefit of technological knowhow for horticultural crops and its management / maintenance
Documentation	ATMA	DLPMT		<ul style="list-style-type: none"> • The process and learning cases documented and shared widely for improved adoption by other farmers and increased area coverage.

3.1.6.3 Vermicompost:

(Cost Table Reference: WR-20 / C1.3-C; WR-20 / C 1.1-C)

In recent years, the methodology of waste management has shifted from conventional disposal strategies such as burning, landfill etc. to conversion of waste into value added products. Vermicomposting is one such process wherein, the earthworms consume organic waste and transform it into more useful manure by grinding and digesting organic wastes with the help of aerobic and anaerobic micro flora in their intestine. The gut enzymes play a dominant role in this process. The total organic carbon is metabolized into CO₂ and the leftover earthworm casting is called 'vermicompost', nutrient rich compost for soil application.

Raw material for vermicomposting: The quality of the manure depends on the quality of the waste material. Almost all types of biologically degradable and decomposable organic waste such as animal dung, agricultural waste, kitchen waste, waste from mushroom cultivation etc. are utilized in vermicomposting.

Objectives

1. To convert organic waste in to useful manure for soil application;
2. To discourage the crop residue burning process as a means of organic waste management;
3. To enrich the soils and improve the soil health with compost application;
4. To reduce the cost of fertilizer application and support in INM / IPNM.

Benefits of Vermicomposting

1. Vermicomposting is compatible with sound environmental principles that value conservation of resources and sustainable practices;
2. Vermicomposting is faster, produces fewer odours and produces a superior product;
3. Huge quantities of farm organic waste can be handled easily.
4. Soil gets all the essential nutrients;
5. Increases microorganism population in the soil;
6. Contains plant useful hormones and antibiotics;
7. Plants can resist pest attack to a higher degree;
8. It increases rate of germination, plant growth and crop yield;
9. Support in improving fruit quality
10. Compost when applied to soil increases soil's water holding capacity;
11. Improves soil aeration

Beneficiary Selection

1. Farmers / beneficiaries within the project area including both command and non-command farmers are to be selected as per the existing government selection norms /criteria;
2. Preference will be given to farmers of small and marginal households under SC/ST category
3. Beneficiary should have access to watering the vermicompost pits, as vermicomposting requires frequent watering;
4. The beneficiary should able to provide sufficient quantity of raw material for vermicomposting

Project Assistance

The project will support the intervention as per the existing norms of on-going program of department.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Community consultation and identification of beneficiary farmers;
2. Selection and finalization of interested farmers for vermicompost;
3. Prepare a detail list of farmers and its submission to PD-ATMA / DDH;
4. Appraising PD-ATMA / DDH from time to time on progress and coverage;

Support Organization:

The Support organization will support PD-ATMA / DDH and Community Organizations in the following areas;

1. Assessment of use of vermicompost in the project area and farmers involved in producing vermicompost;
2. Selection of farmers for project support for vermicompost unit along with PP /WUA / FPO;
3. Orientation / training of farmers on vermicomposting and its field application;
4. Periodic visit to the vermicompost units, consultation with farmers and assessing the benefits;
5. Submission of progress / output report to PD-ATMA / DDH

PD-ATMA / DDH:

1. Assessment of current production and use of vermicompost and farmers involvement;
2. Review the list of households prepared and submitted by the CBOs (PP / WUA / FPO) for project support;
3. Consultation with the CBOs and selected farmers;
4. Prepare detail plan for project support;
5. Training / orientation to the selected farmers on vermicomposting methods;
6. Providing guidance / technical support as per the plan;
7. Periodic visit to the field by technical staff, guiding the farmers and assessing progress;
8. Documentation of learning and its dissemination.

DLPMT:

1. Periodic monitoring to vermicompost units and physical observation of its utilization;
2. Discussion with the beneficiary farmers involved in the activity;
3. Assess the benefits harvested by the beneficiary through vermicompost;
4. Preparing monitoring report and its sharing in DLPMT meeting and with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Periodic monitoring, including visit to the vermicompost units, consultation with farmer on production, field application of vermicompost and economic / environmental benefits of vermicompost;
2. Consultation with PD-ATMA / DDH on progress of the activities and review of records;
3. Assess the environmental and economic benefit of the activity and reduction in cost of inputs;
4. Providing required guidance for improving the investment outcome;
5. Document the learning lessons and dissemination.

Table 54: Expected Output and Indicators

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Identification and selection of farmers	PP / SO	ATMA	Improved nutrient efficiency, reduced negative impact on soil health, and cost incurred by the farmers towards fertilizer reduced.	No. of farmers selected for vermicompost making;
Supporting farmers by constructing pits and supply of worms	ATMA	PP / SO		No. of vermicompost units promoted; No. of farmers benefited
Training to farmers on Vermicompost making and orientation of farmers on vermicompost application to field	ATMA	PP / SO		No. of training/orientation programs conducted; No. of farmers participated in training/orientation program;
Monitoring and guidance	ATMA	DLPMT		No. of farmers oriented on the application of
Documentation	ATMA	DLPMT / SO		No. of farmers who have accessed required technical support and guidance during monitoring / supervision
				Quantity of vermicompost generated; Benefits of application of vermicompost documented and experiences shared with other farmers.

3.1.6.4 Micro Irrigation (Drip / Sprinkler Irrigation)

(Cost Table Reference: C1.3-C)

It is established that use of micro irrigation improves water use efficiency for both surface and groundwater resources. Also bring more area under irrigation and increase crop yields. The project will promote such systems in the tanks / cascades on demand basis, following the existing government norms. Promotion of micro irrigation system would be helpful to save water up to 50-70 percent which can be utilised for irrigating more area and improve cropping intensity.

Objective

To improve water use efficiency, reduce wastage of water due to flood irrigation and increase the irrigated area with the help of micro irrigation system.

Benefits of Drip Irrigation

1. Requires very low pressure;
2. Since irrigation is provided in the vicinity of the tubing installation, any weed seeds there do not receive water and dies;
3. Since soil moisture is kept in control, soil erosion is reduced;
4. Targeted fertilizer is provided resulting in reduced use of fertilizer, reduced cost of input and reduced loss of fertiliser;
5. Improvement in seed germination.

Beneficiary Selection

1. Both command and non-command farmers are eligible to access micro irrigation;
2. Every land holder, who is either an owner (or) a tenant farmer (with a lease Agreement for at least 10 years) with a functional water source, either own or shared, in the project village;

3. Project will give priority to small and marginal farmers, including women and ST farmers, for the installation of micro irrigation system;
4. While selecting the block, minimum area per each block should be more than 10 Ha.

Project Assistance

The project will support the intervention as per the existing norms of on-going program of department.

Key Guiding Principles

1. Project will not encourage drilling of additional borewells rather primary objective is to improve the efficiency of existing borewells;
2. For shallow water table areas, the project may provide community borewells if the ground water development status is below the recommended norm;
3. Project assistance will be as per government norms followed by the Agriculture / Horticulture Directorate;
4. Pani Panchayath, with the support of the local SO, will identify the beneficiaries at the cascade level and the list of the beneficiaries has to be verified by the department before providing project assistance;
5. Micro irrigation will be promoted for field crops as well as for fruit and vegetable crops;
6. Operation and maintenance of micro irrigation system will be the sole responsibility of the concerned farmer.
7. The beneficiary farmers will be trained on operation and maintenance of the micro irrigation system;
8. The supplier of micro irrigation system will be contracted for providing on time services to farmers, based on received complain.

Beneficiaries would be trained on the use of drip irrigation system and key precautionary measures to be taken to ensure that the system functions properly. Specific aspects to be taken care of by the beneficiaries for proper functioning of the drip are:

1. Protecting the tubes from harsh sun which can damage the tube;
2. Regular check of tubes as without proper filtering, mineral deposit tends to build up and clog the tubes;
3. Maintaining and monitoring pressure as pipes and fittings can blowout during pressure fluctuations. Pressure reducing valves are required to ensure water pressure is low enough to avoid blowouts which cause dirt to enter lines.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Community consultation, awareness creation and identification of beneficiary farmers;
2. Selection and finalization of interested farmers for micro irrigation;
3. Prepare a detail list of farmers and its submission to PD-ATMA / DDH;
4. Appraising PD-ATMA / DDH from time to time on progress / area coverage under micro irrigation;

Support Organization:

The Support organization will support PD-ATMA / DDH and Community Organizations in the following areas;

1. Assessment of use of micro irrigation in the project area, including area coverage;
2. Educating farmers on importance of micro irrigation and its benefits;
3. Selection of farmers for project support for micro irrigation;
4. Orientation / training of farmers on micro irrigation, its operation and maintenance;
5. Periodic visit to the field, consultation with farmers and assessing the benefits;
6. Submission of progress / output report to PD-ATMA / DDH as per requirement;

PD-ATMA / DDH:

1. Assessment of current application of micro irrigation, area coverage and crops under micro irrigation and farmers adopting such practice;
2. Review the list of farmers, submitted by the CBOs (PP / WUA / FPO) for project support;
3. Consultation with the CBOs and selected farmers;
4. Prepare detail plan for project support;
5. Training / orientation to the selected farmers on micro irrigation, its operation & maintenance;
6. Providing guidance / technical support as per the plan;
7. Periodic visit to the field by technical staff, guiding the farmers and assessing progress;
8. Documentation of learning and its dissemination.

DLPMT:

1. Periodic monitoring / physical observation of the use of micro irrigation;
2. Discussion with the beneficiary farmers on current water use, increment in irrigated area etc.;
3. Assess the benefits harvested by the beneficiary through micro irrigation;
4. Preparing monitoring report and its sharing in DLPMT meeting and with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Periodic monitoring, including visit to the farmer's field, consultation with farmer on micro irrigation use, area under micro irrigation, increment in irrigated area etc.;
2. Consultation with PD-ATMA / DDH on progress of the activity and review of records;
3. Assess the environmental and economic benefit of the activity;
4. Providing required guidance for improving the investment outcomes;
5. Document the learning lessons and dissemination.

Table 55: Expected Output and Indicators; Micro Irrigation

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Identification of farmers	PP/SO	ATMA	Area coverage under drip and sprinkler irrigation systems increased for different crops,	No. of farmers supported with drip and sprinkler systems
Providing support to farmers	ATMA	-	bringing improved efficiency in water use and more area under irrigation.	No. of drip irrigation sets distributed Total area (in ha) covered under micro irrigation
Training to farmers on drip / sprinkler & water use	ATMA	SO		No. of farmers / beneficiaries trained on micro irrigation system operation and management

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
efficiency				
Procurement & installation of micro irrigation systems	ATMA	Farmer / Agency		Additional area (in ha) put to irrigation due to improved water use efficiency
Monitoring water use efficiency periodically	ATMA	DLPMT/ SO		Quantum of water saved through micro irrigation.

3.1.6.5 Protected Cultivation

(Cost Table Reference: C1.3-C)

Protected cultivation practices can be defined as a cropping technique wherein the micro climate surrounding the plant body is controlled partially or fully as per the requirement of the crop grown during their period of growth. Looking at the increasing population, climate variability, decreasing land holdings, increasing pressure on natural resources, i.e., land, water and high demand of quality horticultural fresh produce warrants to shift towards modern technologies of crop production like protected cultivation. Promotion of protected cultivation will certainly help in creation of self-employment for unemployed educated youths. Protected cultivation not only provides high water and nutrient use efficiency but also improves the quality, increases productivity and favourable market price to the growers. Protective cultivation enables the farmers to fetch a good income in off-seasons. Further, it is safe to raise vegetable nursery for off season vegetable/flower production under protective cultivation, especially under adverse weather conditions. In this context, it is proposed to promote protected cultivation in a big way. Among the various protected cultivation techniques, it is proposed to promote poly houses / green houses and shade net cultivation techniques.

The project will promote protected cultivation in a big way in the project villages. Bamboo Poly greenhouse Max. size 300 sqm-25x12 for mushroom cultivation, seedling raising & vegetable cultivation. Cultivation in poly houses is expected to result in higher germination, more yields and fetch competitive price. Poly house culture enables to get high quality produce in summer season/off season cultivation of vegetables under these structures.

Beneficiary Selection Criteria

1. Farmers / beneficiaries are to be selected as per the existing government selection norms / criteria;
2. The beneficiaries must have land on his/her name to avail the project assistance;
3. PPs will identify such beneficiaries and project support will be routed through PPs / WUAs;
4. The farmer should have provision for irrigation;
5. Farmers having land in command and non-command area in the project villages will be eligible for project assistance;
6. Project will give priority to small and marginal farmers, including women and tribal farmers;
7. Land being used by the farmers, taken under share-in or leased-in agreement cannot be proposed for poly house structures

Project Assistance

The project will support the intervention as per the existing norms of on-going program of department(*Bamboo Poly greenhouse Max. size 300 sqm-25*12*).

Implementation Process

1. Pani Panchayath, with the support of the SO / implementing entity, will identify the beneficiaries at the tank / cascade level and the list of beneficiaries has to be verified by the department before providing project assistance;
2. The identified beneficiary has to apply to the department, through PP, for assistance in the prescribed format, along with certified copies of all land-related documents;
3. The beneficiaries must have land on his/her name to avail project assistance. Land being used by the farmers under share-in or leased-in agreement, cannot be proposed for shed net / poly house structures. The selected beneficiary has to submit a copy of the ROR and other related documents that confirm that the land is in his / her name
4. Inclusive strategy will be adopted where marginal and small farmers, women farmers and farmers from SC/ST community are included as beneficiaries. Existing assistance norm for farmers of such categories (SC, ST, women farmers) will be applicable for rendering project support;
5. Project assistance will be credited directly to the bank a/c of the beneficiary, based on the work progress, as assessed by PP / dept. staff;
6. The beneficiary can procure goods / items from the agencies empanelled with the department;
7. Required technical support for the installation of poly house / shed net will be provided by the concerned supply agency with the technical guidance of the department;
8. The assistance will be on a one time and non-refundable basis;
9. Any household that has availed of poly house / shade net / similar structure for protective cultivation under any other scheme of the government, will not be eligible for this benefit;
10. Maintenance of the structure will be the responsibility of the farmer / beneficiary.

Role and Responsibilities:

Community Organizations (PP / WUA / FPO):

1. Community consultation, awareness creation and identification of beneficiary farmers;
2. Selection and finalization of interested farmers for poly house structures, as per the criteria;
3. Prepare a detail list of farmers and its submission to PD-ATMA / DDH;
4. Appraising PD-ATMA / DDH from time to time on progress;

Support Organization:

The Support organization will support PD-ATMA / DDH and Community Organizations in the following areas;

1. Assessment of current status of protected cultivation in the project area;
2. Educating farmers on importance of protected cultivation and its benefits;
3. Selection of farmers for project support for installation of poly house;
4. Orientation / training of farmers on protected cultivation and maintenance of the structure;
5. Periodic visit to the field, consultation with farmers and assessing the benefits;
6. Submission of progress / output report to PD-ATMA / DDH as per requirement;

PD-ATMA / DDH:

1. Assessment of current scenario of protected cultivation in the project area;
2. Review the list of farmers, submitted by the CBOs (PP / WUA / FPO) for project support;
3. Consultation with the CBOs and selected farmers;
4. Prepare detail plan for project support;

5. Training / orientation to the selected farmers on protected cultivation methods;
6. Providing guidance / technical support as per the plan;
7. Periodic visit to the field by technical staff, guiding the farmers and assessing progress;
8. Documentation of learning and its dissemination.

DLPMT:

1. Periodic monitoring / physical observation of the protected cultivation structures and its use;
2. Discussion with the beneficiary farmers on crops grown, farming practices etc.;
3. Assess the benefits of protected farming system;
4. Preparing monitoring report and its sharing in DLPMT meeting and with S-SPUs and SPMU.

Sub-SPU and SPMU (PD-OIIPCRA):

1. Periodic monitoring, including visit to the farmer's field, consultation with farmer on protected farming system, crops grown, production and productivity etc.;
2. Consultation with PD-ATMA / DDH on progress of the activity and review of records;
3. Assess the economic benefit of the activity (economic gain of the beneficiary);
4. Providing required guidance for improving the investment outcomes;
5. Document the learning lessons and dissemination.

3.1.6.6 Capacity Building

(Cost Table Reference: C1.1-D)

3.1.6.6.1 Capacity Need Assessment:

Capacity Need Assessment (CNA) will be done for the farmers of different categories before preparing the capacity building plan. Based on the identified needs, training modules will be designed in local language (Odia) and validated / piloted before full scale execution. If there is any existing training modules (OCTMP Project), it may be examined contextually and if required, suitable modification can be made as per the project requirement. The capacity gaps identified will be addressed through in-house and field trainings. The required training modules and manuals will be developed by the concerned department in consultation with SPMU on different thematic areas to impart training to the farmers / farmers organisations. The department will prepare an annual training calendar for different categories of participants. The training calendar will be prepared in advance and will be discussed and finalised with the SPMU. Training programs will be arranged within and outside the state.

3.1.6.6.2 Capacity Building Training:

Trainings will be organized by the department along with Support Organization (SO), engaged by the project to facilitate overall execution of the project. The department will depute expert resource persons to impart trainings. In case of requirement, training will be imparted by experienced, learned and trained resource persons, drawn from other agencies, Govt. and private institutions / organizations, practitioners etc. The resource persons would be selected well in advance and informed about the theme, objectives, and contents to be discussed with the participants in the training session/s. A training session plan / training window would be prepared to keep the training well organized and covering all the themes that are planned for discussion.

Apart from training and exposure, the farmers will be provided with hand holding support for effective execution of different project activities. The hand holding support will be rendered primarily by the department personnel along with SO and officials / experts from the SPMU associated in the implementation of the project. Apart from this, different technical agencies such as SAU (OUAT), ATMA, KVKs, and national level institutions may be invited from time to time to support the farmers on different aspects like crop water budgeting, crop planning, ground water management etc.

Key Guiding Principles

1. Conducting Capacity Need Assessment (CNA) of farmers and staff periodically;
2. Capacity building design and plan would be prepared based on the CNA findings;
3. Training to farmers will be taken up, at the local level (village / GP / Block);
4. Farmers Training Centre, established under the project, will be utilized for imparting training;
5. Trainings will be organized in different batches;
6. Capacity building on climate resilient technologies and horticulture enterprise promotion will be focused, as per the identified needs;
7. Necessary training modules / manuals / IEC materials would be designed and circulated to farmers / staff;
8. As a part of capacity building, field demonstrations and in-situ guidance will be provided along with exposure to some of the demonstration sites.

Table 56: Expected Output and Indicators; Capacity Building

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Conducting CNA	ATMA	S-SPU / SPMU	Improved quality of services rendered by staff / officials / experts with better skill and knowledge base, benefitting the farmers, and leading the interventions towards realization of the objectives.	Key capacity building areas identified for farmers and officials / staff of horticulture dept.; Detailed capacity building plan prepared based on the needs identified by farmer / staff;
Development of training modules / manuals / learning materials	ATMA	S-SPU / SPMU	Improved knowledge base and understanding of the farmers promoted;	Separate training modules / manuals developed for farmers and officials / staff; The developed materials translated into the local language for better understanding of the farmers
Organization of training / workshops	ATMA	S-SPU / SPMU	Higher adoption rate of climate resilient technologies and practices.	No. and days of trainings organized; No. of farmers and officials / staff trained
Follow-up and organizing refresher, if required	ATMA	S-SPU / SPMU		No. of refresher trainings organized and no. of farmers and staff who have availed of refresher course
Documenting application of learning	ATMA	S-SPU / SPMU		Use of learning is documented and shared.

3.1.6.6.3 Exposure Visit

Apart from training, exposure visits will be organized for the progressive / selected farmers during the life of the project for their learning and replication of climate resilient technologies. Exposure visits can be arranged inside and outside the state.

For better education of the farmers, exposure visits will be organized from time to time for selected and progressive farmers. The areas of exposure would be primarily on the practices that have been taken towards improving resilience in agriculture sector to climate variability. Different initiatives taken at the state and national level to promote climate resilience and climate smart agricultural practices will be identified, prior to exposure visits.

Key guiding principles

1. Selection and finalization of exposure sites that have demonstrated climate resilient agricultural practices / initiatives;
2. Farmers would be selected from the project area who are willing to adopt climate resilient agricultural practices;
3. Farmers would be selected from different holding and social categories for exposure. Inclusive criteria will be followed in the selection process of farmers for exposure;
4. No farmer would avail repeated exposure, for both inter-state and intra-state exposure visits, excluding cases where department and PP feel that it is relevant for selected farmer/s to avail repeated exposure benefit;
5. Sharing of learning by the farmers, who were exposed to different climate resilient agricultural initiatives, with PP / other farmers after the visit;
6. Periodic monitoring on adoption of climate resilient agricultural practices by those farmers who have availed of the benefit of exposure and extension of required guidance.

Table 57: Expected Output and Indicators; Exposure Visits

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Selection and finalization of exposure sites (inter- and intra- state)	ATMA	DLTMT& SO	Farmers gained improved knowledge on climate resilient agricultural practices, and their capability enhanced for adoption and replication of such practices.	No. of sites with demonstrated climate resilient agricultural practices identified and finalized
Selection of farmers for exposure	PP/FPO/ FIG &SO	ATMA		No. of progressive farmers willing to adopt climate resilient agricultural practices are selected for inter-state and intra-state exposure visit
Consultations with farmers	ATMA	PP/FPO/FIG &SO		Importance of exposure and key learning aspects from the exposure is discussed with the farmers
Organizing exposure visits	ATMA	SO		No. of exposure visits organized and no. of farmers who have availed of the learning
Sharing exposure learning with PP/ other farmers	Farmers	PP/FPO/FIG &SO		No. of village level meetings organized to share the learning experience with other farmers of the PP / WUA / village
Monitoring	ATMA	DLPMT / SPMU / S-SPU		Adoption of learnings from the exposure is monitored periodically and appropriate action taken based on monitoring findings.

Table 58: Proposed Interventions under Sub-Component

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
A Interventions in Agriculture Production			
A.1	Preparation of Integrated Irrigation and Agriculture Plan (IIAP)	Consultancy for preparation of IIAP	No. of IIAPs prepared / No. of districts having IIAP;
A.2	Crop Diversification & Demonstration	<ol style="list-style-type: none"> Demonstration of Climate Resilient Crop Varieties Aerobic Rice Demonstration Integrated farming System (IFS) Inter cropping / Bund plantation Demonstration on cropping systems Demonstration for diversification of ID crops (In the above-mentioned demonstrations viz demo of Intercropping and demo of cropping systems, ID crops (Low water requiring crops like pulses/oil seeds/vegetables are called ID crops) will be taken up as intercrop/in upland kharif/rice fallow in Rabi. Integrated crop management (INM/IPM) 	<ol style="list-style-type: none"> Crops and varieties selected for demonstration; Rice varieties selected for SRI/DSR demonstration; No. of IFS models selected for demonstration; No of crops selected for INM/IPM; No. of demonstrations conducted and area (in ha.) covered under demonstration of different technologies and practices; No. of farmers involved in demonstration by their holding categories, sex, and social category; No. of tribal farmers involved in demonstrations; Expenditure incurred in promoting the activity.
A.3	Promotion of Environmentally Sustainable Practices	<p>Solar Pump Sets</p> <p>Organic Waste Converter</p> <p>Moisture Meter</p>	<ol style="list-style-type: none"> No of solar pump sets distributed / installed; No. of farmers benefited by sex, holding category and social group; Area covered under irrigation using solar pumps; Expenditure incurred in implementation of the activity. No. of organic waste converters distributed; No. of farmers (by sex, holding category and social group) benefited; No. of FPO / PP / Entrepreneur associated with; Quantity of compost produced periodically / seasonally; No. of farmers benefited with training and awareness programs; Expenditure incurred in implementation of the activity. No. of moisture meters distributed; No. of farmers (by sex, holding category and social group) benefited; Water use efficiency / irrigation efficiency attended; No. of farmers benefited with training and awareness programs;

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
		Farm Guard	<ol style="list-style-type: none"> 5. Expenditure incurred in implementation of the activity. 1. No. of farm guards installed; 2. No. of farmers benefited by sex, holding category and social group; 3. Acreage area covered (ha); 4. No. of farmers benefited with training and awareness programs; 5. Reduction in pest attack / cost incurred towards pest management; 6. Expenditure incurred in promoting the activity.
A.4	Capacity Building	Farmer Field school (FFS)	<ol style="list-style-type: none"> 1. No. of Farmer Field Schools organized 2. No. of farmers (by sex, social group & holding categories) participated in FFS 3. Expenditure incurred
		Farmers training on climate resilient practices	<ol style="list-style-type: none"> 1. No. of training programs organized; 2. No. of farmers (by sex, social group & holding categories) trained on climate resilient practices; 3. No. of farmers adopted the practices on field due to capacity building inputs; 4. Expenditure incurred in training / capacity building.
		Module development for Agri Entrepreneur training and extension service providers	<ol style="list-style-type: none"> 1. Capacity need assessment conducted and capacity building needs identified; 2. No. of need based modules developed and finalized for execution during training / capacity building.
		Training to Agri-Entrepreneur	<ol style="list-style-type: none"> 1. No. of identified Agri entrepreneurs trained; 2. No. of Agri entrepreneurs reported managing their business profitably.
		Training of <i>KrushakSathis</i>	<ol style="list-style-type: none"> 1. No. of training programs organized 2. No. of <i>KrushakSathis</i> trained on agricultural / horticultural aspects; 3. Improvement in facilitation and service delivery ability of the <i>KrushakSathis</i> Expenditure incurred in training
B Interventions in Horticulture Production			
B.1	Area Expansion Under Horticulture	Hybrid Vegetable Cultivation	<ol style="list-style-type: none"> 1. Area covered under hybrid vegetable cultivation (in ha); 2. Types of vegetables cultivated (Nos); 3. No. of farmers (by sex, social group and holding category) benefited with hybrid vegetable

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
			cultivation;
			4. Average per farmer income from hybrid vegetable cultivation;
			5. Expenditure incurred in implementation of the activity.
		Floriculture (Marigold)	1. Area covered under Marigold cultivation (in ha);
			2. Marigold variety cultivated;
			3. No. of farmers (by sex, social group and holding category) benefited from Marigold cultivation;
			4. Average per farmer income from floriculture;
			5. Expenditure incurred in implementation of the activity.
B.2	Horticulture Investment for Vulnerable Group	Backyard Nutritional Garden (Papaya, Banana, Drumstick, K. lime, Guava, Yam)	1. No. of seedlings distributed for backyard plantation / gardening (per identified family);
			2. No. of households (by social group and holding category) benefited from backyard nutrition garden;
			3. Average per household income from nutritional garden;
			4. Expenditure incurred in implementation of the activity.
		Lemon Grass Cultivation	1. Area covered under lemon grass cultivation (in ha);
			2. No. of farmers (by sex, social group and holding category) benefited;
			3. Average per farmer income from lemon grass cultivation;
			4. Expenditure incurred in implementing the activity
		Mushroom Cultivation (Production Unit)	1. No. of mushroom production units promoted;
			2. No. of mushroom entrepreneurs / groups covered under mushroom cultivation;
			3. Average per household / group income from mushroom cultivation;
			4. Expenditure incurred in promoting mushroom cultivation.
B.3	Soil Health Management	Vermicompost Pit	1. No. of vermicompost units promoted;
			2. No. of farmers (by social group and holding category) benefited;
			3. Quantum of production of vermi compost;
			4. Reduction in quantum of synthetic fertilizer application and cost incurred;
			5. Expenditure incurred in promoting the activity.
B.4	Promoting Micro	Drip Irrigation	1. No. of drip irrigation sets

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
	Irrigation		distributed; 2. Area by crop covered under micro irrigation systems (in ha); 3. No. of farmers (by social group and holding category) availed of micro irrigation system; 4. Growth in irrigation efficiency and crop water productivity; 5. Expenditure incurred in promoting micro-irrigation system.
B.5	Protected Cultivation -	Poly green House	1. No. of poly-green houses installed; 2. No. of farmers (by social group and holding category) practicing protected cultivation; 3. Area covered under protecting cultivation; 4. Crops taken up in protected cultivation, crop specific production and productivity; 5. Average seasonal / annual income from protected cultivation; 6. Expenditure incurred in promoting protected cultivation
B.6	Capacity Building and Training	Training and Exposure of Farmers	1. No. of training and exposure visits organized 2. No. of farmers (by sex, social group and holding category) trained / exposed to different initiatives at the state and national level; 3. Expenditure incurred towards capacity building

3.2 Sub-Component 1.2: Fishery

3.2.1 Introduction

The State of Odisha, with 480 km long coastline, is one of the major maritime States in the country, offering vast scope for development of inland, brackish water and marine fisheries. Freshwater resources of the State are estimated to be 6.76 lakh ha comprising 1.25 lakh ha of tanks/ponds, 2 lakh ha of reservoirs, 1.80 lakh ha of lakes, swamps & jheels and 1.71 lakh hectares of rivers and canals. The State's brackish water resources are of the order of 4.18 lakh ha with a breakup of 0.79 lakh ha of Chilika Lake, 2.98 lakh ha of estuaries, 32,587 ha of brackish water area and 8,100 ha of backwaters.

The total fish production of the State in 2013-14 was 4, 13,000 tonnes. The overall increase in fish production during the past five years from 2007-08 to 2012-13 was in the order of 63,660 tonnes, with an annual growth rate of about 3 percent. While the fish production from the inland fisheries (Freshwater and brackish water) resources has increased from 2, 18,716 tonnes to 2, 94,000 tonnes, the marine fish production declined from 1, 30,767 tonnes to 1, 20,000 tonnes during the corresponding period. However, the per capita fish consumption in the State is showing an increasing trend from 8.70 Kg. during 2004-05 to 13.49 Kg. during 2016-17.

Contribution of Odisha to the present level of marine products exported from the country is about 2.5 percent in terms of quantity and 4.8 percent in terms of value. For developing inland fisheries, the

Department of Fisheries has 106 fish farms, out of which 27 are fish breeding farms with hatcheries and the private sector has 89 fish breeding farms. Presently there are 108 fish seed hatcheries in Odisha with the designed capacity for producing around 70 crore fries. The average productivity of the reservoirs in the State was around 9.3 kg per ha as compared to the national average of 15 kg/ha. As a result of application of appropriate management measures such as continuous stocking of advanced fingerlings based on the provisions as contained in the State Reservoir Fisheries Policy notified in the year 2012, the productivity of the reservoirs has increased to 93 kg/ha. (in intervention reservoirs).

Freshwater aquaculture in the State is being promoted through district level Fish Farmers Development Agencies (FFDAs). These FFDAs have so far brought under scientific fish farming in 62,167 ha in 30 districts with an average fish productivity of 2.13 tonnes/ha. Out of the total potential brackish water area of 38,575 ha, 32,587 ha has been found suitable for brackish water aquaculture. So far, 16,387 ha brackish water area has been developed, of which 10,174 ha has been brought under shrimp culture. The shrimp production during 2012-13 was 13,227 tonnes at the rate of 1,300 kg/ha/yr. There are 14 shrimp hatcheries with an installed annual capacity of 50.5 crore post larvae and about 73 percent (36.7 crore) of the total installed capacity is produced every year.

There are 3,878 fishermen villages of which 813 are marine and 3,065 are in-land. The total fishermen population in Odisha is 14,80,704 comprising 6,05,514 (CMFRI census 2010) are marine fishermen and the remaining 8,75,190 are inland fishermen. There are about 1,69,000 active marine and about 1,89,000 inland fishermen. The number of active fishermen cooperatives in the State is 638 (78 marine and 560 inland) with a total membership of 99,294 (19,651 marine and 79,643 in-land, source: CMFRI Census 2010).

3.2.2 Vision for Fishery Sector

The vision of fishery sector as per Odisha Fisheries Policy, 2015 is “to be a pioneer in aquaculture development & fisheries extension for ensuring food security, livelihood, welfare of fishers and employment generation”.

Mission for Fishery Sector

1. Sustainable development of inland, coastal and marine capture and culture fisheries are promoted so as to attain self-sufficiency in fish production for domestic consumption and development of seafood industry.
2. Contribution of the fisheries sector to food, nutritional and livelihood security of the people of the State of Odisha and our nation is enhanced.
3. A balanced approach to fisheries management based on sound ecological, economic and precautionary principles is promoted to ensure that fish populations remain viable, productive and accessible to future generations.
4. An efficient value-chain and an organized and secure marketing/ supply system/ chain for fish and fishery products is created so as to protect the producers’ and consumers’ interest and to augment marine products export and foreign exchange earnings to the State of Odisha.
5. Infrastructure facilities for aquaculture clusters and for landing and berthing of fishing crafts are augmented.
6. Public-private partnership and community participation for developing, managing, conserving and sharing the fishery resources, is promoted for the benefit of our society.
7. Human resource base for fisheries management and development is created through capacity building.

3.2.3 Key areas of the Fisheries Policy, 2015

Inland Fisheries

Realistic Resource Assessment: For sustainable management of capture and culture fisheries in the inland water bodies a reliable assessment of inland resources, including the small water bodies, will be undertaken through a detailed survey using Remote Sensing and Geographic Information System (GIS).

Capture Fisheries: The policy looks at (i) Appropriate measures for developing, propagating, conserving and protecting riverine and other open water fisheries in general and threatened fish species in particular, including; (a) Fishing in the open flowing waters will be rationalized appropriately. Use of destructive types of fishing and obstruction of naturally flowing waters by fixed/ stake nets, which is detrimental for migration and natural propagation of fish, will be prohibited; (b) Improvement of river fish genetic resources through river ranching and (c) Restoration of the degraded river systems and initiation of appropriate conservation measures; and (ii) Promoting co-management of the resources by effective involvement of the local community in a cohesive manner with a view to ensure sustainable livelihood of the fishers.

Culture Based Fisheries in Lakes/ Reservoirs:

1. Open water bodies such as Minor Irrigation Projects (MIPs), Kata, irrigation tanks, percolation tanks and reservoirs will be brought under the fold of culture-based fisheries;
2. Emphasis will be given for Cage/ Pen culture in reservoirs wherever feasible;
3. Reservoir fisheries management and development and enforcement of regulation of fishing in reservoirs, will be in line with the provisions contained in the Odisha State Reservoir Fisheries Policy 2012 notified by the Government of Odisha;
4. Efforts will be made to create live storage of reservoirs by developing tanks in between the areas of Full Reservoir level (FRL) and Dead storage level (DSL) for fish culture;
5. Special efforts shall be made for clearance of dead tree stumps and other submerged substrates from the reservoir bed;
6. Preference shall be given to register Primary Fishermen Cooperative Societies (PFCS) or authorized Self-Help Groups (SHGs) or Pani Panchayat of that reservoir for leasing of the fishing rights of reservoirs at base price. 25% of reservoirs under the control of Fisheries Department including those which are mismanaged by the fisheries cooperatives could be considered for leasing to private entrepreneurs for commercial pisciculture by auctioning;
7. Regular stock enhancement programs shall be taken up in selected reservoirs for enhancing the reservoir fish productivity and production. To accomplish this, steps shall be taken to create basic infrastructure facilities in the reservoir sites such as captive hatcheries, nurseries, fry/ advance fingerling raising centers, fish landing and handling sheds, ice plants, etc.;
8. Government shall take suitable measures to bring the unused/ derelict water bodies like swamps, waterlogged areas, canals, dead rivers etc into the fold of extensive pisciculture to increase fish production in the State.

Aquaculture in Tanks and Ponds:

1. Best practices being followed in the country for increasing the fish production, particularly from aquaculture to be adopted wherever suitable, in the State for the purpose of doubling of fish production in the next 5 years;
2. Aquaculture shall be developed in a sustainable manner for enhanced production, increased income, employment generation, nutritional and livelihood security;

3. Minor Irrigation Projects (MIP) below 40 ha water area/ Gram Panchayat (GP)/ Revenue tanks shall be uniformly leased for a period of not less than five years for pisciculture. Suitable norms for leasing of these water bodies may be prescribed in consultation with the Department of Fisheries;
4. Aquaculture production will be promoted through vertical and horizontal expansion by following scientific and eco-friendly methods. Special attention shall be given to small-scale aquaculture by helping them in improving their aquaculture practices through the provision of extension services and capacity building for entrepreneurship development through training;
5. For improving and stabilizing farm productivity and income of the rural poor, integrated farming, rice-fish diversified farming, fish culture in watershed ponds or water harvesting structures, and backyard/household ponds, will be promoted;
6. Government shall incentivize/ subsidize farmers/ entrepreneurs to develop waterlogged areas/ Tampara (Ganjam district)/ dead rivers of government/ private ownership into fish ponds which are now lying unused and unproductive;
7. Recirculatory aquaculture production systems shall be promoted as highly intensive farming practices in urban and sub-urban oriented aquaculture for high value fish species;
8. Cluster approach (Aquaculture Estates) shall be encouraged which will help in promoting entrepreneurship and in improving the technical design of the farms, 10 common infrastructure provisions, effective control on pollution hazards, easy and single window clearance for issue of licenses and registration;
9. Commercial aquaculture will be promoted for attracting entrepreneurs in fishery sector in the State;
10. Demonstration projects will be taken up to popularize the latest and advanced fish seed production & fish culture technologies among the aqua-culturists;
11. Adoption of good aquaculture practices are recommended for increasing production, productivity, and returns as well as for ensuring sustainability at the production and environmental levels;
12. Organic farming will be promoted for attracting niche market;
13. Aqua-clinics/ Aqua-shops/ Aqua-business Centres will be set up at selected locations providing subsidy, which are essential areas of intervention for disease surveillance and supporting promotion of aquaculture and employment generation;
14. Clusters will be created in Govt/ Pvt. land and leased out on long term to fish farmers for commercial aquaculture;
15. Convergence of various developmental programs such as ATMA, Watershed Mission, OCTMP, MGNREGS, NMSA, RKVY, RIDF, Externally Aided Projects etc. will be considered for promotion of aquaculture in the State;

Fish Seed Production and Certification

1. The Government will augment the existing capacity of the fish seed hatcheries to meet the widening gap between the demand and supply of fish fry/ fingerlings. The existing single species fish seed hatcheries in the public sector will be converted into multi-species fish seed hatcheries as a measure of diversifying aquaculture covering a wide range of freshwater fish species;
2. A need-based assessment on the fish/ scampi seed requirement will be made and establishment of fish/ scampi hatcheries both in the public and private sector will be encouraged on an as-is need basis. While doing so, Cluster Approach (CA) on PPP mode will be supported by allocating specific areas for fingerling production with suitable infrastructure, where the private sector, fisheries cooperatives and SHGs could work jointly;
3. Fish seed certification norms and fish seed hatchery registration based on the Govt. of India's guidelines issued during 2010, shall be formulated and implemented for checking the quality of fish seed produced within the State and those imported from other States. Fish seed producers/ hatchery owners and One-stop Aqua Shops in the state will be duly registered and

accredited for ensuring free movement of disease free and quality fish/ scampi brood stock, seed and other inputs and implements within and/ or from outside the state;

4. Quarantine measures will be introduced wherever necessary and enforced for Trans boundary import of any seed, feed and ornamental fish species.

3.2.4 Intervention Approach

The project intends to have an opportunistic approach, in terms of fishery promotion in the project tanks within a basin / sub-basin. The project approach to intervene in demonstrating end to end solution, i.e., from quality fishseed production to market linkage where capacity building will be a cross cutting in all the project activities. Based on the feasibility of the tanks in the cascade, project will focus on seed production augmentation of inland species, improvement of existing hatcheries, fish production and management support and facilitating marketing of the produce by providing facilities to the fishermen folk. The Primary Fishermen Cooperative Societies (PFCs) will be the vehicle for the implementation of the project framed activities where fishers and entrepreneurs related to fishery activities will be the direct beneficiaries. The sub-component will support in strengthening PFCs in project districts to carry out fishery activities.

3.2.5 Key Guiding Principle

Intervention in fishery sector will adhere to the fishery policy of the State of Odisha, 2015. The project will focus on intervening in those areas that are essential for the sector growth and feasible for implementation at the tank / cascade level. Along with this, for the overall sector growth, the project will focus on infrastructure development for fishery promotion, in general, in the project districts. Key principles for fishery sector promotion are:

1. Increasing the income of fishers by utilizing project tanks / water bodies within the cascade;
2. Propagation of scientific fish farming technologies among the fishers for improved production;
3. Fishermen's Cooperatives as the primary stakeholder of the sector intervention; in the absence of Fishermen Cooperatives, self-help groups will be encouraged;
4. Strengthening pure line fish seed production and supply chain management to make it available to fishers;
5. Demonstrating intensive and semi-intensive fish farming in the ponds in the project area for higher return to the fishers;
6. Strengthening post-harvest management through infrastructure and support to fishers; and
7. Support to selected Fishermen Cooperatives and Government Institutions for fishery-based enterprise.

Fishery Intervention Framework

SN	Project Activities	Y1	Y2	Y3	Y4	Y5	Y6
1	Completion infrastructure activities to support the implementation key project activities						
1.1	Modernizing Fish Hatchery - at Chiplima, Kathphal and Bhanjanagar by OPDC						
1.2	Portable Carp Hatchery - at 30 locations in the project area by CIFA						
1.3	Pure line breeding: Germ Plasm improvement programme by OPDC in 1 selected hatchery location in the project area						
1.4	Fish Seed transportation system - 3 Nos of seed transportation vans with carrier crates at Chiplima, Kathphal and Bhanjanagar by OPDC						
1.5	Establishment of Mini Fish Feed Mill by OPDC						
1.6	Provision of fish feed for seed production (OPDC)						
2	Fish Production						
2.1	Tank Culture of IMC (Indian major carps) - MI: to be implemented by CIFA / CIFRI / OPDC / and other ICAR Institutes like IIWM						

SN	Project Activities	Y1	Y2	Y3	Y4	Y5	Y6
2.2	Polyculture with Mola / Scampi in selected MI tanks along with IMC covering 100 Ha of the tank by CIFA / OPDC						
2.3	Gift Tilapia Culture to be demonstrated in select areas by OPDC						
2.4	Demonstration of Pangassius culture in select tanks in the project area by OPDC						
2.5	Demonstration of climate resilient aqua - culture production models by CoF,OUAT						
2.6	Demonstration of cage culture in 1 MI tank by CIFRI / and other ICAR Institutes like IIWM						
2.7	Stocking of self-replicating species by OPDC						
2.8	Demonstration of Integrated Farming system by CoF - Including Duckery in 16 select tanks						
2.9	Strengthening Women Fisher SHG through promotion of Ornamental Fish Culture through FNGOs / Central Institute of Women in Agriculture						
2.10	Net Barricading by CIFA / CIFRI / OPDC / and other ICAR Institutes like IIWM						
2.11	Disease Diagnostic Centre (by CoF)						
3	Processing and Value Addition						
3.1	Supply of ice Boxes by FISHCOPFED (50Lt., 100 Lt. & 200 Lt.)						
3.2	Establishment of fish processing unit (one) in selected location for value added products (Eg. Filleting, Pickle making, Cutlrt making etc.) - through CIFT / CIWA / FISHCOPFED and any other identified CBOs / NGOs / Agencies						
3.3	Strengthening Value chain infrastructure - Hygienic fish / fish product transportation - through CIFT / CIWA / FISHCOPFED and any other identified CBOs / NGOs / Agencies						
3.4	Strengthening Marketing Infrastructure-modernization of 2 model kiosks for fish and fish product retailing in PPP mode - through CIFT / CIWA / FISHCOPFED and any other identified CBOs / NGOs / Agencies						
3.5	Market study (by Consulting Agencies through SPMU, OIIPCRA)						
4	Capacity Building						
4.1	Intensive / Semi-intensive fish farming (PFCS)						
4.2	Scientific Aquaculture Management (PFCS)						
4.3	Value Addition / Processing / Marketing (PFCS)						
4.4	Exposure of Women SHG on Processing & Marketing						
5	Support to Fish Tanks in Extra Water Spread Area Created through Rehabilitation (based on assessment and planning)						

3.2.6 Fish Seed Production

(Cost Table Reference: C1.2-A)

3.2.6.1 Modernization and Upgradation of Hatcheries

The fish seed production capacity of the State, at present, is limited. There is scope for increasing their capacity to produce more spawn and rear spawn up to fry. The existing government fish seed farms, based on the area available for expansion and water supply position will be utilized for enhanced seed production. They will be modernized by renovating existing Chinese hatcheries, improvising nursery area and water supply arrangements etc. Regarding civil works, the fisheries engineering division of Directorate of Fisheries will prepare the estimates, call for tenders and execute the works under the technical supervision of the District Fisheries Officer. The materials required will be procured as per the project procurement guidelines. The project assistance will be 100% to modernize 3 hatcheries.

The focus would be on developing the hatcheries for selected species, since they are climate resilient (they can be less susceptible to climatic abnormalities) and can fetch a better return to the fishers. The modernization of hatcheries would be done to maintain quality of the seed and increase production.

This will help in increasing the harvest and hence will give a boost to the income by ensuring assured supply.

Table 59: Modernization & Upgradation of Hatcheries

Activities / Sub-Activities	Responsibility		Outputs& Indicators
	Primary	Secondary	
<i>Establishment, Modernization and upgradation of Hatcheries</i>			
Finalization of Govt. fish seed farms for modernization / upgradation	DOF	SPMU	A list of 3 Govt. fish seed farms finalized for upgradation / modernization
Civil work estimation / designing / layout planning	DOF	DOF	Detail plan is prepared for improvement of 22 fish seed farms
Construction (civil work)	Contractor	DOF&DLPMT	Construction works taken up as per the plan and estimates.
Technical monitoring and supervision	DOF	DoF ATMA DLPMT	Works completed as per the schedule and estimated cost.
Supply of seeds to fishermen cooperatives / fishers	DOF	PD-ATMA S-SPU / SPMU	The fishermen and their cooperatives avail good quality seeds

3.2.6.2 Portable Community Fish Hatcheries

The project will facilitate in establishing community fish hatcheries in 30 feasible locations with the involvement of local community / fishermen / fisherwomen cooperatives to support aquaculture. The focus would be on developing the hatcheries for selected species of Indian Major Carp (IMC). Promotion of portable community fish hatcheries would be done to make available fry / spawn at the locality, reduce external dependency, maintain quality of the seed and increase production. This will help in increasing the harvest and hence will give a boost to the income by ensuring assured supply. These community fish hatcheries may also be linked to other fishermen / fisherwomen cooperatives for supply of fry / spawn and will operate as a viable business venture.

3.2.6.3 Pure-line Breeding of Inland Species

Genetically improved varieties of fish are propagated to overcome the problem of inbreeding of the fish in the same area and to increase the productivity. At national level, the pure line breed fish are produced in brood banks set up by the National Fisheries Development Board and it will be multiplied at the state level by state governments. Pure line breeding is used to “fasten” desirable traits in a breed.

Tilapia is an exotic species of fish imported from Africa. Pond culture is the most popular method of growing Tilapia. One advantage is that the fish are able to utilize natural foods. Management of Tilapia ponds ranges from extensive systems, using only organic or inorganic fertilizers, to intensive systems using high-protein feed, aeration, and water exchange. Tilapia is suitable for culture due to faster growth rate, amenable for culture in ponds, cages and for its high productivity levels and as GIFT Tilapia seed is available with Rajiv Gandhi Centre for Aquaculture (RGCA). Advance production and processing technology will be imparted to fish farmers in association with ICAR Institutions such as Central Inland Capture Fisheries Research Institute (CIFRI), Central Institute of Freshwater Aquaculture (CIFA), Central Institute of Fisheries Technology (CIFT) and the College of Fisheries in Odisha.

Seed of Amur carp, an improved variety of Common Carp is available which can be accessed from CIFA, Bhubaneswar or from West Bengal and Andhra Pradesh. Care would be taken to sensitize the farmers on the Brood Stock development through Best Management Practices (BMP).

Four suitable government fish seed farms are selected to establish brood banks for GIFT Tilapia, Pangassius, Jayanthi Rohu and Amur Carp. As per the guidelines, minimum area of the fish seed farm should be 2 ha and capable of producing 100 lakh fries. Hatchery will include brooder pond, nurseries, rearing tanks, small laboratory, water and electric supply as per requirement. Hatchery will be under direct management of state government and would be managed by qualified staff. Fish seed (spawn) produced will be supplied to Fish Seed Farmers (FSFs).

1. Seed will be procurement from different sources, including out of state in case of requirement;
2. Civil work estimation / designing / layout planning will be done at the district level;
3. Technical monitoring and supervision with the support of district level officials of the fisheries directorate;
4. Supply of seeds to fishermen cooperatives / fishers as per their need / requirement;

Table 60: Pure Line Breeding of Inland Species

Activities / Sub-Activities	Responsibility		Outputs & Indicators
	Primary	Secondary	
<i>Establishing Brood bank with Captive Hatchery for pure line breeding</i>			
Seed procurement from different sources, including out of state	OPDC	DOF / SPMU	Seeds of improved variety procured for further nurturing.
Civil work estimation / designing / layout planning	OPDC	DOF	Detail plan is prepared for improvement of fish seed farms
Construction (civil work)	OPDC	DOF	Construction works taken up as per the plan and estimates.
Technical monitoring and supervision	OPDC	DOF	Works completed as per the schedule and estimated cost.
Supply of seeds to fishermen cooperatives / fishers	OPDC	DOF	Brood bank supply pure line quality seed to hatcheries. The fishermen and their cooperatives avail good quality seeds

3.2.6.4 Fish Seed Transportation System

Fish farming, to a large extent, depends on the supply of quality fish seeds. Effective transportation of fish seed from the source to the tanks / ponds become essential with minimum stress. Transportation of seeds also depends upon the techniques adopted in their conditioning, packing and transport. For the transportation of fish seeds from the modernised fish hatcheries of Chiplima, Kathphal and Bhanjanagar to places of demand (nurseries / tanks / ponds), the project will support in providing three fish seed transportation vans with carrier crates. This will help to reduce transportation related mortality with the adoption of suitable measures.

3.2.6.5 Provision of Fish Feed to the Breeding Farms of OPDC

With the objective of producing quality feed seed, it is essential to provide high protein content feeds to the brood stock. The present feeding pattern of OPDC breeding farms will be supported with good quality brood fish feed developed by CIFA having desired protein level. In return, this will result in good quality fish seed production for the project which in turn will enhance the fish production.

3.2.6.6 Disease Diagnostic Centre (by CoF)

A good harvest depends upon the healthiness of the fishes and water bodies. Loss due to diseases in fish impact the fishers in terms of less return on investment. Hence, growth of fish in a healthy and disease-free aquatic environment is of paramount importance in aquaculture and fisheries. For the purpose, monitoring of fish health over a period of time is essential so that required measures can be taken at the time of need to safeguard the health of fish in these water bodies. In this regard, the

project will support in strengthening disease diagnostic centre of College of Fisheries in terms of providing required instruments and strengthening infrastructural facilities. The disease diagnostic centre, after enhancement of its capacity, will be able to cater to the disease surveillance needs of the fish tanks taken up under the project. The college of fisheries at Rangailunda, Berhampur, Ganjam district will be supported to strengthen its disease surveillance capacity. Key activities that will be taken up are (1) soil and water analysis of water bodies taken up for pisciculture under the project, (2) diagnosis of fish samples, (3) advisory services to fishers and their cooperatives on scientific health management, and (4) capacity building of fish farmers / fishers cooperatives on fish health management.

3.2.7 Enhance Fish Production

(Cost Table Reference: C1.2-C)

3.2.7.1 Demonstration of Cage Culture

Cage culture is an innovative technology which helps in better control of the external parameters in the culture period. But the limitation factor is maintenance of required depth of water during the period of culture. Cage units (one battery of 24 cages) will be setup in the project area tanks to demonstrate fish production in cages. The fishermen will be trained before commencing the activity in the tank. It will be planned, designed, constructed and managed under the supervision of concerned Fisheries Officer. The cages will be designed and prepared by CIFRI, using locally available materials to reduce the cost. The materials will be procured as per the project procurement guidelines. The services of concerned support organization will be utilized for better participation of fishers. The cage culture will be promoted in a small scale with the assistance of the project.

Table 61: Promotion of Cage Culture

Activities / Sub-Activities	Responsibility		Outputs & Indicators
	Primary	Secondary	
Promotion of Cage Culture	CIFRI	DOF S-SPU PFCS / SO / PP / FPO / WSHG	Tanks identified and finalized for taking up cage culture for fish production
Establishment of Cages (planning, designing, construction)	CIFRI	DOF Technical Agency PFCS	24 cages established in suitable tanks for seed rearing
Training of fishermen and their cooperatives on use of cage for seed production	CIFRI	DOF Technical Agency SO	Fishermen and their cooperatives trained on cage culture for seed rearing
Monitoring and technical support	CIFRI	DOF DLPMT / SPMU	Availability of technical and hand holding support to fishers / their cooperatives

3.2.7.2 Establishment of Feed Production Units (Mini Fish Feed Mills)

Feed is a significant cost in fishery sector operations and play an important role in the successful production of fish. The genetically improved varieties require specially formulated fish feed for higher productivity. Small fish feed mills of 1-5 quintal / day capacity would be established using locally available ingredients. They aim at better Food Conversion Ratio (FCR) using improved formula which could be operated easily by the beneficiaries after sensitizing them in fish nutrition technology. The established units will be operated by the beneficiaries / selected fishermen cooperatives in a revenue model. The interested fishermen cooperative/s will be supported with 90.0

percent cost of the unit. The small size fish feed units will be established as production supportive venture by encouraging youth/ technocrats with project assistance (90% of the unit cost). The project will support in establishing such units with a capacity of 1 to 5 quintals per day per unit.

1. Beneficiaries will be selected by the Dept. based on criteria fixed by the Dept.;
2. Persons availed similar benefit earlier under any other scheme will be excluded;
3. The beneficiary will submit a bankable business plan to avail project support;
4. Beneficiaries will contribute 10.0 percent of the unit cost;
5. An agreement will be signed with the beneficiary to cater to the feed requirement of the fishers of the project area on priority basis;
6. Project support will be one time for each unit;
7. Feed production unit will be established by the beneficiary;
8. Activity benefits will be monitored and learning lessons will be documented.

Table 62: Establishment of Feed Production Unit

Activity/Sub-Activity	Responsibility		Outputs& Indicators
	Primary	Secondary	
<i>Establishment of Fish Feed Production Units (Feed Mills)</i>			
Inviting application from interested private bodies with detail business plan (DPR)	OPDC	PD-ATMA	Applications invited from interested beneficiaries, review and finalization of submitted applications for project support. Beneficiaries selected for project assistance.
Mobilization of contribution (10.0 percent of total cost)	Fishermen Cooperative / SO / PP / FPO / WSHG	DOF SO	Selected persons give their contribution to access project benefits
Project support to the selected private body (90.0 percent)	OPDC	DOF	Project assistance provided, as per the norm, to the beneficiaries who contributed their share and their business plan (DPR) found to be viable.
Technical guidance for fish feed production unit	OPDC	DOF	Required technical guidance rendered regarding fish feed production, composition of the feed, ingredients etc.
Benefit monitoring (benefit to the project)	OPDC	DOF DLPMT	Benefit of the feed mill to the fishers, profitability of the venture and operational challenges assessed through periodic monitoring and required measures initiated accordingly.

3.2.8 Post-Harvest and Market Linkage

(Cost Table Reference: C1.2-D)

Post-harvest management, strengthening marketing channels and remunerative linkages are important components in Aquaculture. The produce has to be properly preserved and to be taken to market without spoilage. The project will facilitate in improving supply chain and value chain of the fish through different measures. The activities to be taken up for post-harvest management are as follows:

Salient Features

1. Fishers from fishermen cooperative societies will be given priority, if he/she fulfils the benefit accessing criteria;
2. Interested entity has to submit a detail bankable business plan for accessing project support;

3. The entrepreneur / beneficiary has to bear part of the overall cost of the venture;

3.2.8.1 Supply of Ice Box to Fishermen

The fishermen do not own any transport facility for transporting their catch or ice box for keeping the catch fresh and hygienic. While project will support the fishers with boat for improved catch, cycle with ice box will be provided for better transportation and keeping fish fresh for meeting consumer requirement. These assets will be given to the fishers individually or to their cooperatives, whichever is feasible. For improving the market access and efficiency, 6,000 units of cycle with ice box will be provided in 12 project districts. Each unit will consist of a bicycle and an ice box. The project will support 90.0 percent of the total cost (through PFCS) and remaining 10.0 percent will be the beneficiary contribution. The materials will be procured at the district level. The asset will be given to those who pay 10% of the unit cost as beneficiary contribution and not availed such assistance previously.

Table 63: Supply of Bicycle and Ice Box to Fishers

Activities / Sub-Activities	Responsibility		Outputs & Indicators
	Primary	Secondary	
Selection of fishers / their cooperatives	FISHCOPFED	PFCS/ SO / PP / FPO / WSHG	Fishers requiring such support are identified.
Collection of 10.0 percent contribution	Fishermen Cooperative	DOF SO	Beneficiary contribution collected to avail the project support.
Supplying Ice Box unit	FISHCOPFED	DOF	Project assistance provided to the selected fishers who contributed their share.

3.2.8.2 Establishment of Fish Processing Units

Nearly 90% of the inland fish produced is marketed without any processing. There is good demand for fish fillets of fish like Pangassius. There is good scope for export of processed fish products. In order to improve the fish value chain, the project will support in establishing 1 mini-processing unit (capacity of 100 kg per day) in suitable locations, having required communication facility for primary processing of fish. The unit will be equipped with chilling rooms, fish processing and washing tables, backup generator and administrative offices. This would help in maintaining hygienic conditions and decrease the post-harvest losses. Any fishermen cooperative, interested in establishing mini fish processing units will be supported under the project. The project assistance will be limited to 90.0 percent of the total cost of the unit.

1. Beneficiaries will be selected by the Dept. based on criteria fixed by the Dept.;
2. Persons availed similar benefit earlier under any other scheme will be excluded;
3. The beneficiary will submit a bankable business plan to avail project support;
4. Beneficiaries will contribute 10.0 percent of the unit cost;
5. An agreement will be signed with the beneficiary to cater to the need of fishers of the project area, including fish purchase / collection from the project area;
6. Project support will be one time for each unit;
7. Processing unit will be established by the beneficiary;
8. Activity benefits will be monitored and learning lessons will be documented.

Table 64: Establishing Mini Fish Processing Unit

Activity/Sub-Activity	Responsibility		Outputs& Indicators
	Primary	Secondary	
Inviting application from interested private bodies with business plan / DPR; Review and finalization of business plan	CIFT	DOF	Applications invited from interested beneficiaries, review and finalization of submitted applications for project support. Beneficiaries selected for project support.
Mobilization of contribution (10.0 percent of total cost)	CIFT	SO/ PP / FPO / WSHG	Selected persons give their contribution to access project benefits.
Project support to the selected applicant (90.0 percent)	CIFT	DOF	Project assistance provided, as per the norm, to the beneficiaries who contributed their share and their business plan (DPR) found to be viable.
Technical guidance for operation of fish processing plant	CIFT	DOF	Required technical guidance rendered regarding water collection, periodicity of sample collection, its testing etc.
Benefit monitoring (benefit to the project)	CIFT	DOF SO	Benefit of the unit, profitability of the venture and operational challenges assessed through periodic monitoring and required measures initiated accordingly.

3.2.8.3 Promoting of Fish Vending Kiosks / Mobile Kiosks

The consumers have good awareness that fish is highly nutritious. But the fish is not being marketed in hygienic conditions and consumer travel long distances to get fish. For improved marketing, the project will promote kiosks / mobile kiosks. The interested beneficiary has to submit a self-contained Detailed Project Report (DPR) with full justification and technical details of kiosk/ mobile kiosk. They have to provide documentary evidence of availability of required land free from encumbrances for stationary kiosk. The documentary evidence is required for financial resources, necessary clearances/ permissions etc. The project will not provide any support for purchasing land or taking it on lease basis. The interested beneficiary has to deposit his/her contribution upfront to access project support. The beneficiary has to give an undertaking and ensure that the kiosk/ mobile kiosk will be used for sale of fish and fish products. It is planned to establish 2 kiosks/ mobile kiosks with the support of the project. Each interested and selected beneficiary will be supported with 90.0 percent of the unit cost for establishing kiosk. The beneficiary will be trained in hygienic handling of fish and women will be preferred. The beneficiary has to ensure kiosk/ mobile kiosk is used for sale of fish and fish products.

1. Beneficiaries will be selected by the Dept. based on criteria fixed by the Dept.;
2. Persons availed similar benefit earlier under any other scheme will be excluded;
3. The beneficiary will submit a bankable business plan to avail project support;
4. Beneficiaries will contribute 10.0 percent of the unit cost;
5. An agreement will be signed with the beneficiary to use of kiosk primarily for fish selling;
6. Project support will be one time for each unit;
7. Kiosks will be established by the beneficiary;
8. Activity benefits will be monitored and learning lessons will be documented.

Table 65: Fish Vending Kiosks / Mobile Kiosks

SN	Activity/Sub-Activity	Responsibility		Outputs& Indicators
		Primary	Secondary	
1	Inviting application with business plan /DPR	FISHCOPFED	DOF SO / PP / FPO / WSHG	Applications invited from interested entrepreneurs, review and finalization of submitted applications for project support. 2 entrepreneurs selected for the Kiosks based on their business plan and other parameters.
2	Mobilization of beneficiary contribution (10.0 percent of total cost)	FISHCOPFED	DOF SO	Selected persons give their contribution to access project benefits
3	Project support to the selected private body (90.0 percent)	FISHCOPFED	SO	Project assistance provided, as per the norm, to the persons who contributed their share and their business plan (DPR) found to be viable.
4	Training of the entrepreneur on hygienic handling	FISHCOPFED	DOF SO	Persons assisted under the project were trained on handling and management
5	Benefit monitoring	FISHCOPFED	DOF	Benefit of the kiosks, profitability of the venture and operational challenges assessed through periodic monitoring and required measures initiated accordingly.

3.2.9 Capacity Building

(Cost Table Reference: WR-20 / C1.2-E)

3.2.9.1 Skill Upgradation / Capacity Building

Required skill upgradation and capacity building measures will be taken for the department officials and other stakeholders for technology promotion and its adoption of best practices in fishery. The capacity building measures will be taken up separately in phases for different stakeholders with 100.0 percent project assistance. A total of about 3,500 persons will be trained / skilled during the project period.

1. Assessment of capacity requirement / training need assessment of different stakeholders;
2. Designing skill development trainings / capacity building training based on the identified capacity needs;
3. Developing training modules / manuals, involving external resource agencies, if required;
4. Piloting of Training modules / manuals and adoption for conducting capacity building trainings;
5. Involvement of resource agencies for imparting training / skill development, in case of requirement;
6. Encouraging field level training with demonstration / practical learning sessions, apart from in-house classes;
7. Follow-up and organizing refresher trainings, if so required;
8. Reporting and documentation of trainings (reports, photographs and video);
9. Monitoring the application of acquired technology / skill / knowledge base;
10. Documentation of learning cases (where capacity building measures translated in to action).

Table 66: Capacity Building of Fishers

Activity/Sub-Activity	Responsibility		Outputs & Indicators
	Primary	Secondary	
Capacity Assessment	Need	FISHCOPFED SPMU SO	Capacity building needs of different stakeholders, including department officials identified
Designing Building Plan	Capacity	FISHCOPFED S-SPU / SPMU Fishery Institutions	A detail capacity building plan is prepared by stakeholder typology with content and session plan.
Designing / preparing training module / manual / course materials / course curriculum		FISHCOPFED S-SPU / SPMU Fishery Institutions	Different training modules / manuals prepared, course curriculum for different trainings designed.
Pilot testing of the training materials		FISHCOPFED S-SPU / SPMU Fishery Institutions	All training modules / manuals pilot tested, required changes made and finalized before imparting training.
Organizing training for fishers and their cooperatives in a phased manner, covering all activities		FISHCOPFED Fishery Institutions SO	Trainings organized in a phased manner, using the training modules / manuals.
Training report / documentation		FISHCOPFED Fishery Institutions SO	Detail training process, key training inputs etc. are documented for future reference.
Training follow-up (refresher training if so required)		FISHCOPFED Fishery Institutions	Follow-up of use of training inputs by the fishers / cooperatives and organization of refresher training on key aspects.

3.2.9.2 Exposure Visit

Exposure visits will be organized for the progressive fishers, entrepreneurs and officials / experts of facilitating agency to best practice sites at the international level. This will help them in understanding the best practices adopted by fish farmers in different areas, getting a perspective of the problems faced in those areas and how to tackle them. This exposure will help in acquiring knowledge base and replicating in their locality, based on contextual relevance. Exposure visits will be organized in a phased manner to different locations overseas.

Table 67: Exposure Visits

Activity/Sub-Activity	Responsibility		Outputs & Indicators
	Primary	Secondary	
Finalizing theme / area of exposure	FISHCOP FED	DOF PFCS	Areas of learning like semi-intensive fish farming, cage culture, pen culture etc. finalized for exposure and learning
Finalizing place of visit (overseas locations for learning)	FISHCOP FED	S-SPU SPMU	Places that demonstrated good / learning practices finalized for exposure
Organizing exposure	FISHCOP FED	DOF	Exposure visits organized as per schedule in different batches, involving fishers and their cooperatives
Monitoring use of learning / replication of learning	FISHCOP FED	DOF DLPMT SO	Use of learning from exposure by fishers and their cooperatives monitored from time to time and guided as per the requirement.

3.2.9.3 Studies / Impact Assessment

Different studies will be conducted during the project period to understand the project progress and its benefits to the fisher folk. An Impact Assessment Study will also be conducted to assess the overall impact of the project initiatives in terms of improving fish production / productivity, income of fishers and allied sub-components. The studies, including impact assessment would be conducted by an external agency selected by the SPMU and guided by the Project Director, OIIPCRA.

3.2.9.4 Market Study

In order to understand the current market mechanism for selling of in-land fish species and market demand of value-added fish products, the project will conduct a market survey with the support of a consulting agency / technical institution. The objectives of market assessment are as follows. The findings of the market assessment will be referred in promoting fish-based value-added products and strengthening market linkage of fresh, semi-process and processed fish-based products.

1. Developing understanding on demand and supply scenario of inland fish species (selected species) in Odisha and identify critical gaps in fish supply and value chain;
2. To find out the demand, supply and existing gap in neighbouring states of Andhra Pradesh, Chhattisgarh, Jharkhand, West Bengal, North Eastern states and other potential states in the country for live, iced and dry fish;
3. To identify potential buyers for fresh and dry fish keeping in mind the bigger markets in the country and export potential;
4. Identifying and suggesting options for processing, packaging and branding of identified species considering the market demand;
5. Identifying markets for inland fish species in the OIIPCRA implemented districts and identify existing buyers (traders, exporters & processors);
6. Identify capacity needs of fisher folk to produce marketable products

3.2.9.5 Support to Fish Tanks in Extra Water Spread Area

Feasible tanks, in project districts having required water spread area will be taken up for pisciculture, involving local Primary Fishermen Cooperative Societies. A detail plan will be prepared for each such tanks by the district level officials of concerned department with the support of SO and FISHCOPFED and the local PFCS will be supported to improve fishery activities in these tanks. This activity will also support in strengthening PFCS in feasible tanks, so identified under the project.

3.3 Sub-Component 1.3: Support to Diversification & Produce Marketing

3.3.1 Introduction

In order to minimise the crop loss and better price realisation by farmers, it is important to go for post-harvest management, agri-business promotion and market linkage of produces. This sub-component will enhance (1) post-harvest management and minimise the post-harvest losses, (2) value addition of agricultural and horticultural commodities, and (3) improving market access by bringing in producers and consumers closer for locally produced goods. Market access will be facilitated under the component by enhancing market penetration and developing alternate marketing channels through value added products. The project will utilize the FPOs, wherever feasible, as the platform at cluster of villages, or at an appropriate level. This component will help the farmers to realise a greater return to their products through value chain improvement and supply chain management. The project will take up different measures, based on the requirement of the farmers, to improve the value chain of agricultural and horticultural crops in different project locations. The project interventions will provide the primary producers and agri-entrepreneurs a remunerative return.

3.3.2 Objectives

The overall objective is to improve post-harvest management and access to market. Objectively, it looks at enhancing income of the farmers / small holders and reduce price risks through forward market linkages and backward support systems, value addition of farm produce by creation of required infrastructure, facility and services. For improved market access and value addition of the commodities, Farmer Producer Organizations (FPOs) and Agri Entrepreneurs (AEs) will be associated in suitable cases.

The specific objectives are;

1. To improve market linkage through collectivization and product aggregation;
2. To improve return to farmers and its organisation (FPO) through value addition and storage;
3. To improve accessibility of farmer's collectives to agribusiness services;
4. To strengthen post-harvest management and supply chain through infrastructures, facility and services.

3.3.3 Project Approach

1. Project shall develop model investment plan for the project district (facilitated by ABSOs to be engaged by the project) addressing the gaps in infrastructure/market/technology/input supply based on the diagnostic study/value chain assessment of identified commodities;
2. For the promotion of agribusiness activities for efficient produce marketing and making it a profitable venture for the marginal and small farmers, the project will strengthen farmer's markets / Krushak Bazar⁷ in strategic locations. It will be helpful to the farmers to sell their products directly in the market, minimizing intermediary association;
3. For improved post-harvest management, emphasis shall be given for establishment of integrated pack houses and low-cost storage structures for project supported / other identified commodities;
4. Farmer Producer Organisations FPOs and interested agri-entrepreneurs shall be encouraged for association in agribusiness activities, based on their potential;
5. The FPO / PP / AE etc. to be involved in the post-harvest management and agribusiness activities should be assessed and will be selected based on the assessment findings;
6. For promotion of collective actions in input, production, aggregation, value addition and marketing, FPOs shall be strengthened through capacity building, business plan development and productive investment linkages.
7. For strengthening and improving access to market, the regulated and private markets will be tied up with national market through e-NAM. It will help the farmers to sell their produce at the national level with a remunerative price. The project will facilitate in establishing and strengthening necessary infrastructural requirements in the selected markets for accessing national level markets.
8. Market information, more particularly the commodity specific price of different markets will be made available to the farmers / FPOs periodically. It will help the farmers / FPOs / traders etc. to sell their produce in a better price. It will minimize the distress sale of the commodities.
9. For strengthening farmer Consumer market linkage, effective buyer-seller meets shall be organized every year in the project districts.

⁷Under 12-point initiative programme, Krushak Bazar (Farmers Market) were set up to help farmers to their produce directly to the consumer as like in some other state where call it APNI Mandi, Rayatu Bazar etc. Around 43 krushak bazars were established in the State at different location under some of the RMCs in the state with basic infrastructure facilities out of which 32 are functional. Steps are being taken to activate all the Krushak Bazar (Source: OSAMB).

10. The project will follow Mission on Integrated Development of Horticulture (MIDH) guidelines / National Horticulture Mission (NHM) guidelines in providing assistance to the entrepreneurs (AEs / PP / FPO etc.) and designing the infrastructures and facilities for post-harvest management / value addition.

3.3.4 Project Interventions

To achieve the objectives of the sub-component, the project will take up different agri-business promotion activities and sub-activities in project districts, covering all tank command villages and nearby villages. The project will intervene in the areas (processing unit, marketing infrastructure, aggregation centres, packaging units etc.), identified during the assessment, to improve the economic condition of the small producers / producer groups in an integrated manner.

3.3.5 Engagement of Agribusiness Support Organisation (ABSO):

(Cost Table Reference: C 1.3-A)

The project will engage one Agribusiness Support Organisations (ABSOs) at the State level with outreach to project districts to facilitate agribusiness activities. The ABSO will facilitate, coordination and manage agribusiness activities of all the project districts based on the market potential of different commodities. The ABSOs will be selected, following below mentioned criteria.

1. The agency must be having a minimum of 10 years of experience in facilitating / executing agribusiness activities, including business plan preparation, establishing forward and backward linkages, establishing market linkages with national and state level markets, value chain assessment and product specific value chain promotion;
2. Should not have been black listed by any Department of Government of India or Government of Odisha;
3. Having requisite human resources, including experts in agribusiness, agri-enterprise promotion and marketing;
4. Experience of working in the project State (Odisha);
5. Experience of production of specific agricultural/ horticultural commodities and in establishing market linkage of agricultural/ horticultural commodities in PPP mode;
6. Experience in market linkage of agricultural commodities through e-market gateways;
7. Demonstrated ability in promotion of producer groups, management of producer groups and business linkage of producer groups;
8. Should have experience of working with more than 3 World Bank funded projects;
9. Public entities, private sector agencies and reputed multinational companies having national working experience can also apply;
10. The agency must have worked at least in three Indian States for agribusiness promotion and agri marketing;
11. Should have a turnover of at least Rs 2.00 crores (Two crores) in three preceding years (should furnish three years audited statement of accounts);

Key Roles of ABSO:

Under the scope of the project, the ABSOs will perform following role;

District Level Functions of ABSO:

1. Development of model investment plan for the district addressing the gaps in infrastructure/market/technology/input supply based on the diagnostic study/value chain assessment of identified commodities i.e. (i) Pulses (Green gram, Black gram), (ii) Oil Seeds (Groundnut), (iii) Millets (Finger millet), (iv) Vegetables, and (v) Flowers (Marigold);

2. Providing guidance to FPOs / PP / agri-entrepreneurs on regular basis on post-harvest management, supply chain management and value addition;
3. Establishing market linkage with state and national markets for different agricultural / horticultural commodities;
4. Tracking market price of different commodities and support in linking with remunerative markets;
5. Support FPO / PP / entrepreneurs in building their capacity and management of agribusiness infrastructures;
6. Coordinate with the FPO / PP / entrepreneurs and buyers at the state and national level for supply chain management / supply of agricultural commodities / value added commodities;
7. Assist in preparation of business plans, market linkage, credit linkage and technology linkage;
8. Organize buyer-seller interface on periodic basis, involving the FPOs / PP / entrepreneurs and buyers from state and national level;
9. The agri-business expert stationed at SO level, will execute agribusiness promotion, agri-entrepreneurship development and related activities in active collaboration and coordination with PD-ATMA (district level) and FIAC (block level);
10. Facilitate dissemination of price forecast information to farmers.

State Level Functions of ABSO:

1. Prepare assessment guidelines / value chain assessment frame for project supported and other potential commodities for value addition and market linkage;
2. Facilitate / prepare model investment plan for the project districts, based on the assessment;
3. Support in selection of AEs, their training and monitoring their business performance;
4. Coordinate with state and district level institutions on agribusiness and value chain promotion;
5. Undertaking action research, identifying critical gaps and taking measures to bridge the gaps;
6. Organize buyer-seller interface on periodic basis, involving the FPOs / PP / agri-entrepreneurs and buyers from state and national level;
7. Tracking market price of different commodities and support in linking with remunerative markets;
8. Facilitate E-NAM linkage of farmers / FPOs with OSAMB;
9. Working in close coordination with SPMU, State Agriculture University, Directorate of Agriculture, Directorate of Horticulture, Register of Cooperatives, OSAM Board and other project executing entities.

Key Guiding Principles

1. The project will hire the services of suitable Agribusiness Support Organization (ABSO) based on the specified eligibility criteria and as per the need of promoting agri-enterprise / agribusiness activities;
2. The ABSO will be placed at the state / district level and responsible for agribusiness promotion and agri-enterprise support;
3. The ABSO will work in collaboration with FPO / FIG / PP / SHG and agri-entrepreneurs and will provide technical and managerial support, as per the needs;
4. The ABSO will engage experienced personnel to ensure the realisation of the objective of agri-enterprise promotion;
5. Activities related to agribusiness promotion will be taken up by the ABSO, such as conducting diagnostic study, value chain assessment of identified commodities in the project districts, developing model investment plan for the district addressing the gaps in infrastructure / market / technology / input supply based on the diagnostic study /value chain assessment of identified commodities, development of business plans for FPO / FIG / producer groups / agri-entrepreneurs, facilitate in organizing buyer-seller interface on periodic

basis, involving the FPOs / PP / entrepreneurs and buyers; establishing forward linkages with potential buyers, business houses, exporters etc.; and facilitate and promote agri-enterprise in project districts, including providing hand holding support.

Role and Responsibilities of PD-OIIPCRA (SPMU):

1. Preparation of detail Terms of Reference (TOR) for the ABSO in consultation with project executing departments;
2. Advertising and completion of bidding process as per the project procurement guidelines;
3. Discuss with the selected ABSO on project expectations and detail timeline for agribusiness promotion in project districts;
4. Periodic monitoring and review of progress of agribusiness activities along with ABSO;
5. Review the reports submitted by ABSO on quarterly basis;
6. Suggest the ABSO on matters of importance that area linked to project activities.

Table 68: Expected Output and Indicators; Engagement of Agribusiness Support Organization

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Hiring of the services of suitable Agribusiness Support Organization (ABSO)	SPMU	DA&FE	Services of suitable Agribusiness Support Organization (ABSO) hired	Issue of contract to the selected Agribusiness Support Organization (ABSO)
Diagnostic study/value chain assessment of identified commodities	ABSO	PD-ATMA / DDH	Diagnostic study/value chain assessment of the project district done	No. of districts completed Diagnostic study/value chain assessment
Development of investment plan for the district	ABSO	PD-ATMA / DDH	Model investment plan for the district developed	No. of districts developed model investment plan
Development of business plans for FPO / FPCs / AEs / producer groups	ABSO	PD-ATMA / DDH	Business plans for FPO/FPCs/producer groups developed	No. of Business plans for FPO / FPCs/producer groups developed
Organizing of buyer-seller meet etc.	ABSO / SO	PD-ATMA / DDH	Buyer-seller meets organized successfully	No. of Buyer-seller meets organized
Establishing forward and backward linkages and other agribusiness promotion measures	ABSO	PD-ATMA / DDH		

3.3.6 Technical Assistance by OSAM Board

The Odisha State Agriculture Marketing Board (OSAMB) will be associated in implementing specific activities that support and promote market linkage and agribusiness. The board will be instrumental in organizing activities like buyer-seller interface to strengthen the productive alliance, linking agriculture markets with E-NAM / other electronic marketplace, facilitate in developing market infrastructure as identified during the assessment process for the promotion of agricultural marketing etc. If it becomes necessary for the project to have specific price forecasting for the project supported commodities, OSAMB will facilitate the process.

3.3.7 Agri Entrepreneurship Development & Agribusiness Promotion

(Cost Table Reference: WR-20 / C 1.1-A / A.1)

For promoting agribusiness and agri-entrepreneurship in the project area, project will support to strengthen Agriculture Entrepreneurs (AE) at Gram Panchayat (GP) level and hire the services of

Agribusiness Support Organization (ABSO) at district level. The project will support in capacity building of 500 AEs, identified by the local ABSO / SO through proper scrutiny / selection process. The AEs will be selected based on certain criteria like;

1. The person should be from the locality (GP / block / district level);
2. In case of needs, if suitable persons are not identified, persons from other areas can be promoted as AE;
3. Minimum educational qualification of 10th with preference to unemployed graduates;
4. Having prior experience in agribusiness activities;
5. Willing to take up agri entrepreneurship activity as per the AE norms;

Capacity building of Rural Agriculture Entrepreneurs is vital for agribusiness development in the project area. Project shall build the capacity of the Rural Agriculture Entrepreneurs (500 Nos) in convergence mode with the Department of Agriculture & Farmers' Empowerment, Govt. of Odisha. They shall be provided with 54 days extensive training and exposure on entrepreneurship, business plan development, agri-marketing, agribusiness development & management, etc. in premiere institutions (IIMs) in the 1st year of their registration. They will be provided with certificates on successful completion of the training.

Key Guiding Principles

1. Preparation of final list of Rural Agriculture Entrepreneurs selected under Agricultural Entrepreneurship Promotion Scheme-2018 in the project area;
2. Collaboration with premier management institutions for training of Agriculture Entrepreneurs;
3. Development of training modules through Experts/ Resource institutions;
4. Development of training calendar;
5. Organization of training programs at the premier institutions as per the training calendar;
6. Issuance of certificates to the trainees on successful completion of training.

Role and Responsibilities:

PD-ATMA:

1. Identification of stipulated number of AEs as per the criteria;
2. Discussion with identified AEs and final selection of AEs;
3. Prepare a detail list of AEs by GP / Block and its submission to DLPMT / S-SPU / SPMU;
4. Orientation of AEs on agribusiness aspects of the project;
5. Engaging potential AEs based on the scope of the project in agribusiness promotion;
6. Periodic monitoring and review of their engagement benefits.

PD-OIIPCRA (SPMU) and S-SPU:

1. Discussion with the selected AEs to understand their perspective and plan;
2. Discuss the scope of their engagement / association in the project and operational modalities;
3. Selection and facilitation of AEs for capacity building in institutions at State / National level;
4. Periodic monitoring and review of AEs activities from agribusiness and project perspective;
5. Discuss with DOAFE / APICOL on AEs involvement as Agri entrepreneurs;
6. Documentation of learning cases and its sharing / dissemination.

Table 69: Expected Output and Indicators; Entrepreneurship Development

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Preparation of final list of Agriculture Entrepreneurs in project area for training & exposure	PD-ATMA	S-SPUSPMU	List of Agriculture Entrepreneurs finalized for training	No. of Agriculture Entrepreneurs finalized for training
Collaboration with premier institutions	SPMU	APICOL	Collaboration with premier institutions established	No. of institutions collaborated for training of Agriculture Entrepreneurs
Development of training modules	Experts/ Resource institutions	S-SPU SPMU	Training modules developed	No. of training modules developed
Development of training calendar	S-SPU / SPMU/ APICOL	Training institution	Training calendar developed	Development of training calendar
Organization of training programs	S-SPU / SPMU/ APICOL	Training institution	Agriculture Entrepreneurs trained	No. of Agriculture Entrepreneurs trained
Issuance of certificates to the trainees	DA&FE, Training institution	S-SPU SPMU	Certificates issued to the trainees	No. of Certificates issued to the trainees

3.3.8 Investment Plan Financing

(Cost Table Reference: WR-20 / C 1.3-C)

The ABSO, with the support of district level implementing entities and other stakeholders, will prepare a detail investment plan based on the assessment findings. The investment plan would cover different aspects that support agribusiness promotion, strengthening agri-entrepreneurs, strengthening of producer groups, market infrastructure development, establishment of processing units etc. The project will support in implementation of identified and feasible activities under investment plan financing.

Role and Functions (Investment Plan Financing):

ABSO:

1. Conducting assessment of different agricultural / horticultural commodities, market mechanism, infrastructural facilities, agri business services, status of agri enterprises, mapping agri entrepreneurs and related aspects; covering all the project areas;
2. Share the assessment findings with PD-ATMA / DLPMT / S-SPU / SPMU and submit detail analysis report to the authority;
3. Prepare a detail investment plan, based on the feasibility of the investment and taking in to account the assessment findings
4. Share the investment plan with PD-ATMA / DLPMT / S-SPU / SPMU and submit detail investment plan by project area / project district for value addition and agri business promotion;
5. Monitoring the project investments and providing technical / managerial support.
(refer the role of ABSO for details)

PD-ATMA:

1. Review the assessment report and investment plan prepared by the ABSO;
2. Independent assessment of feasibility of infrastructure / facilities proposed under the plan;
3. Facilitate establishment / strengthening of agri business infrastructure, facilities and services;
4. Preparing guidelines for operation and maintenance of the infrastructures / facilities;

5. Orientation of AE / FPO / WUA / PP involved in operation & management of created facilities;
6. Monitoring the functioning of the created infrastructures / facilities;
7. Providing necessary guidance to AEs / FPOs etc. on agri enterprise promotion and strengthening;
8. Preparation of periodic reports and sharing with DLPMT / S-SPU / SPMU

AE / FPO / PP / WUA:

1. Apply for establishing / managing the agribusiness infrastructure / facilities / services;
2. Participate in the bidding / selection process;
3. Contribute as per the investment modalities finalized for each plan aspects;
4. Manage the operate and maintenance of the infrastructure / facility as per the guidelines;
5. Periodic reporting to PD-ATMA / DLPMT on functioning of the infrastructures / facilities;

SPMU (PD-OIIPCRA) and S-SPU:

1. Review the assessment report and investment plan prepared by the ABSO;
2. Review of feasibility report prepared by PD-ATMA;
3. Support in preparing guidelines for operation and maintenance of the infrastructures / facilities;
4. Monitoring the functioning of the created infrastructures / facilities;
5. Assessment of benefits of the infrastructures / facilities in financial / non-financial terms;
6. Suggest PD-ATMA / entrepreneurs on required improvement in functioning of the infrastructure and facilities;
7. Documentation of learnings and its sharing / dissemination.

Chapter Four: Improving Access to Irrigation and Water Productivity

To deal with climate variabilities, it is necessary to adopt mitigation and adaption measures at the same time. In agriculture, appropriate water management would be able to increase the resilience of agricultural production to climate change. The project will adopt various feasible options to deal with irrigation issues at the cascade / tank level. It is realised that improving the reliability of irrigation and adopting demand driven approach in irrigation is critical to deal with water storage and building resilience to climate change. It is particularly important in the targeted project areas that are characterized by frequent droughts and variable rainfall. The reliability of irrigation services and productive use of water resources in the project areas is influenced by a number of factors such as (1) limited knowledge and skills in water management, (2) weak institutional arrangement for operation and maintenance (O&M), (3) the poor condition of irrigation infrastructures / hydraulic assets, and (4) poor adoption of water conservation mechanisms for improvement in water savings and irrigation coverage. Additionally, most of the tank irrigation systems have been designed and developed for paddy cultivation. The existing irrigation system need to adapt to a more diversified cropping system through appropriate and scientific water management.

Improving water management therefore requires adopting a comprehensive approach that takes in to account both surface and ground water and enhance demand driven irrigation coverage. The project will improve the performance of irrigation across cascades of selected tank irrigation systems through institutional reforms and modernization of hydraulic assets and related capacity strengthening of water institutions. The objective is to use water more efficiently, reduce water losses and save water during Kharif season, and transfer these savings to Rabi to support crop diversification. This component of the project will support in (i) introducing water sector reforms, including piloting of Integrated Water Resources Management (IWRM), support for the preparation of groundwater regulation, establishment of a Pani Panchayat (PP) support unit in DoWR, and piloting of Public-Private Partnerships (PPP) in irrigation management; and (ii) investments in selected cascades of irrigation tank systems.

The overall objective of Component B (Component B: Improving Access to Irrigation and Water Productivity) is “to use water more efficiently, reduce water losses and save water during Kharif season, and transfer these savings to Rabi season.” To realize this objective, the project will support in following areas, which includes (1) support to water sector reform and (2) support to investment in cascades.

4.1 Sub-Component 2.1: Support to Water Sector Reform

Under the sub-component, the project will intervene, as a part of Integrated Water Resource Management (IWRM) in (1) preparing a cascade development and water management plan in a micro catchment of Kharkhari drain in Rushikulya Basin, (2) establishing a Cascade Council for effective water regulation and management, (3) establishing a monitoring network to collect data on surface water, groundwater, soil moisture, actual and potential evapotranspiration (AET and PET), cropping patterns and intensity, and agricultural and irrigation practices, and (4) conducting hydrological investigations and surveys.

4.1.1 Cascade Development Planning (CDP)

(Cost Table Reference: C 2-B)

A detailed assessment study would be conducted at the cascade level, covering all the project tanks (including their relative dependence) , to identify the repair and renovation requirements. Based on the assessment, Cascade Development Plan (CDP) will be prepared covering all the structural and

civil works that are necessary for restoration and improvement of cascade system. All such activities that are required in a cascade, covering all the cascade tanks for enhanced water availability and irrigation improvement should be prepared along with detail design and cost estimation.

The planning process will follow the assessment of specific requirements for each tank system and also the techno-feasibility survey to identify critical cascade system improvement needs. The survey will deploy both qualitative and quantitative techniques to understand the sector importance and its implication for the farming community residing in the cascades. The Techno-feasibility survey would include the following to identify the structural requirements for cascade system improvement and necessary renovation / restoration measures that are essential:

1. Foreshore survey and preparation of contour plan with marking of bund alignment, FTL (Full Tank Level), MWL (Maximum Water Level), DSL (Dead Storage Level), Contours etc.;
2. Preparation of the Cascade area map on Topo sheet and with Geo-referencing;
3. Preparation of L. Sections, Cross Sections of existing earth bund alignment indicating the Surplus weir, and Sluices;
4. Collection of data for rainfall, runoff, irrigation and farm size distribution;
5. Assessment of catchment yield, computation maximum flood discharge, checking adequacy of flood discharge capacity of existing surplus weir and prepare alternate proposals for increasing capacity of existing weir arrangements if needed;
6. Cropping pattern and crop water requirements;
7. Design of Surplus Weir, sluice for checking of adequacy and proposal for remedial measures in case of inadequacy;
8. Design of civil works on earth bund, canal and distribution system adopting latest techniques, IS code and relevant guide lines;
9. Preparation of cost estimate for all components for tank / cascade restoration.

After identification of the interventions, the design and cost estimates for the civil works will be prepared by the technical personnel of the project (EE-MI / SPMU / Hired Consultant).

Role and Responsibilities:

External Agency (consulting firm):

1. Discuss with the SPMU-OIIPCRA / PD-OIIPCRA on the scope of the work in detail and map the project expectations from the assignment;
2. Presentation of detail approach and methodology of cascade development planning to PD-OIIPCRA / SPMU-OIIPCRA and DLPMTs of the project districts;
3. Depute qualified and experienced persons for the preparation of the CDP;
4. Collect required primary and secondary data / maps / images etc. from different sources;
5. Discuss with the implementing Depts. / local CBOs / SO and other stakeholders during planning;
6. Assess the geo-hydrological situation of the cascade/s and its mapping using topo sheet / maps / satellite images etc.;
7. Prepare detail plan for the development of the cascade, including sectors of intervention like agriculture, horticulture, fishery etc.;
8. Sharing the plan with PD-ATMA / DLPMT and modifying the plan as per the suggestion;
9. Finalising the plan and sharing the plan with PD-OIIPCRA / SPMU-OIIPCRA.

PD-ATMA:

1. Facilitate coordination with implementing entities / SOs / other associated agencies at the district level;

2. Provide / facilitate to provide all the relevant data to the external planning agency that are required for preparing the plan;
3. Periodic review and monitoring of the planning progress;
4. Review of cascade development plan, organizing DLPMT meeting for presentation and discussion on the plan and suggest for modification in the plan, if it is required;

PD-OIIPCRA (SPMU):

1. Preparing the scope of work for the external agency for the preparation of cascade development plan;
2. Initiate the bidding process and engagement of consulting agency for the preparation of CDP;
3. Facilitate coordination with implementing entities;
4. Provide / facilitate to provide all the relevant data that are required for preparing the plan;
5. Periodic review and monitoring of the planning progress;
6. Review of cascade development plan and suggest for modification in the plan, if it is required;
7. Final approval of the plan for implementation.

4.1.2 Hydrological Investigations and Surveys

Within the scope of the project, a study will be conducted to assess yield levels and quality of groundwater in Odisha and help the GoO design appropriate regulation to ensure sustainable use of groundwater for irrigation while safeguarding water and soil quality. The project will work closely with the Central Ground Water Board (CGWB) in designing the regulation. The study will cover both independent tanks and cascades.

The project will take up hydrological investigation in the cascade to understand both surface and ground water situation. The hydrological investigation is objectively designed to promote / support conjunctive water use planning, improving water use efficiency and water productivity. Studying different hydrological aspects will help in preparing water budget which is essential part of the project to attain resilience of agriculture sector in project areas. The study will assess the process of water in-flow / out-flow to understand water surplus and deficit. The assessment would be helpful in calculating water availability Vs irrigation needs.

Investigation of Groundwater Resources: Guidelines for planning conjunctive use of surface and ground water in irrigation projects by Central Water Commission, Indian National Committee on Irrigation and Drainage (INCID), Ministry of Water Resources, Government of India, March, 1995 edition provides a detailed description of deciding the quantum of groundwater resources for conjunctive use. Following steps will be followed for estimating the quantity of groundwater resources for conjunctive use:

1. Estimate the water balance for the pre-project period;
2. Identifying the area where groundwater development is to be taken in the cascade;
3. Estimating additional recharge due to the project.
4. Estimate minimum quantity of groundwater extraction necessary to stop alarming rise of groundwater level which can lead to water-logging and other problems;
5. Estimate the maximum permissible additional groundwater use in the area in order to avoid unplanned mining of groundwater;
6. Estimate the optimal quantity of groundwater use, within the limits;
7. Estimate the quantum of groundwater use available for irrigation conjunctively with surface water after considering the other (non-irrigation) uses of the planned groundwater use, taking into account quality limitations.

The suggested minimum necessary and maximum permissible withdraw as percentage of the additional recharged caused by the project is presented in table.

Table 70: Suggested minimum and maximum permissible withdrawal (%) of additional recharge caused by the project

Present groundwater status		Minimum necessary additional withdrawal as percentage of the additional recharge caused by the project	Maximum permissible withdrawal as percentage of the additional recharged caused by the project
Depth of Groundwater	Trend		
Less than 2 m	Rising	70%	100%
	-do-	50%	80%
	-do-	30%	60%
2m to 6m	Rising	60%	90%
	Generally steady	40%	70%
	Falling	20%	60%
More than 6m	Rising	50%	80%
	Generally steady	30%	60%
	Falling	0%	40%

Notes:

1. For the purpose of this table, a general long - term rise or fall of more than 0.2m/year in case of alluvial condition & of more than 0.5m/year in case of hard rock areas would qualify for classifying the trend as "rising" or "falling".
2. In case an accurate groundwater regime worked out by the specialists and tested and verified through modelling and field verification in both conditions is available, the maximum/minimum withdrawal can be worked out on the basis of these water balance studies instead of using the percentage given above. Such detailed studies are desirable in specialized areas having salinity problems.
 - i. Coastal areas: For coastal areas say within 50 km of the sea, depending upon the local hydrogeological set up, all values may be reduced by 20% to avoid the possibility of saline ingress due to heavy conjunctive use.
 - ii. Saline and Shallow Groundwater: Where the groundwater is saline (conductivity > 4m mhos/cm.) and in shallow, say less than 6 m depth (and particularly less than 3 m depth) the area should normally be considered unfit for either surface irrigation or groundwater use.

Investigation of Surface Water: The direct runoff shall be computed from rainfall considering the soil type, land-use/land-cover and antecedent soil moisture conditions. Manual on artificial recharge of groundwater by Central Ground Water Board, Ministry of Water Resources, Government of India, September, 2007 edition provides a detailed description of the computation of direct runoff from rainfall. A brief description is provided here. The runoff can be computed as,

$$Q = \frac{[(P-I_a)^2]}{[(P-I_a)+S]} \dots\dots\dots (1)$$

where, Q is runoff [L], S is the potential maximum retention [L], and I_a is the initial abstraction [L]. A minimum of 30 years data of rainfall should be used for the computation of direct runoff.

Following steps to be taken for computing available surface water resources:

1. Compute 75 % dependable direct runoff based on the direct runoff computed for different years.
2. Compute the daily evaporation based on the Penman-Monteith (FAO-56) method. The total evaporation shall be computed by considering the average water spread area and number of day tank has water.
3. Compute the deep infiltration loss from the tank as Deep infiltration = 1.4 mm/day X average water spread area X number of day tank has water

4. The net available surface water resources shall be computed as the available water resources computed in step (i) minus the losses computed in step (ii) and step (iii).

Role and Responsibility:

EE-Minor Irrigation:

1. Assessment of ground water during pre-monsoon and post monsoon with the support of CGWB;
2. Map the ground water status at the tank and its influence zone;
3. Estimation of surface run off;
4. Planning and regulating ground water extraction;

4.1.3 Water Management Planning:

(Cost Table Reference: C 2-B)

The water management plan would encompass crop water budgeting and water productivity enhancement. The Integrated Irrigation and Agriculture Plan (IIAP) will be the basis for water management planning. Along with IIAP and CDP, a study will be conducted (external agency may be engaged for the purpose) to understand the scope of promoting Public Private Partnership (PPP) in irrigation management to increase the efficiency of water use and improve the quality of irrigation service delivery at the tank / cascade level.

4.1.3.1 Crop Water Budgeting

The objective of crop Water Budgeting (CWB) is to shift the focus from supply side to demand side management. The CWB will provide the community with knowledge and motivation for social regulation on groundwater and natural resources management. Improving water use efficiency and diversifying livelihoods are important strategies for sustainable groundwater management and adaptation to climate change. Issues of equity and vulnerability will be better addressed by an informed community, which controls and manages its own groundwater and other natural resources.

A water budget reflects the relationship between input and output of water throughout a region. The concept is used to determine how best to use the available water resource. The concept of water budgeting has two main purposes, i.e., (a) to determine what area of crop should be planted given the water resource available at the beginning of the season; and (b) to determine how to best utilize crop inputs during the season as water availability changes (determining time of ploughing, time of sowing, and application of fertilizers, etc.). In this context, it appears important to provide the community with knowledge on water budgeting, how to choose crops, cropping systems along with acreage and how to plan agricultural operations, apart from motivating them to follow crop planning for improving water use efficiency. In view of the importance of water budgeting, the project proposes to build capacity of the farmers with respect to water budgeting, taking ground water (open well / dug well / borewells) and surface water (tanks) in to account. Benefits of Crop Water Budgeting are;

1. Efficient utilization of available water is a good recourse for bringing more area under irrigation;
2. Increase crop productivity;
3. Increase cropping intensity;
4. Protect the crop from dry spells;
5. Reduce excess irrigation and losses caused thereby;
6. Avoid run off losses.

Objective

While the objective of water budgeting is “to use water judiciously for human, agriculture and livestock” with a view to optimizing benefits in a context of climate variability, erratic rainfall and possible drought; training on crop water budgeting is to educate farmers on the crop water budgeting process so that they can plan their crop based on the availability of water.

- i. Conducting small group meetings / discussions at the village level, involving farmers and other water users, covering all villages in the tank command / sub-basin, to understand water sources and its current use;
- ii. Participatory assessment of current water availability, water use, water demand vs. availability of water for agriculture and other uses during different seasons with farmers and other water users;
- iii. Designing training module / manual / IEC materials on crop water budgeting;
- iv. Scheduling and finalizing training days with PP as per the need;
- v. Organizing training for PP executive body, its sub-committee members and farmers in a phased manner;
- vi. Department of Agriculture will organize the training, involving the PP;
- vii. Training can be designed and organized either in a “resource person development approach” where Training of Trainers (TOT) is organized for identified resource persons who in turn will conduct training for farmers at the tank / sub-basin level; or through the “direct training approach” where farmers are trained directly by the Department of Agriculture;
- viii. In case of TOT approach, each batch of resource persons should not contain more than 15 persons, and in the direct training approach, each batch should not have more than 25 farmers;
- ix. Following training, refresher orientation should be organized during both Kharif & Rabi at the tank / sub-basin level;
- x. The entire cost of the training program will be borne by the project.

In case of adoption of Training of Trainers approach (TOT), the resource persons would be selected based on the following criteria:

1. Having minimum educational qualification of 10+2 pass;
2. Involved in farming / agricultural activities, at least for five years;
3. Must be from local area;
4. Lead farmers of the area can be considered as resource persons;
5. Express his/her interest to be a resource person for facilitating the process.

By the end of training programs farmers will have better understanding on crop water budgeting and they can plan for judicious water use. Farmers can do their crop planning based on water availability assessment. The trainings will also be helpful for the farmers to develop their knowledge on collection, analysis and management of data on rainfall, groundwater, and surface water. This would in turn facilitate appropriate crop /cropping system planning with available water for higher returns.

4.1.3.2 Water Productivity

The crop water productivity (WP) is the amount of product produced with the unit amount of water. The WP requires the measurement of product produced and the amount of water applied from all sources (rainfall, surface water and ground water). Department of Water Resources will measure the water applied from all sources and Department of Agriculture/Horticulture will measure the total marketable product produced. With these inputs, PD-ATMA / DLPMT will compute the WP.

1. Water productivity to be assessed and computed at the end of each cropping season (Kharif / Rabi);
2. Water productivity should be assessed for all crop categories, cultivated in the tank command;

3. Water use data (surface and ground water) in the tank command for crop production should be maintained by PP / WUA;
4. Crop cutting, as per the procedure, should be conducted to estimate production / productivity;
5. The PP / WUA should maintain production figures by crop type with the support of SO;

Role and Responsibilities:

Community Organizations (PP / WUA):

1. Mobilizing farmers associated with the PP /WUA / FPO;
2. Facilitate / organize orientation / training / meetings on crop water budgeting / crop planning;
3. Prepare crop planning by plot during Kharif and Rabi in collaboration with executing dept. / other stakeholders / SOs etc.;
4. Monitoring cropping pattern / crop wise area coverage and irrigation provision made;
5. Coordinate with EE-MI and PD-ATMA on irrigation coverage as per the plan and crop coverage;
6. Maintain database on coverage of area under different crops and quantum of water supplied for irrigation;

PD-ATMA:

1. Awareness / sensitization of the local community on water management principles and crop water budgeting;
2. Discuss with local PP / WUA and other community level stakeholders, in association with implementing depts., on water availability and crops that can be taken up and area that can be irrigated;
3. Finalize type of crops to be taken up, area to be covered under different crops and irrigation provision through surface and/or ground water;
4. Finalize the plan and its monitoring during cropping seasons.
5. Discussion with PP / WUA / local farmers on irrigation provision during Kharif and Rabi;
6. Analysis of irrigation supply data by crop types with the support of EE-MI;
7. Compute water productivity by crops in Kharif and Rabi taking in to account water used (both surface and ground water) and crop specific production;
8. Prepare report on water management system and water productivity, its sharing in the DLPMT meeting and submission of report to S-SPU and SPMU.

Support Organisation (SO):

1. Collection of required primary data from village / household level on water supply for irrigation, crop specific production etc.;
2. Discussion with PP / WUA / FPO etc. on irrigation coverage and production details;
3. Facilitate and organizing awareness camps, meetings / orientations on crop water budgeting and crop planning;
4. Supporting PD-ATMA in water productivity estimation in terms of providing with required primary / secondary data;
5. Discussion with farmers on production and productivity of different crops during Kharif and Rabi;
6. Documentation of crop water budgeting / crop planning process and sharing with PD-ATMA.

SPMU-OIIPCRA (PD-OIIPCRA):

1. Support in preparing guidelines for crop water budgeting, crop planning and water productivity estimation and its circulation to project districts for adoption;

2. Review the crop water budgeting and water productivity report/s submitted by PD-ATMA;
3. Monitoring the irrigation coverage, area coverage under different crops, crop production and productivity;
4. Assessment of benefits of crop water budgeting in Kharif and Rabi and supporting in computation of water productivity;
5. Suggest PD-ATMA / EE-MI / community organizations (PP / WUA) on required improvement in crop water budgeting, crop planning and irrigation coverage improvement;
6. Documentation of learnings and its sharing / dissemination.

Table 71: Improving Water Productivity and Efficiency

Component / Activities / Sub-Activities	Responsibility		Output
	Primary	Secondary	
<i>Crop Water Budgeting</i>			
Estimation of crop water requirement	PD-ATMA / EE-MI / PP / SO	DLPMT	Percentage of tanks covered under Crop water requirement assessed / estimated for different crops
Preparation of crop plans	PP / SO / PD-ATMA / DLPMT	DOA / DOH	
Training to PP/Farmers on Crop Water budgeting	SO / DLPMT / PD-ATMA / EE-MI	S-SPU / SPMU	No. of WUAs / PPs associated in crop water estimation;
Monitoring, Supervision & Guidance	SO / DoWR	DLPMT / SPMU	Area (in Ha.) and no. of farmers covered under crop planning.
<i>Measuring Water Flow - Cascade/Tank</i>			
Installation of Measuring Devices	DoWR	DLPMT / SPMU	No. of measuring devices installed and no. of tanks covered.
Taking reading and planning for conservation / distribution / scheduling	PP / SO	DoWR / DLPMT	
<i>Measuring Water Flow - Field Level</i>			
Installation of Measuring Devices	DoWR	DLPMT / SPMU	No. of measuring devices installed and no. of tanks covered.
Taking reading and planning for water distribution / scheduling	PP / SO	DoWR / DLPMT	
<i>Strengthening Data Centre and Satellite Based Imaging and Data Analysis on Cascade Basis</i>			
Estimation of soil moisture, before and during the project	SPMU	PD-ATMA / DLPMT / SPMU	Required data generated at each cascade, database developed and planning and measures taken;
Creation of thematic database	SPMU	PD-ATMA / DLPMT / SPMU	Hydrological model/s developed for different scenarios.
Hydrological modelling	SPMU	PD-ATMA / DLPMT / SPMU	
Support concurrent and continuous monitoring of activities	SPMU	PD-ATMA / DLPMT / SPMU	
<i>Water Productivity Estimation</i>			
Computation of water applied	DoWR	PD-ATMA / DLPMT / SPMU	No. of tanks and No. of crops covered under water productivity estimation during Kharif and Rabi.
Computation of marketable product produced	PD-ATMA / DoA/DoH	DLPMT / SPMU	
Computation of WP	PD-ATMA / DLPMT	SPMU	

4.1.4 Cascade Treatment

(Cost Table Reference: C 2-A)

Depending upon the water yield, cascade treatment will be taken up in convergence with the Directorate of Soil Conservation and Watershed Development Mission, Department of Agriculture and Farmer's Empowerment / PR &DW Department / Rural Development Department, Govt. of Odisha. Cascade treatment would include soil water conservation measures that are feasible to improve water yield of the cascade. Cascade development would include following components

1. **Tank Rehabilitation:** Removal of excess sediment through partial desilting method (where ever required and technically feasible), structural repairs (sluices, spills, canals, waterways, drainage, field culverts etc.), tank ecosystem development, cultivation scheduling, crop diversification etc.
2. **Development of Tank Reaches:** Development of tank reaches, including upper reaches would cover reforestation, rainfed conservation farming, agro-forestry (fruit-forest gardens) development, community pasture land development, plantation development (tree planting, vegetable plot), composting, rainwater harvesting, soil conservation etc.
3. **Promoting other livelihood activities:** support for promotion of agriculture, horticulture, fishery, agri-enterprise and processing of agricultural commodities.
4. **Institutional development:** Social mobilization, establishment of a cascade based institutional network, linkage development for agricultural inputs, marketing (collection centers, community storage, processing, forward linkages), technology services etc.

The SPMU at the State level and the EE-MI (Executive Engineer-Minor Irrigation) at the district level will take up the cascade treatment and development activities with the Watershed Development Mission, Department of Agriculture and Farmer's Empowerment / PR &DW Department /RD Department. The cascade treatment would be done based on the hydrological suitability, e.g., non-committed surplus monsoon run off in space and time and constructing/repairing the suitable structure.

Guiding Principles

1. Collaboration and Convergence with Directorate of Soil Conservation and Watershed Development Mission, Department of Agriculture and Farmer's Empowerment, Govt. of Odisha / other dept. for cascade treatment, taking cascade as one hydrological unit;
2. Preparation of cascade development plan for the identified cascade, based on the assessment;
3. Promotion of Cascade Council, involving all the PPs / WUAs of the tanks in the cascade for effective implementation and management of the plan;
4. Associating of local PP / WUAs / Cascade Council (association of PPs / WUAs) in planning and monitoring of cascade development measures;
5. Benefit monitoring (minimized soil erosion, reduced run-off velocity, ground water recharge etc.) of cascade development by EE-MI / DLPMT and SPMU.

Role and Responsibilities:

Executive Engineer-Minor Irrigation:

1. Review of cascade development plan and feasibility of different suggested measures;
2. Consultation with different PPs /WUAs and other community institutions functioning in the cascade;

3. Work in collaboration with Directorate of Soil Conservation and Watershed Development Mission, Department of Agriculture and Farmer’s Empowerment / PR &DW Department for cascade treatment;
4. Monitoring the activities taken up under cascade treatment;
5. Preparing monthly / quarterly progress report and appraising to DLPMT and SPMU.

SPMU-OIIPCRA (PD-OIIPCRA):

1. Discuss with the Directorate of Soil Conservation and Watershed Development Mission, Department of Agriculture and Farmer’s Empowerment / PR &DW Department for cascade treatment;
2. Signing MOU with concerned Dept. / directorate for cascade treatment (if required);
3. Discuss with EE-MI from time to time on progress in execution of the planned activities;
4. Monitoring of cascade development activities on periodic basis, discuss with local institutions / organizations and assess the benefits of the cascade development in terms of improvement in water availability, irrigation coverage etc.;
5. Review the progress reports submitted by EE-MI;
6. Documentation of learning and its sharing / dissemination.

Table 72: Cascade Development

Activities / Activities	Sub-	Responsibility		Expected Outputs	Indicators
		Primary	Secondary		
Assessment of hydrological situation of the identified cascade		SPMU	EE-MI DoWR	Cascade development plan prepared and implemented in the identified cascade/s for the improvement of hydrological situation	1. Assessment report of the hydrological situation of the cascade;
Preparation of cascade development plan		SPMU	EE-MI / DLPMT / PD-ATMA		2. Cascade Development Plan of the identified cascade/s;
Implementation of Cascade Development Plan (structural / non-structural)		PP / EE-MI PD-ATMA DLPMT	S-SPUs SPMU		3. Structural and non-structural cascade development measures taken up;
Monitoring & supervision		DLPMT	S-SPUs SPMU		

4.1.5 Constitution of Cascade Council

(Cost Table Reference: C 3-F)

As one cascade will have more than one tank and even more than one PP / WUA, it is important to establish a coordination mechanism among them for the overall development of the geo-hydrological unit. Looking at the need, it is proposed to have a Cascade Council (CC) at the cascade level, involving all the PPs / WUAs operating in the cascade. Details of the Cascade Council are as follows:

Legal Entity: It is an informal coordinating body at the cascade level, without any legal entity. It is an association of all the PPs / WUAs of the cascade with an objective of ensuring a collaborative mechanism for the overall development of the cascade, as a unit of project intervention and amicably settles the issues arising at the cascade level that pertains to more than one PP / WUA functioning in the cascade.

Membership in the Cascade Council

1. All PPs / WUAs of the cascade will be the members of the Council, represented by their President / Secretary;
2. The Local official of the implementing line Depts., such as Department of Water Resources, represented by EE-MI; Directorate of Agriculture and Food Production, represented by DD-Agriculture; Directorate of Horticulture, represented by DD-Horticulture; Directorate of Fishery, represented by District Fishery Officer; etc.
3. The Team Leader of local SO will also be the member of the Committee;
4. The Committee may also have independent invitees from the locality, as per the need.

Role and Functions

1. The Cascade Council will extend support in hydrological assessment of the cascade, preparation of cascade development plan and its successful execution;
2. The Cascade Council will take up issues that are of common interest in nature and associated with more than one PP / WUA;
3. Any conflict and grievances that covers more than one PP / WUA will be discussed and finalized in the Committee;
4. Taking decision on development activities in geographical area / village of the cascade that covers more than one PP / WUA or not under the operational jurisdiction of any of the PP / WUAs within the cascade;
5. The Council shall meet at least once a month initially and later once in a quarter to discuss and resolve grievances;
6. The EE-MI or his/her representative will act as the convener of the council;
7. The meeting will be presided by one of the Presidents / Secretaries of the PP / WUA, on a rotational basis;
8. Unanimous decision is expected from the Council. However, in case if no unanimity is arrived, there will be voting and each member, excluding the invitee, will have single voting right;
9. The decision of the council will be binding on all and recorded for future reference;
10. The local SO will record minutes of the meeting and circulate it among the members.

Role of PP / WUA in the Cascade Council: Selected Executive Committee member of the PP / WUA, preferably President or Secretary will be a member of the Cascade Council. The representatives of all the PP / WUAs that are within the cascade shall be the members of the council. They will be participating in different meetings, organized by the council and discuss different aspects of the works/activities taken up at the cascade level and resolve any such issue that comes to the notice of council for solution. As more than one PP / WUA will be the involved in the cascade council, representatives of all the PPs / WUAs shall participate and discuss matters of importance pertaining to the cascade.

4.1.6 Establishment of a PP Support Unit

(Cost Table Reference: C 2-C)

The Project will support in establishing a unit within the DoWR that will provide comprehensive and targeted support to PPs / WUAs, including capacity building, management of the PP / WUA, revenue generation and operational sustenance (O&M of irrigation systems). The PP support unit will be staffed with persons deputed from govt. departments. In case of requirement, the support unit may hire external experts for providing required services and executing different functions.

4.2 Sub-Component 2.2: Support to Investments in Cascades

(Cost Table Reference: C 2-A)

The project will support in restoration and rehabilitation of tanks / cascades and invest in hydraulic infrastructure in selected tanks / cascades. All tanks located within the cascade will be eligible for investment and support, regardless of their size. A total of 162 “green tanks” have been identified for improvement in phase I of the project. Before taking up remaining 370 tanks, the project will conduct a hydrological assessment to define the cascades based on technical and social considerations (using the initially identified tanks as an entry point) as a basis of identifying the investments so that they contribute to optimizing water use across the cascade and throughout the year. In tank rehabilitation, the project will invest in strengthening of canal bunds, construction of field channels, improving the distribution network, modernizing hydraulic canal structures, and installation of sub-surface pressurized pipes. The project will help farmers’ access subsidies at central and state level for the promotion of micro-irrigation.

4.2.1 Cascade Identification and Tank Selection Process

As one of the innovative approaches, the project will adopt cascade system development to achieve the objective of this component. In a cascade, the available water is influenced by the flow from upstream small-scale community-based irrigation systems. The project has identified the green tanks (without any influence) and red tanks (where upstream/downstream influence is there and additional investment is required for interlinking).

The following methodology was adopted to classify tanks (those who may be part of a cascade and independent ones).

Green project (tanks): A Minor Irrigation Project (MIP) is called a ‘green project’ if it is not adversely impacted by the existing upstream tanks/ponds/reservoir or MIP and also does not adversely impact the downstream tanks / ponds / reservoirs or MIP.

The methodology to identify the green project is divided in two parts (see figure 1):

- **Part A:** Watershed delineation
- **Part B:** Analysis of the dependency of a project

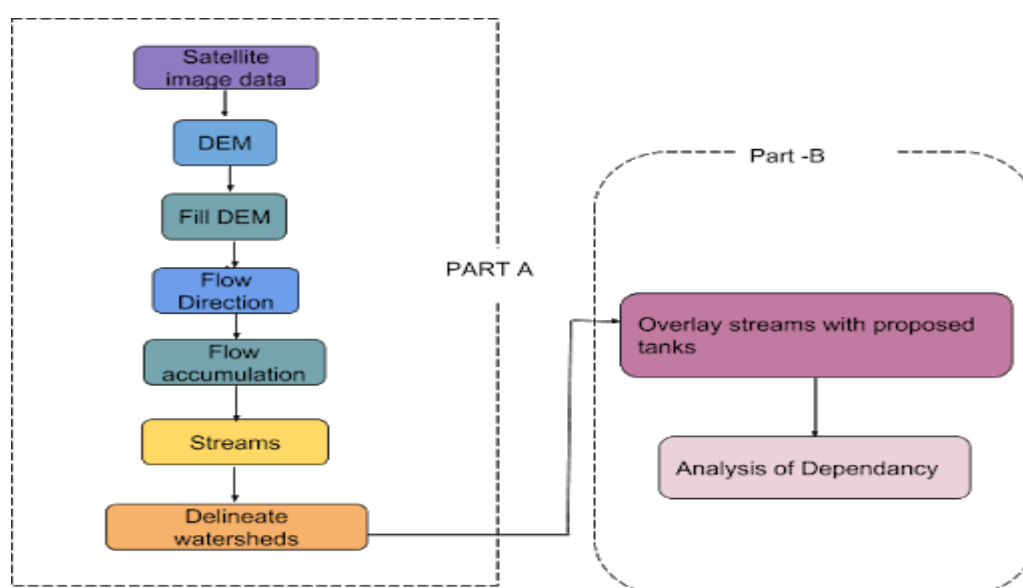


Figure 11: Tank classification steps

Part A: Watershed Delineation

Watershed is the area of land from which streams drain all the water in it to the nearby water body. Watershed combines with the other watershed to form the streams, rivers and bigger water bodies. Watershed has been delineated from the Cartosat-1 DEM using GRASS GIS. Natural flow routes and their charging sub-catchments were delineated using GRASS GIS (<https://grass.osgeo.org/>) and outlets were identified in the Project area. The Cartosat DEM is filled by identifying and removing the sinks (Sinks are low elevation areas in digital elevation models (DEMs) that are completely surrounded by higher terrain) if present. Based on the direction of the steepest descent in each cell, flow direction is measured (see figure 2). The D8 flow method is adopted for the computation of flow direction. In this method, the flow is from each cell to its steepest down-slope neighbour. The output of the Flow Direction tool run with the D8 flow direction type is an integer raster whose values range from 1 to 255. By providing a threshold value, the pixels contributing to that pixel is delineated and identified as basins.

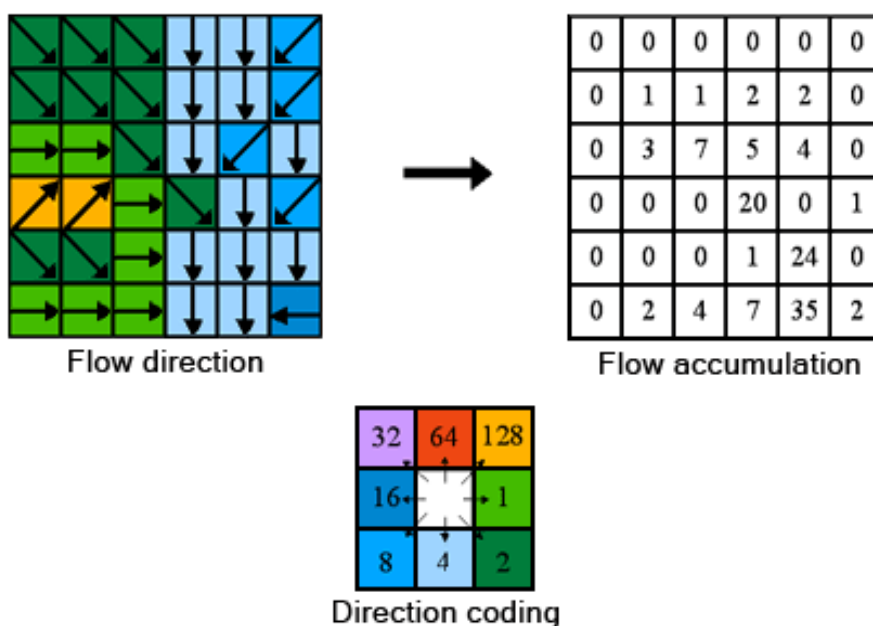


Figure 12: D8 algorithm used for the calculation of flow direction and flow accumulation

Part B: Analysis of Dependency

The delineated stream-network in the part A was overlaid on the Google Earth images to visually identify the existing upstream tanks/ponds/reservoir/MIP/water bodies in the upstream and downstream.

There were two kind of MIPs in the current project:

- i) Tank/reservoir
- ii) Diversion weir.

A tank classified as a 'green project' if no tank is present in its upstream side and downstream side (upto a higher order stream). A diversion weir is classified as 'green project', if no tank was present in its upstream side. In the case of diversion project, downstream side was not checked as these projects are on higher order stream. All small tanks/ponds are ignored which do not have major influence hydrologically. If in a diversion weir project, significantly large catchment area is available to provide the water to the MIP, it is classified as 'green project'.

Currently there is no specific institutional arrangement for water management among the cascade tank communities. In the cascade system, the flow from a tank and surplus water can be used in the downstream. Water distribution will be considered in its entirety, which will enable more efficient and equitable water use than an individual tank-based approach. This approach will be supported by institutional strengthening and capacity building, and by in-flow hydrology management.

The criteria for tank selection will be based on the following guiding principles:

1. Tanks having more than 40 ha of ayacut will be considered as isolated;
2. Tanks having less than 40 ha ayacut will be considered if they are part of a cascade;
3. Identification of cascade has to be based on natural drainage.
4. Hydrological viability and feasibility of cascades to be studied;
5. Gap ayacut for the tanks should be more than 25%;
6. Exclude tanks/cascade in which land acquisition is involved;
7. Revision of hydraulic standards will not be allowed in the revival/restoration of the tanks in implementing the project during estimates or execution;
8. Tanks to be considered as per need based duly considering the repairs and condition of the tank;
9. Priority may be given to tanks where groundwater levels are very low in and around the tanks; and
10. Buttressing of tanks taken up in previous projects may be considered if required under this project.

4.2.2 Demonstration of Automation in Select Project/s

The activities of this component include modernization of hydraulic assets i.e. control structures (diversion weirs), supply channels, cross-masonry structures, de-silting of feeder and supply channels, strengthening and up-gradation of tank bunds, installation of flow measurement devices, up-gradation of distribution systems, improvements of irrigation and drainage canals, and introduction of modern quality testing devices. This component includes civil works proposed for improving small scale irrigation performance along with the data required for crop water budgeting.

The project has consciously chosen basins that are either entirely in the state or the basins which have limited inter-state issues. The idea is to demonstrate automated water management in a basin for future replication. Currently, the system is managed manually through a system of channel control gates and mechanical water meters. The system is labour intensive and imprecise; however, it is cost effective as long as water is available in plenty. With labour availability becoming increasingly scarce, frequent droughts and routine water scarcity, a more efficient system is critical.

For automation in the demonstration project, control center operators will monitor channel levels and water orders and issue remote gate movement commands to release water based on known time and volume parameters. Requisite sensors will be installed and connected to a SCADA system. Accurate and responsive, this system allows farmers to change their water orders (based on crop water budgeting). The PPs who agree to partner in the process will have incentive mechanisms based on water saving (with taking low duty crops or with efficient water management using water saving devices).

4.2.3 Tank Bund Strengthening & Aligning

The tanks bunds which are identified for repair and renovation will be strengthened. It is proposed to bring it to its original Top Bank Level (TBL), Top Width, Slopes, as per hydraulic standards and compacted to 95 to 98 % Proctors density duly benching for connectivity with old bund and to the proposed profile. The TBL of the tanks, as per the earlier free board design, were 1.2 Mt. which is

now changed to 1.5 meter. as per Indian Standards (IS). In cases, where such conditions apply, the TBL of tanks may be modified suitably to 1.5 meter.

The proposals are to be firmed up through detailed surveys by taking levels of (1) longitudinal section of the bund at intervals depending upon the configuration of top bank profile; (2) cross sections of the bund for every 2 to 3 metric chains depending upon the intensity of the damages occurred on the slopes of bund.

The present hydraulic standards of the bund will not be changed except in a few cases as per the exigencies. The Top width, wherever below 1.8 m, is to be revised to a maximum of 3 m depending upon the contingency with due justification.

Table 73: Tank Bund Strengthening and Aligning

Activity/Sub-Activity	Responsibility		Expected Outputs	Indicators
	Primary	Secondary		
Assessment of the current condition & estimation of the hydraulic standard	DLPMT	SPMU DoWR	Bunds, requiring restoration, identified and restored.	1. No. of tanks covered under assessment to understand the bund condition;
Restoring the Bunds	DLPMT	SPMU DoWR/		2. No. of tanks covered under bund restoration measures;
Monitoring the bund condition	DLPMT	SPMU DoWR/		3. No. of tanks monitored during pre-monsoon and post-monsoon.

4.2.4 Clearance of Tank Bund

The shrubs and other vegetation on the bund and its slopes are to be removed / clear up to 15 cm girth stems so that any seepage, settlements can be monitored in case of exigencies of floods and full reservoir storages.

4.2.5 Installation / Repair of Head Regulator / Sluice

The objective of this activity is to ensure that the head regulators / sluices function effectively in regulating / release of water. The project will take up this activity as a part of tank system improvement and modernization plan. During the technical assessment, the project will identify such structures that need repairing or installation of new head regulators at the tank / cascade level. Such individual tanks / tanks in the cascades will be taken up as a part of modernization for repairing / installation of the head regulators / sluice. All such project tanks which are having damaged head regulators, identified during the assessment, will be taken up for repairing / replacement. The sluices are to be checked for leakages and if there are excessive leakages observed, the bund is to be cut open to a reasonable width with slopes of 4H:1V and proper benching, followed by:

1. Repairs of the pointing to masonry of sluice barrels; or
2. Total reconstruction in case of unsafe sluice, the earth filling is to be taken up with proper compaction and revetment is to be redone.

In case of leakages through sluice shutters, same is to be replaced. The anchorages like gearbox and Screw Gearing Rods are to be replaced in case they are non-functional.

Table 74: Installation / Repair of Head Regulator / Sluice

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Estimation of current leakage	EE-MI DLPMT	SPMUDo WR	Defective head regulators repaired / replaced and leakage prevented	1. No. of tanks assessed for sluice condition and current leakage estimated; 2. No. of head regulators / sluices repaired / replaced and number of tanks covered under replacement measures.
Replacement/ installation /repair of sluices	EE-MI DLPMT	SPMUDo WR		

4.2.6 Construction / Repair of Canal System

Often, farmers are unable to distribute the available water in irrigation canals due to lack of or improper / damaged canal systems / field channels. Such canal systems / channels also increase water use, conveyance loss and reduce water availability and efficiency. To bring the water to the farms, it is essential to repair the existing canals / field channels and construct new, if not existing. The efficient canal system / field channels will give farmers better control over water. The canals / field channels may have a dual role of distribution of both surface and ground water. The executive engineer, minor irrigation of DLPMT will be responsible for the construction of the field channel. The PP / WUA should be responsible for maintaining the field channels. Following are the major activities to be performed by the EE-MI:

1. Proper maintenance (de-silting and weed removal) of the canals / field channels should be performed twice in a cropping season;
2. Training to PP / WUA to maintain field channels;
3. Repair of the existing field channels to bring them to their full capacity;
4. Construction of the field channels, if it does not exist.

Table 75: Field Channel Construction / Repair

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Assessment of the existing field channels	EE-MI DLPMT	SPMUDo WR	Field channels, wherever required, is repaired by which additional area put to irrigation with reduced water loss.	1. No. of tanks assessed to understand field channel status. 2. No. of tanks with field channel having repair / construction plan; 3. Length of field channels repaired / constructed (average per tank) and no. of tanks covered under repair / construction measures; 4. Average land area per tank irrigated through repair and construction of field channels; 5. No. of PP / its sub-committee members trained on maintenance of field channels; 6. No. of trainings and average days of training organised for PP / its committees.
Construction/repair of channels	EE-MI DLPMT	SPMUDo WR		
Training of PP for maintenance of channels	EE-MI DLPMT	SPMU		

4.2.7 On-Farm Development / Command Area Development

On-farm development / command area development is a major component in the project to improve the irrigation water distribution as CAD-WM by providing irrigation water to each 1.0 ha of sub-command area under the outlets of Minor Irrigation projects. The project proposes to provide CAD-WM channel system in the minor irrigation projects to reduce the wastage of water percolating to ground under the out-lets and projects not having any canal system where irrigation is being provided by flooding in field-to-field.

The CAD-WM is planned by creating patches of 1.0 ha sub-command in the command under each outlet. The CAD-WM channels will be constructed without land acquisition and not curtailing the cultivated land of the farmers. Construction of channels will be done as watercourses along the common bunds between the agriculture fields. The channels would be slim, low-cost and durable CAD channel, which impelled the project to develop such section basing on the information and method being practiced in the state.

The On-Farm Development (OFD) works will include lining of field irrigation channels and infrastructural facilities like bed regulators, diversion and distribution boxes, turnouts and drop structures to regulate and convey the irrigation water from the outlets to individual land holdings. This type of works will reduce conveyance and application losses, minimize water logging condition and conserve water. The OFD works are planned duly considering the entire command area under each sluice. Essential structures such as channel crossing, small culverts etc. will be constructed wherever necessary.

The OFD / CAD strategy will include;

- CAD channel is having the plan to provide irrigation to each ha. of land independently;
- Network of CAD channels through “main, branch&delivery” courses of reducing capacity at 1/3 rd of the former;
- The bed slope will normally be from 1:600 to 1:1000;
- The time limit to reach the water from main canal to the field will remain equal to all fields;
- The time for complete wetting will be around 24 to 30 hours per ha. of land.

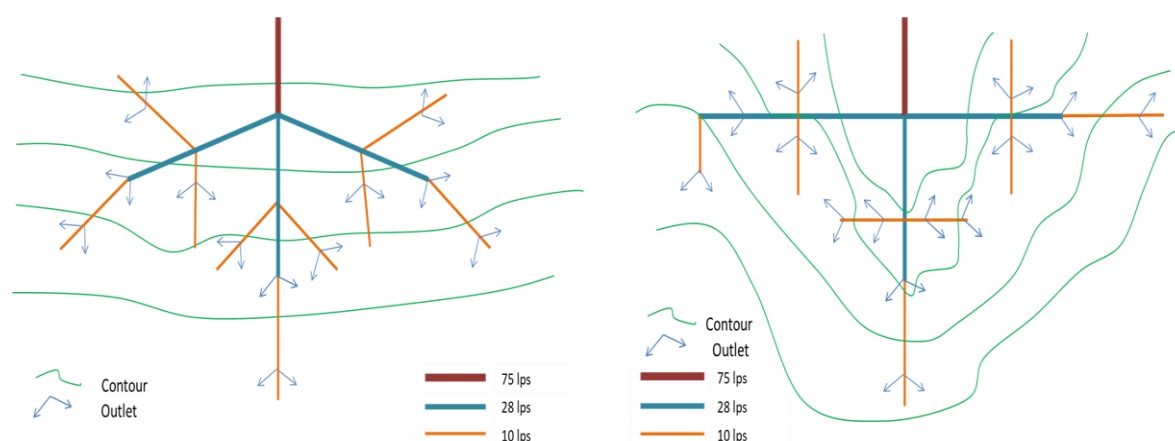
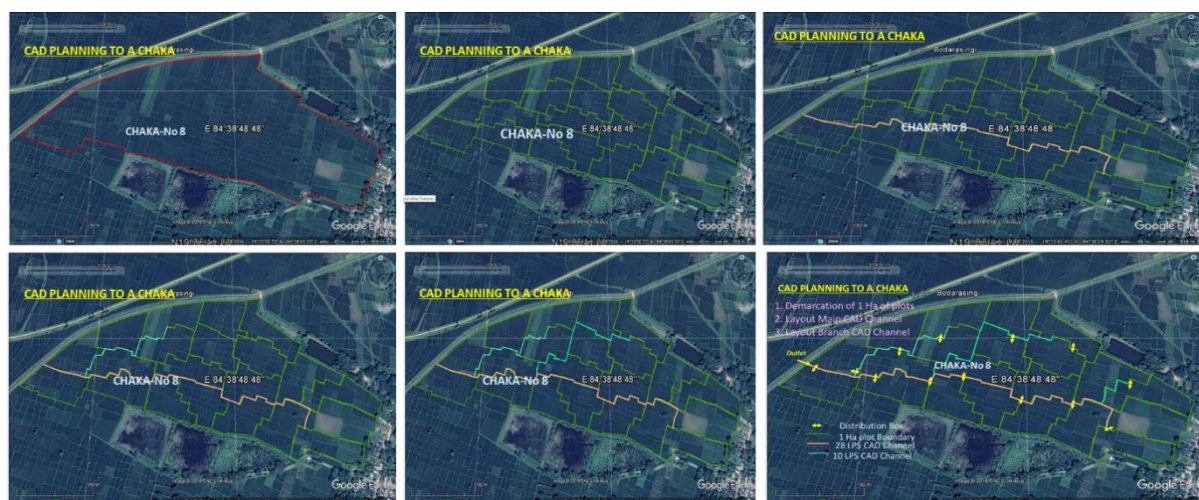


Figure 13: CAD Channels in the Command

Guiding Principles:

1. The sizes of outlets under Minor Irrigation project vary from 4.00 Ha to 16.00 ha. Some projects are not having any canal system and irrigation is being provided by flooding in field-to-field. Such selected projects will be taken up for OFD works;
2. The section presently proposed is kept at 30 cm x 30 cm; are designed to carry a discharge of up to 18.4 to 26 litre per second considering various slopes of terrain (1 in 500 to 1000).
3. The projects, where there is no canal system and irrigation is being provided by flooding in field-to-field, some larger size channel up to 25 to 40 LPS (for 25-40 Ha of command) may be required. As such, some more sections have also been proposed in a tabular form to be chosen basing on the necessity considering to channel discharge. However, the section properties for construction would remain same except for the cross-section parameters.
4. The Channel section, could be rectangular in cross-section, to be constructed in cement concrete by providing nominal steel reinforcement.
5. The hydraulic design would be made adopting the Mannings' equation of flow velocity and recommended Rugosity coefficient of 'n' for concrete. From practical point of view, the 'n' value was considered at 0.020 for this section instead of 0.018 recommended for smooth surface concrete; as the value of 0.018 for concrete surface cannot be achieved in the field due to various reasons associated with the actual workmanship;
6. The thickness of the concrete wall and bed will be 100 mm.;
7. Free board will be 50 mm to 100 mm.;
8. To have a working platform, a solid foundation base in M10-A40 concrete mix will be provided below the channel section;



DESIGN OF RECTANGULAR CEMENT CONCRETE LINED CHANNEL			
Channel discharge required : 1 Cusec or 28.3 Litres per second			
Bed slope : 1 in 600 to 1000			
Section of Rectangular			
Type of lining: Cement Concrete			
Considering:			
A = Cross-sectional area in m ²			
P = Wetted perimeter in m			
R = Hydraulic mean depth in m			
b = Bed width of channel in m			
d = Depth of flow in m			
S = Bed slope of channel			
n = Rugosity Coefficient as per Mannings' equation			
Let b = xd, where x is a multiplier			
then, Cross-section area A = xd ²			
Perimeter P = 2d+xd			
Hydraulic Mean depth R = xd ² /d(2+x)= xd/(2+x)			
flow velocity V = 1/n R ^{2/3} S ^{1/2}			
Discharge Q = AV = d ² x/n R ^{2/3} S ^{1/2}			
or Q = x/n d ² (xd/2+x) ^{2/3} S ^{1/2}			
Considering a Trial Section with,		Computed :	
n =	0.020	A =	0.06
d =	0.200	P =	0.70
b =	0.300	R =	0.09
S =	1/500 = 0.002	V =	0.43
		Computed x = b/d =	1.50
		Computed Q =	0.026 Cumec
		or Q =	26.08 lps
		Provide Freeboard of 10%	2.61 lps
		Design discharge Q _D =	28.69 lps

CAD-WM Channels for OIIPCRA									
Rate of Discharge in Rectangular CC Channels for Different Bed Slopes (LPS)									
S = 1/500		BED WIDTH (m)			S = 1/800		BED WIDTH (m)		
n = 0.020		0.20	0.30	0.40	n = 0.020		0.20	0.30	0.40
DEPTH (m)	0.20	14.71	26.08	38.54	DEPTH (m)	0.20	11.63	20.62	30.47
	0.25	19.25	34.61	51.68		0.25	15.22	27.36	40.86
	0.30	23.86	43.36	65.28		0.30	18.86	34.28	51.61
	0.35	28.52	52.26	79.21		0.35	22.55	41.31	62.62
	0.40	33.21	61.26	93.38		0.40	26.26	48.43	73.82
S = 1/600		BED WIDTH (m)			S = 1/900		BED WIDTH (m)		
n = 0.020		0.20	0.30	0.40	n = 0.020		0.20	0.30	0.40
DEPTH (m)	0.20	13.42	23.81	35.18	DEPTH (m)	0.20	10.96	19.44	28.73
	0.25	17.57	31.59	47.18		0.25	14.35	25.80	38.52
	0.30	21.78	39.58	59.59		0.30	17.78	32.32	48.66
	0.35	26.04	47.70	72.31		0.35	21.26	38.95	59.04
	0.40	30.32	55.92	85.24		0.40	24.76	45.66	69.60
S = 1/700		BED WIDTH (m)			S = 1/1000		BED WIDTH (m)		
n = 0.020		0.20	0.30	0.40	n = 0.020		0.20	0.30	0.40
DEPTH (m)	0.20	12.43	22.04	32.57	DEPTH (m)	0.20	10.40	18.44	27.25
	0.25	16.27	29.25	43.68		0.25	13.61	24.47	36.54
	0.30	20.17	36.64	55.17		0.30	16.87	30.66	46.16
	0.35	24.10	44.16	66.94		0.35	20.17	36.95	56.01
	0.40	28.07	51.78	78.92		0.40	23.48	43.32	66.03

CONSIDERATIONS:

Bed Slope = S, shall be considered matching to the average terrain gradient
 Rugosity Coefficient '**n**' = **0.020**, considered on practical workmanship point of view

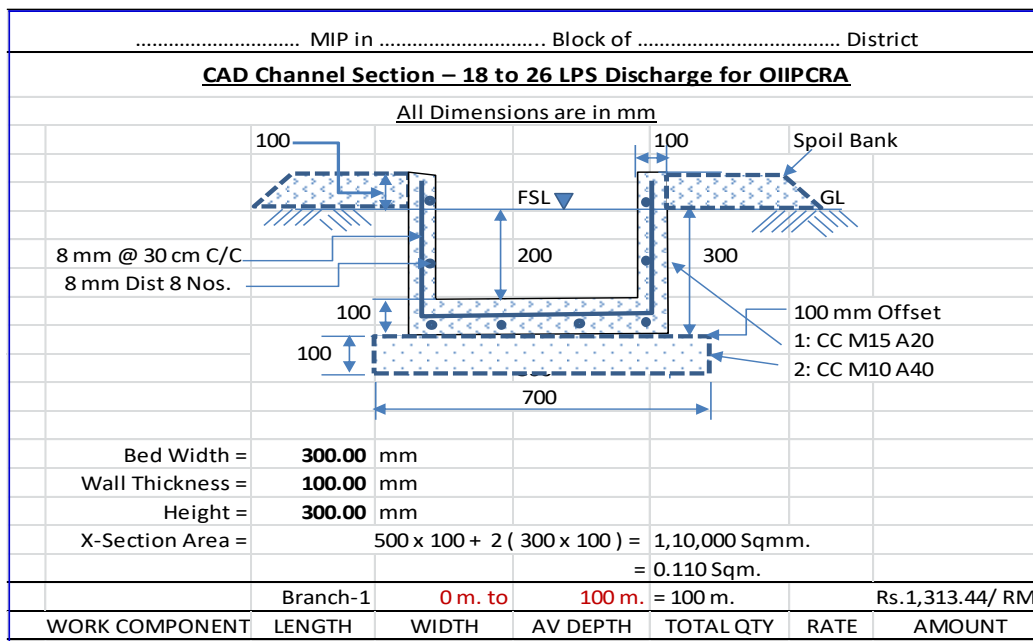


Table 76: On-Farm Development (OFD) Works

Sub-Activities	Responsibility		Expected Outputs	Indicators
	Primary	Secondary		
Assessment of current status of field channels in tank command	EE-MI	SPMU DoWR	Irrigation provision made to each ha. of land in the tank command and water is distributed equally improving scope for putting more area under crops and bringing in efficiency by reducing loss of water.	<ol style="list-style-type: none"> No. of tanks / cascades covered under assessment to understand the status of field channels, repair / restoration / new channel construction required and detail plan prepared for each command; Total area covered under OFD works and length of field channels / canals constructed / repaired & restored; Total area (in ha.) provided with irrigation, volume of water discharged as per the plan and improvement in irrigation efficiency; Quality assessment conducted periodically and assessment report of construction / repair of field channels / canals prepared and shared with appropriate authority.
Repair / restoration and construction of canals / distributary channels	EE-MI	SPMU DoWR		
Quality assessment of repair / construction	Third Party Agency	DLPMTS PMU DoWR		

4.2.8 Cleaning Feeder Channels

As one of the oldest man-made ecosystems, the tank system consists of feeder channels apart from other structures. Gradual reduction of flow to tank and later complete stoppage of flow will result with the death of the tank. Feeder Channels are the lifeline of tanks. Normally, the tanks are man-made and the channels carry water to tanks forming tank cascades. In all such cascades, the feeder channels are the lifelines. Over the period, it is observed that the carrying capacity of these channels had been reducing due to heavy siltation. Siltation has reduced the depth and breadth of the channels and consequently the water carrying capacity. Because of siltation, the channel could never carry the designed flow to serve the dependent tanks unless it is cleaned and de-silted. The cleaning and clearing of the channels would revive up to their design standards and would be helpful in retrieving the areas served by the tanks and the agriculture.

Hence, in the tank system, realizing the importance of the feeder channels and its current condition, the feeder channels to the tank will be taken up under the project for cleaning up, strengthening and repairing and the feeder channel distribution system. The executive engineer (EE-MI) of DLPMT will be responsible for cleaning the feeder channels, in association with the PP / WUA, and following are the major activities to be performed:

1. Feeder channels are to be checked for the carrying capacities and the section brought to the designed section for realizing the designed supplementary inflows into the tank;
2. Silt removal in the feeder canal, repairs to cross drainage and cross masonry works are to be undertaken to keep the feeder channel effectively operational;
3. Wherever the canal banks are below the standards, it is to be brought to Top Bank Level (TBL) with proper compaction;

- The regulator of feeder channel, pick up anicut are to be ensured for diverting the required supplies into the tank through the feeder canal.

Table 77 Cleaning Feeder Channels

Sub-Activities	Responsibility		Expected Outputs	Indicators
	Primary	Secondary		
Estimate the current carrying capacity of feeder channel	EE-MI DLPMT	SPMU DoWR	Feeder channels restored, based on feasibility, to its carrying capacity and periodic maintenance taken up as per monitoring.	5. No. of tanks / cascades covered under assessment to understand the carrying capacity of the feeder channels;
Restore the carrying capacity of feeder channel	EE-MI	SPMU DoWR		6. No. of tanks / cascades having plan for cleaning / repair and restoration of feeder channels;
Monitoring and Periodic Maintenance	PP EE-MI DLPMT	SPMU DoWR/ DLPMT		7. No. of tanks / cascades where carrying capacity of feeder channels restored through cleaning / civil works; 8. No. of tanks / cascades monitored during pre-monsoon and post-monsoon to assess the feeder channel condition and plan prepared for maintenance / repair.

4.2.9 Cleaning Main Canal, Branch Canal & Distributaries

The command area under every tank is covered by irrigation channels or a distributary system network depending upon the size of the command under a tank. The irrigation channel at entry and at control outlet points should have cut throat measuring devices to measure the discharge in the canal at various depths and at full supply depth. This would entail the correct position of water in the canal, whether the users are getting their required rightful share of water or not.

The irrigation canals are to be maintained to its section to realize its carrying capacity. Likewise, all the cross drainage and cross masonry works are to be revived to their operable conditions. masonry lining or C.C. lining is to be adopted wherever canal is vulnerable to losses. The irrigation channels are to be made free of weeds, vegetation and silt.

Table 78 Cleaning Main / Branch Canals & Distributaries

Sub-Activities	Responsibility		Expected Outputs	Indicators
	Primary	Secondary		
Assessment of canal's situation / sedimentation	EE-MI DLPMT	SPMU DoWR/	Canal and distributaries of tanks cleaned, as per the assessment, and water flow measured using installed devices.	1. No. of tanks assessed for sedimentation load in its canals / distributaries;
Cleaning of Canals / Distributaries, wherever needed	EE-MI PP/WUA DLPMT	SPMU DoWR/		2. Length (in Km.) of canal / distributaries cleaned and no. of tanks covered;
Installation of flow measuring devices	EE-MI DLPMT	SPMU DoWR/		3. No. of tanks having water flow measuring devices;
Training to PP / WUA for water flow measurement and distribution planning	EE-MI DLPMT	SPMU DoWR/		4. No. of trainings organised and no. of PPs / WUAs / its committees trained on water flow measurement and distribution planning.

4.2.10 Dam Safety Plan Preparation

(Cost Table Reference: C 2-B)

Dam safety bill, 2018 provides for surveillance, inspection, operation and maintenance of specified dams for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning. As per this, the states are expected to have dam safety organization to systematically maintain the logs on dam health through systematic inspection and assessment, classify dams as per the vulnerability and hazard and recommend corrective measures to be followed by dam owners from time to time.

Odisha has 204 numbers of large dams (as per ICOLD classification), which is the 7th largest in India in terms of numbers. This includes 10 major project dams, 50 medium project dams and rest 144 dams under minor irrigation projects.

Dam Safety Panel (DSP) would be necessary for tank bunds of height more than 10m as these structures are prone to technical deficiencies in various components, particularly in bunds, surplus weirs and surplus course. The DSP would be constituted in order to meet dam safety requirements for tank bunds above 10 meters height. The DSP will issue guidelines to the field engineers on the remedial measures to be taken for implementation of rehabilitation of these tanks. Any other tank reporting such critical problems will be inspected by the Dam Safety Panel to suggest measures to ensure the safety of the structure.

The Dam Safety Review Panel (DSRP) established for the project by the Government of Odisha shall undertake comprehensive, independent review from dam safety and operation and maintenance point of view and recommend the remedial measures for rehabilitation of MI tanks that have bund height more than 10m for implementation. The DSRP will be guided by the Government of Odisha related legislations, regulations, standards and guidelines, and World Bank's Operational Manual BP 4.37. Review by the panel should be based on the guidelines issued by the Central Water Commission (CWC). The DSRP will also monitor the implementation of the Dam Safety Works, taken up under the project from time to time.

The DSRP shall review the project record and history of such tanks under the OIIPCRA project to familiarize with its operational and maintenance requirements. The specific elements to be reviewed and evaluated by the DSRP shall include the following.

1. Built drawings and construction specifications;
2. Design records including geological reports foundation investigation, material testing and stability analysis;
3. Construction records and recent operation and maintenance records including any instrumentation data;
4. Criteria, methodology and determination of design flood routing studies and spillway size, examine spillway operation records and evaluate the adequacy of spillway size;
5. Emergency plans, including down-stream flooding effects, emergency reservoir drawdown, notification of impending dangers to down-stream municipal authorities, major flood early warning system, reservoir operation plan and site access during emergencies.
6. Field inspection reports of the EE-MI / DLPMT and any other available report;
7. The proposals for remedial measures prepared by field engineers for rehabilitation/modernization of the head works along with computations and other technical analysis;
8. The DSRP may seek additional field data, laboratory tests, etc., which will be provided by the EE-MI / DLPMT;
9. The State Project Director, OIIPCRA will be responsible for all correspondence between Government of Odisha and the DSRP, and will also be the convener of the panel;

10. The DSRP shall meet as and when required or as per the requirement felt by the chairperson and convener, to review the records and data and discuss the issues if any, with the EE-MI / DLPMT and among the members of the DSRP;
11. As and when requested by the DSRP, the EE-MI / DLPMT will make available the Operation & Maintenance Staff, to respond to the DSRP queries;
12. The EE-MI / DLPMT will provide necessary information, any relevant data, and explanations regarding the design computations or methods used. The DSRP may suggest additional studies to assist in evaluation of the matters relating to the dam's safety status; and
13. DSRP will prepare reports and present to SPMU for appropriate action.

Table 79 Dam Safety Plan Preparation

Activity/Sub-Activities	Responsibility		Expected Outputs	Indicators
	Primary	Secondary		
Constitution of Dam Safety Panel	DoWR	-	Dam Safety Panel constituted as per the Govt. Rule; Periodic assessment of sample tanks and preparation of dam safety plan; Dam safety guidelines issued to EE-MI / DLPMT for necessary measures.	1. No. of sample tanks visited by the panel;
Visit of Panel to Tank Sites (> 10-meter bund height)	Dam Safety Panel	DoWR		2. No. of visit reports submitted with recommendations
Identification of tanks eligible for DSP	Dam Safety Panel	DoWR		3. No. of tanks identified for DSP;
Issue guidelines	Dam Safety Panel	DoWR		4. No. of DSPs prepared.
Periodic Monitoring, Reporting and Guidance	Dam Safety Panel	DoWR		5. No. of tanks monitored annually and reports submitted.
Implementation of the recommendations	SPMU	DoWR		6. No. of tanks assessed and reports prepared

Chapter Five: Component III: Institutional Capacity Strengthening

5.1 Introduction

Institutional capacity strengthening measures are creative processes for transition to new level of rational thinking, striving and aspiration for new approaches and tools for problem solving. Institutional capacity strengthening is related to the ability to identify and solve problems and to design and apply in development programs. It is a process of change, affecting individuals, organizations and societies in a complex, interrelated manner. Although often supported by exogenous assistance, it leads to the achievement of development objectives in a sustainable manner.

In order to build the capacity of the key functionaries and strengthen the institutions in the project area, this component shall promote and strengthen the community level organizations, undertake capacity development of Pani Panchayats (PPs), Farmer Producer Organizations (FPOs), Primary Fishery Cooperative Societies (PFCS), SHGs and community volunteers (identified in the process), training and exposure of the key officials and extension functionaries of the line departments (Department of Water Resources/Agriculture & Farmers' Empowerment/Fisheries), development of training modules, communication materials (IEC/ICT) and create pool of Resource Persons and Support Organisations (Resource Agencies) for training & capacity development of the stakeholders.

5.2 Objectives

Overall objective of this component is to develop the capacities of key functionaries and strengthen community-based institutions in the project area through trainings, demonstrations & exposure visits, development of training modules and communication materials (IEC/ICT) by associating knowledge partners/ resource institutions/technical support organizations. The project, under this component, will support in strengthening of community institutions in a sustained manner with the adoption of an appropriate exist protocol.

5.3 Project Approach

1. The interventions under this component shall cover both command and non-command area of the project districts;
2. Capacity development of the community-based institutions like Pani Panchayats (PPs) / WUA, Farmer Producer Organizations (FPOs), Primary Fishermen Cooperative Societies (PFCS) shall be done through trainings and exposure visits. All the trainings may be associated with demonstration for better understanding and learning;
3. Project shall develop pool of Resource Persons and Resource Agencies for imparting trainings. The Resource Persons/trainers shall be selected from the practitioners, extension service providers and subject matter experts. Project shall strengthen the extension service providers/practitioners through training of trainer program;
4. Project shall develop training modules and IEC/ICT materials through national / state level knowledge partners/ individual experts/ resource agencies;
5. Project shall engage Support Organizations (SO) for social mobilization, facilitation of capacity development activities and other activities as specified in the role and responsibilities of SO;
6. Project shall develop a framework for capacity development of Engineers under DoWR through professional agency;
7. Project shall organize training cum exposure visits of the SPMU experts, key officials of line departments and field functionaries of the line departments associated with OIIPCRRA;

8. Project shall take up formation of new PFCS and strengthening of existing PFCS in the project area; formation of new WUAs in areas where there are no Pani Panchayats.

5.4 Project Interventions

1. Preparation of database of community level institutions, such as PP / WUA / SHG / PFCS etc. and its regular updation;
2. Capacity Development and strengthening of the Pani Panchayats (PPs) / WUA, Farmer Producer Organizations (FPOs), Primary Fisheries Cooperative Societies (PFCS), women SHGs and young volunteers through training and exposure visits;
3. Development of training modules and communication materials (IEC/ICT);
4. Organizing of study tour cum exposure visits of the key officials/field functionaries of the project, partner agencies and line departments associated with OIIPCRA;
5. Development of framework for capacity development of Engineers under DoWR;
6. Identification/selection of Resource Persons and Resource Agencies for imparting trainings;
7. Training of trainers;
8. Training of community level volunteers;
9. Social mobilization with the facilitation of Support Organizations (SO);
10. Formation of Primary Fisheries Cooperative Societies / WUA.

5.5 Strengthening of PP / WUAs

(Cost Table Reference: C 2-C)

Measures will be taken under this sub-component to strengthen the functional and management capacity of the PPs by which they can take up management and maintenance of community-based irrigation infrastructures; apart from water distribution, regulation and efficient use of available water resources. As the PP/WUA is a platform of the water users in the tank command, which normally covers almost all households in a demarcated hydraulic boundary, association of PPs/ WUAs will help to mobilise the community for active and effective participation in the overall process. The project will support in strengthening the PPs/ WUA to make them a vibrant community institution which is capable of promoting climate resilient practices and strengthening livelihood of people. As PPs/ WUA are suitably placed in a rural set-up and represents the local community in general, they would be instrumental in identifying the critical needs of people, facilitating local planning process and can take up measures to ensure that available natural resources are conserved and utilised appropriately without hampering the local ecosystem. Inclusion and equity aspects in accessing project benefits can also be addressed amicably by these community institutions. Hence, the project will consciously attempt to strengthen the PPs and involve them in the overall water governance system at the tank level.

5.5.1 Guiding Principles

The institutional strengthening process under this sub-component, which basically focuses on PPs / WUAs, will necessitate all such measures, within the scope of the OPPA, 2002, OPP Rules, 2003 and related amendments to the OPPA, 2002 (OPPA (amended), 2008; OPPA (amended), 2014) and in accordance to the scope of the OIIPCRA project.

The PPs/ WUA shall mobilize their members to participate in the implementation of project activities such as tank system development, joint azmoish for water tax finalization and collection, corpus mobilization and for O&M of tank and irrigation systems. The PPs/ WUA will motivate all tank system stakeholders to take advantage of all sectoral activities and responsibility for efficient water use including crop-water budgeting, water sharing, adoption of climate resilient agricultural technologies and promotion of fishery. Along with this, the PPs/ WUA will also be supportive and facilitate agri-business to be taken up by the FPOs / FPCs.

Means of Institutional Strengthening: Each PP shall conduct at least once a monthly meeting of its executive body to discuss project related activities and issues. During the meeting, the PP members shall focus on issues like water management, sharing of water, crop plan preparation, O&M of tanks, etc. Meeting of the general body shall be conducted at least once in six months appraising the activities taken up and overall functioning of the PP as per the stipulated role. As per the requirement, PPs will be involved in the preparation of Tank / sub-basin Development Plan (TDP), identification of members for PP sub-committees, collaboration with FPOs and FCS members etc. In all the project activities, PPs will encourage participation of women members, including PP meetings and project activities. PPs will identify farmers / households, based on their eligibility norms, focusing on inclusion and equity aspects to access physical and financial resources of the project in particular and from other government or non-government sources in general.

Maintenance of PP Records: Transparency and accountability is an important aspect of PP / WUA function for which PPs/ WUAs will maintain different records that are relevant to their functioning. The records can be used to apprise different activities taken up by the PP / WUA as a part of their information disclosure mandate and accountability norms. Documents related to each and every transaction, minutes of the meetings (with key decisions made), details of farmers / land holders in the tank command / landless and other households under the tank etc. would be maintained by the PP / WUA. Different books/records to be maintained by the PP / WUA are: (i) Minutes book, (ii) Particulars of PP / WUA members and other members, (iii) Cash book, (iv) Special fees and other collections, (v) Details of crops and extent of cropping area, (vi) Works sanctioned book, (vii) Water tax raising and collection register, (viii) Stock register, and (ix) Visitors book. Additional records, as per the requirement of the project, will also be maintained by the PP / WUAs.

Tank / Cascade Development Plan: The PPs/ WUAs will be involved actively in the tank / sub-basin system development planning process, adopting participatory approaches. The PP / WUA will collect relevant data / information from primary as well as secondary sources, with the support of involved departments and other agencies, so assigned for planning. Based on the identified gaps and emerging needs (on priority basis), a detail plan will be prepared, taking into consideration the project components and suggested key activities under different components / sub-components. The detail plan, so prepared and finalized, will be shared / discussed with the PP / WUA general body and getting its approval.

Transparency and Accountability (T&A): One of the important aspects of the project is 'transparency' in project implementation starting from PP / WUA level. It will help to avoid conflicting situation among the PP members in specific and the entire tank command in general. It will also be useful for outsiders to know the level of works completed, pending works, cost involved, PP / WUA functioning details, stages of implementation of project activities by designed components etc. The PPs will take different measures in this regard like suo moto disclosure of its activities, financials, display of important information in the display board / social audit board, sharing information with the members based on their need, display of information in a common place at the tank command level etc.

Rating of PPs / WUAs: PP functionaries are required to perform different roles in the project in agreement with the existing Act and Rules. Functions of the PPs includes institution management, irrigation system management (O&M), water management, revenue generation etc. Different activities are expected to be monitored by the PPs from time to time, apart from OIIPCRA project activities. Based on the activities taken up by the PPs, there will be rating of each PP on quarterly basis. Ratings will be done at two levels, i.e., self-rating by the concerned PP and rating by the DLPM/ project implementing institutions for different components of the project. The key areas of assessment are (1) Participation and dialogue, (2) Performance, (3) Self-management, and (4) Innovation and technology adoption.

Water Charges Collection: As per the OPPA, 2002, PPs may collect water charges from the water users, in a manner specified by the Government. For the purpose of collection of charges, PP executive body will conduct a joint verification with Revenue & DM Department, Dept. of Agriculture and Farmers Empowerment and Water Resources Department to assess the cropping area under the tank and actual area irrigated and number of farmers having access to tank water. Accordingly, water charges will be fixed and collected from the individual farmers.

5.5.2 Capacity Development of PPs / WUA

5.5.2.1 Capacity Need Assessment (CNA)

Capacity development of PPs will be done in different phases of the project, i.e., during the planning phase, implementation phase, and during the post-implementation/consolidation phase. Before taking up capacity development measures, Capacity Need Assessment (CNA) will be conducted for all the PPs/ WUAs in a project tank / cascade. A PP / WUA Capacity Need Assessment tool will be designed to assess the actual needs of the PPs, in terms of their functional dimensions and on project related aspects.

5.5.2.2 Designing Training Module / Manuals

Based on the identified needs, training modules will be designed in local language (Odia) and validated / piloted before full scale execution. If there is any existing training modules (OCTMP Project), it may be examined contextually and if required, suitably modified as per the project requirement. The capacity gaps identified will be addressed through in-house and field trainings. The required training modules and manuals will be developed by the SPMU on different thematic areas to impart training to the PPs / WUAs.

To a certain extent, need for capacity development, will vary for different PP / WUA sub-committees and Executive Committees as their functional dimensions are different. For example, the capacity development requirement for the Works Sub-committee will be related to works measurement, quality assurance etc. whereas capacity development requirement of the Finance Committee will be more related to financial management aspects. Similarly, capacity development requirement for EC members will be more on coordination, management, negotiations, monitoring etc. So, imparting both hard and soft skills are to be planned in the capacity development measures for different stakeholders within the PP / WUA. The capacity development training would address different category of stakeholders within the PP.

5.5.2.3 Phasing and Scheduling Trainings

For organizing trainings, based on the identified needs, an Annual Training Calendar will be prepared for different categories of participants, within the PP / WUA. The training calendar will be prepared in advance and will be communicated to the PPs / WUAs.

5.5.2.4 Imparting Training

The capacity enhancement for Pani Panchayat (PP) / Water User Association (WUA) will cover aspects related to organizational management, water use efficiency, crop planning, extension services, farm mechanization, crop water budgeting, climate resilient/smart agriculture, agri marketing, revenue mobilization and management etc., On field mobilisation and capacity development of the PPs/ WUAs will be done through the out sourced support organizations (SO). Training of PPs/ WUAs will be organized by the support organizations (SO). Training will be imparted by experienced, learned and trained resource persons, drawn from PD-ATMA / DLPMT, Govt. and private institutions / organizations, practitioners, master trainers, etc. The resource persons would be selected well in advance and informed about the theme, objectives, and contents to be discussed with the participants in the training session/s. A training session plan / training window would be prepared to keep the training well organized and covering all the themes that are planned for discussion.

5.5.2.5 Exposure Visits

Apart from training, exposure visits will be organized for the PPs/ WUAs and its sub-committees, during the life of the project for their learning and replication. Places of exposure visits should be related to the project components where different project related initiatives have demonstrative impact in improving resilience in agriculture and allied sectors.

5.5.2.6 Hand Holding Support

Apart from training and exposure, the PPs/ WUAs will be provided with hand holding support for effective execution of different project activities. The hand holding support will be rendered primarily by the SOs and PD-ATMA / DLPMT / officials/experts, line departments associated in the implementation of the project (depts. of Agriculture, Horticulture, Fishery, animal husbandry and Ground Water) and officials / experts from the SPMU. Apart from this, different technical agencies such as SAU (OUAT), ATMA, KVKs, and national level institutions may be invited from time to time to support the PPs on different aspects like crop water budgeting, crop planning, ground water management etc.

The project has a great responsibility and a crucial role to play in the context of Water Management, Water Use Efficiency improvement and Agricultural Productivity enhancement in the project areas through Training, Research and Development. With this vision the project shall strengthen the water user group/ Pani panchayat members through periodic trainings and exposure visit. The trainings will be imparted on crop water budgeting, participatory ground water management, cascade/tank level planning as well as need-based trainings.

Key Guiding Principles

1. Identification of trainees from the water user groups/PPs based on their interest, active involvement in PP activities and farming activities;
2. Identification of young volunteers (10 volunteers per tank command) based on their interest for irrigation development in the locality and active involvement in farming/livelihood activities in tank command;
3. Development of training calendar for PPs/ WUAs and young volunteers;
4. Identification of resource persons/trainers from the subject matter experts and field practitioner;
5. Each training will be combination of class room and field training;
6. Class room training will be mostly interactive supported by audio visual program and field training will be led by a progressive farmer/practitioner with support from a subject matter expert;
7. Organization of 3 day training program on Crop Water Budgeting & Crop Planning and Water Regulation and Irrigation Management including Participatory Ground Water Management for 30000 PP / WUA members, 2 day training program on leadership development to enhance capacities of water users in the command area for working together with other stakeholders for 30000 PP / WUA members, 2 day need based training program for 17040 PP members and 1 day training program for 5460 young volunteers (@10 per tank command) on Water Regulation and Irrigation Management;
8. Organization of exposure visit for 21,600 members of PPs/ WUAs on Crop Water Budgeting and Crop Planning, Water Regulation and Irrigation Management, Natural Farming System;
9. Development of communication materials (IEC/ICT) through Expert/Resource institutions.

Role and Responsibilities

Pani Panchayat / Water User Association:

1. Mobilisation of farmers / members for capacity development need assessment;

2. Facilitate capacity need assessment of its EC and GB members;
3. Ensure attendance of the selected members in CB activities like training / workshops / exposures etc.
4. Reviewing the usefulness of the CB inputs with the members from time to time;
5. Suggest to EE-MI / PD-ATMA for any modification in CB strategy.

Support Organisation:

1. Consultation with PP / WUAs to understand their current status and performance in line with the Odisha Pani Panchayat Act;
2. Identification of CB needs of the PPs / WUAs, including its executive body with the help of designed tool/s;
3. Categorisation of PPs / WUAs(ranking) as per their current level of performance (criteria based);
4. Compilation of CB needs of PPs / WUAs by their ranks;
5. Submission of compiled CB needs of PPs / WUAs to PD-ATMA / SPMU for designing capacity development plan;
6. Organising training of PPs in collaboration with identified resource persons;
7. Preparation of training report and its submission to PD-ATMA / SPMU

PD-ATMA / EE-MI:

1. Preparing CB schedule / training calendar for PPs / WUAs;
2. Facilitate in organising training of PPs / WUAs;
3. Participating in different training sessions to understand the quality of inputs, adopted processes for capacity development and suggest if any change is required in the CB strategy.

PD-OIIPCRA (SPMU):

1. Designing training module / manuals / learning materials as per the identified needs in consultation with PD-ATMA / EE-MI;
2. Finalising session plan with the PD-ATMA / EE-MI;
3. Supporting PD-ATMA/ EE-MI in selection and finalising resource persons;
4. Support to PD-ATMA/ EE-MI in finalising thematic areas, designing session plan, strategizing delivery mechanism etc.;
5. Attending sample trainings to understand the quality of inputs and process followed;
6. Reviewing training reports and suggest to EE-MI / PD-ATMA if any change is required in capacity development.

Table 80: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Identification of trainees and finalisation	SO/ PD-ATMA / EE-MI	SPMU	List of trainees finalized	No. of trainees finalized for training.
Identification of young volunteers	SO/ PD-ATMA / EE-MI	SPMU	List of young volunteers finalized	No. of young volunteers finalized for training.
Development of training calendar for PPs/ young volunteers	SPMU	PD-ATMA	Training calendar developed	Development of training calendar.
Identification of resource persons/trainers	PD-ATMA EE-MI SPMU	PD-ATMA	List of trainers finalized	No. of trainers finalized
Organization of training	SO/ PD-	SPMU	Training programs as	-No. of trainings

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
programs as per training calendar	ATMA / EE-MI		per calendar successfully conducted and the trainees trained	completed. -No. of trainees trained
Exposure visit	PD-ATMA EE-MI	SPMU	Identified members of the PPs completed exposure visit	No. of PP members completed exposure visit
Development of communication materials	EE-MI PD-ATMA	SPMU	Communication materials developed	No. of communication materials developed.

5.6 Capacity Development of Primary Fisheries Cooperative Societies and SHGs

(Cost Table Reference: C 1.2-E)

The project envisages strengthening the capacity of fish farmer groups in the project area by creating new fisheries cooperatives and strengthening the existing cooperatives through capacity development inputs and demonstrations. The project plans to have 412 Primary Fisheries Cooperative Societies (PFCS) in the project area out of which 277 are already existing and 135 are to be formed. The society members will be trained on organization & governance management, Intensive/Semi-intensive fish management, Pen and cage culture, and Value addition/processing/marketing. Besides, project also plans to provide training to Women SHGs on Fish Processing for enhancing their income.

Key Guiding Principles

1. Formation of 135 Nos. of new PFCSs through SOs where there is no functional PFCS exists;
2. The new PFCS will be registered under Odisha Cooperative Societies Act;
3. Identification of trainees from the existing/new PFCS (active members of PFCSs);
4. Identification of trainees from the existing Women SHGs in the project area;
5. Development of training calendar for PFCS/SHG;
6. Identification of resource persons/trainers from the subject matter experts and field practitioner;
7. Organization of 2 days training program on organization & governance management for 20600 Fishers, 2 days training program on Intensive/Semi-intensive fish farming & management for 20600 Fishers, 2 days training program on Pen and cage culture for 20600 Fishers, 3 day training program on Value addition/processing/marketing for 20600 Fishers and 1 day refresher training for 15450 fishers;
8. Organization of 2 days training program for Women SHGs on Fish Processing and on the issues as identified during project implementation;
9. Organization of exposure visit for 3708 members of PFCS on Intensive / Semi-intensive fish farming, Scientific Aquaculture Management, Value Addition / Processing / Marketing;
10. Organization of exposure visit for 1236 members of women SHGs on Processing/Marketing and for 225 barefoot trainers on aquaculture management/value addition/processing/marketing;
11. Development of communication materials (IEC/ICT) through Expert/Resource institutions.

Role and Responsibilities

Primary Fishers Cooperative Society:

1. Mobilisation of fishers for capacity development need assessment;
2. Facilitate capacity need assessment of its EC and GB members;
3. Ensure attendance of the selected members in CB activities;
4. Reviewing the usefulness of the CB inputs with the members from time to time;
5. Suggest to DFO/ PD-ATMA for any modification in CB strategy.

Support Organisation:

1. Consultation with PFCSs and women SHGs to understand their current involvement in fisher related activities, including value addition and marketing;
2. Identification of CB needs of the members of PFCSs / SHGs, including its executive body with the help of designed tool/s;
3. Categorisation of PFCS / SHGs (ranking) as per their current level of performance (criteria based);
4. Compilation of CB needs of PFCS / SHGs by their ranks;
5. Submission of compiled CB needs (in report form) of to PD-ATMA / SPMU for designing capacity development plan;
6. Organising training of PFCS / SHGs in collaboration with identified resource persons;
7. Preparation of training report and its submission to PD-ATMA / SPMU

PD-ATMA / EE-MI:

1. Preparing CB schedule / training calendar for PFCS / SHG;
2. Facilitate in organising training / exposure etc. as per the CB plan;
3. Participating in different training sessions to understand the quality of inputs, adopted processes for capacity development and suggest if any change is required in the CB strategy.

PD-OIIPCRA (SPMU):

1. Designing training module / manuals / learning materials as per the identified needs in consultation with PD-ATMA / DFO;
2. Finalising session plan with the PD-ATMA / DFO;
3. Supporting PD-ATMA/ DFO in selection and finalising resource persons;
4. Support to PD-ATMA/ DFO in finalising thematic areas, designing session plan, strategizing delivery mechanism, finalising exposure destinations etc.;
5. Attending sample trainings to understand the quality of inputs and process followed;
6. Reviewing training reports and suggest to DFO/ PD-ATMA if any change is required in capacity development.

Table 81: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Formation of new Fisheries Cooperative Societies (PFCS)	SO/DFO/ PD-ATMA	SPMU	New PFCSs formed and registered under Odisha Cooperative Societies Act	No. of new PFCSs registered
Identification of trainees from PFCSs	SO/DFO/ PD-ATMA	SPMU	List of finalized trainees	No. of trainees finalized for training.
Identification of trainees from the female SHGs	SO/DFO/ PD-ATMA	SPMU	List of finalized trainees	No. of trainees finalized for training.
Development of training calendar for PFCSs/ SHGs	DFO S-SPU	PD-ATMA	Training calendar developed	Development of training calendar.
Identification of resource persons/trainers	DFO S-SPU	PD-ATMA	List of trainers finalized	No. of trainers finalized
Organization of training programs as per training calendar	SO/ DFO / PD-ATMA	S-SPU SPMU	Training programs as per calendar successfully conducted and the trainees trained	No. of trainings completed. No. of trainees trained
Exposure visit	DFO	S-SPU	Identified members of	No. of PFCS members

Sub-Activities	Responsibility		Expected Output	Indicators	
	Primary	Secondary			
	PD-ATMA	SPMU	the PFCSs completed exposure visit	completed visit	exposure visit
			Identified members of female SHGs completed exposure visit	No. of women SHG members completed exposure visit	
			Identified barefoot trainers completed exposure visit	No. of barefoot trainers completed exposure visit	
Development of communication materials	DFO Resource Institutions	S-SPU SPMU	Communication materials developed	No. of communication materials developed.	

5.7 Engagement of Support Organizations (SO)

(Cost Table Reference: C 3-E)

Support organizations (SO) are state/district level NGOs, having sectoral subject matter experts involved in the rural development programs at the grassroots level and working with the community. The role of the SO is to facilitate the project implementation process through social mobilization at the tank/cascade level, in association with PPs/WUAs / PFCSs/FPOs/SHGs and implementing line Departments. The SOs will perform different activities such as (1) Awareness creation, (2) Community Mobilization, (3) Supporting and Strengthening PPs/WUAs / PFCSs/FPOs/SHGs etc. Project intends to hire the services of 7SOs in the project districts for social mobilization and program facilitation. Each SO will have 3-4 Cluster Facilitation Teams (CFT) and each CFT will facilitate execution of the project in stipulated number of tanks, as decided by SPMU.

Key Guiding Principles

1. Hiring of the services of Support organizations (SO) at the state / district level based on their experience, expertise and performance in irrigation/agriculture/fishery sector;
2. The SOs will facilitate execution of project activities at the identified tank command and non-command areas covered under the project;
3. Each SO will have more than one CFT to facilitate execution of project framed activities in stipulated number of tank clusters;
4. SPMU will organize orientation training of SOs and conduct refresher trainings as per the need of the project;
5. Each SO will have monthly / quarterly target and annual action plan for each CFT;
6. At the district level, PD-ATMA will conduct progress monitoring, review and performance evaluation of the SOs in consultation with SPMU;
7. If so required, SPMU will review the performance of SOs on quarterly / half yearly basis to assess the project progress;
8. The SOs will report to PD-ATMA periodically (at least once in a quarter) with a copy to FIAC and SPMU for information and necessary guidance.

Support Organisation Selection Criteria:

1. The organization should be a registered body under the relevant national / state Act and is active and operational continuously for the last 3 years on the date of application;
2. The organization should have maintained its books of accounts / accounting records and have them properly audited. Annual statements of income and expenditure should have been prepared;

3. The organization should have at least 5 years of relevant experience in carrying out social mobilization, livelihood promotion, agribusiness activities and facilitating / promoting community level organisations;
4. The organization should have working experience in farmer's issues, irrigation promotion, agriculture / horticulture and agribusiness;
5. The organization should have a minimum annual turnover of Rs. 50 lakhs, on an average for last three years (as per annual audit statements);
6. The organization should not be on any blacklist of any government (Union and/or State), Ministry / Department / Organization / Multinational Donor NGO or any other donor/partner organization in the past;
7. The agency should be non-political and secular in nature;
8. The agency should have demonstrated experience in community development and in training and capacity development in convergence with government departments and agencies.
9. The organization should have registered office in the State of Odisha. Working experience of the agency in project districts will be added advantage;
10. The Organisation shall have required number of human resources to depute / deploy for project activities.

Role and Responsibilities:

Support Organisation:

The Support Organization (SO) shall undertake the following specific tasks towards ensuring that PP / WUAs and other community institutions / organisations become self-sustaining entities. Specific role and responsibilities of the SO would be as below. Apart from below mentioned role and responsibilities, the agency has to contribute to the project mandate, as it is required from time to time, based on the guidance of the SPMU.

1. **Institutional Strengthening:** Strengthen PPs / WUAs and other community organisations in order to achieve their greater association and ownership in project activities by assessing their capacity building needs and providing required inputs in collaboration with PD-ATMA, DOA, DOH, DOF and other institutions.
2. **PP / WUA Book Keeping:** Build the capacity of PP / WUA functionaries in maintaining and regularly updating the records.
3. **Facilitating PP / WUA Meetings:** Support the PP / WUA in organizing its monthly meetings, GB meeting and EC meetings and maintaining proper minutes of the same.
4. **Corpus fund and Water Charge Collection:** Facilitate the PP / WUAs to raise corpus, collect water charges and to prepare and implement development plan.
5. **Agriculture and Horticultural Activities:**
 - a. Assist in implementation of project designed and framed activities such as identification of beneficiaries for crop demonstrations, vermi units, shade net, training, exposure visits etc. as per the project;
 - b. Coordinate with the respective line departments for mobilizing farmers for training and field days under demonstrations and agribusiness promotion activities;
 - c. Support farmers to adopt the best practices demonstrated under the project;
 - d. Collect season wise crop productivity and technology adoption data;
6. **Fisheries Development:** The SO staff shall support the fisheries department in implementing the fisheries sub-component plan in tanks selected for the activity.

7. **Water Management and Related Record Keeping:** Facilitate / support to each PP / WUA to undertake water budgeting and crop planning activity before each season starts and organizes water management and irrigation scheduling that is rigorously recorded. Ensure that PP / WUA updates and maintains farmer-wise, season-wise, and crop-wise irrigated area data.
8. **Joint Ajmoish and Water Use Fee Collection:** Facilitate the PPs / WUAs in collection of water use fee from the farmers of the command area, based on water supply.
9. **Agricultural Production Data to be collected:**
 - a. **Area irrigated:** Collect season-wise time-series data on area irrigated for each tank.
 - b. **Data on average yield:** Collect season wise average yield particulars for project supported crops in the identified tank command and adjacent non-command areas / influence zone.
10. **Agribusiness and Marketing:** With the support of ABSOs, facilitate the PP / WUA/ FPO / AEs to take up post-harvest management and agribusiness activities as per the planned framework. SOs would be supportive to ABSOs in preparing agribusiness plans, facilitate AE selection process, their orientation and implement the activities as per the plan by developing appropriate market linkages.
11. **Participatory in M&E Activities:**
 - a. **PP / WUA Self-rating:** Facilitate the quarterly self-rating exercise by PPs / WUAs of their performance.
 - b. **Community feedback:** Seek PP / WUA/community feedback on access and availability of project services on a regular basis and report to the PD-ATMA / DLPMT on monthly/quarterly basis.
12. **Preparation of IIAP:** The SO will facilitate preparation of IIAPs, covering all the project supported tanks and all the villages within the project cascades / tanks. In the IIAP, SO should facilitate in preparing the sectoral plans (agriculture, horticulture, fishery etc.) as plans related to civil works are already prepared under DPR. The plan document should be submitted to the SPMU / PD-ATMA / Dept. for review and approval.
13. **Conducting Field Verification:** SO staff shall visit each PP / WUA and other community organisations like FPO and PFCS, periodically, as per the project plan. During the field visit, the staff shall collect required data as per the need of the project and submit to PD-ATMA / S-SPU for necessary action.
14. **Reporting:** The SO should submit monthly / quarterly action plan and monthly / quarterly progress report to the SPMU with a copy to PD-ATMA for review **by 5th of every month.**
15. **Success Stories:** The SOs shall prepare case studies / learning cases and submit to PD-ATMA with proper documentation.
16. The SO staff shall work full time exclusively for the project work to accomplish the specific targets fixed by the project on a monthly and quarterly basis. They shall not work in any other project of the SO itself or other Govt./ Private organizations once they are working in this project.
17. **SO staff** shall carry out the project work in consultation with the PD-ATMA / EE-MI under the overall guidance of the SPMU.

Rating of Support Organisation (SO): Like PPs, the performance of involved SOs will also be assessed and rated once in three months by the PD-ATMA / DLPMT. Its main focus is to understand the level of achievement by the SOs as per the agreement with the project. It will also help the project management to know priority areas/activities to be grounded and reasons for delay, if any. The key areas of appraisal would involve (1) progress as per the quarterly plan, (2) innovations, (3) technology adoption / replication etc. The process of assessment and rating will be taken up by the concerned DLPMT in consultation with SPMU. The DLPMT will submit the assessment report to SPMU before quarterly planning exercise at the SPMU level. As per the assessment findings, necessary guidance will be provided to the SOs by the SPMU / DLPMT / PD-ATMA for improvement or speeding up the execution of activities.

PD-ATMA:

1. Review and planning of the project activities along with Support Organisation (SO);
2. Assigning tasks / activities as per the project plan on quarterly basis;
3. Conducting quarterly / monthly review of activity / project progress;
4. Assessing performance of SOs on quarterly basis;
5. Support SOs in organising / implementing different project related activities;
6. Rendering financial support, as per the quarterly project plan, to SOs for organising / implementing different activities;
7. Prepare and submit quarterly report on SO performance to SPMU for review.

PD-OIIPCRA (SPMU):

1. Finalising the scope of work and engagement conditions of Support Organisations;
2. Finalising number of SOs required by project area / thematic areas (agriculture / irrigation / agribusiness etc.);
3. Conducting bidding process, as per the procurement guidelines of the project;
4. Selection of SOs based on the set criteria and as per the procurement guidelines;
5. Induction orientation of SOs to make them understand on the project, expected outputs and outcomes;
6. Periodic monitoring visit and review of progress of SOs with the support and association of PD-ATMA / EE-MI / DLPMT members;
7. Performance assessment of SOs on periodic basis and taking appropriate action accordingly;

Table 82: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Hiring of the services of Technical support organizations (SO)	SPMU	-	MoU signed with Technical support organizations (SO)	No. of MoU signed with Technical support organizations
Organization of Orientation Training of SOs	SPMU	DOA/DOH/DOF/DOWR	Selected SOs oriented on the project	No. of SOs undergone orientation training
Setting of Target and annual action plan for SOs	SPMU	DOA/DOH/DOF/DOWR	Target set and annual action plan prepared for SOs	No. of SOs have program target and annual action plans
Progress monitoring, review and performance evaluation	DLPMT / PD-ATMA	SPMU	Progress monitoring, review and performance evaluation of SOs done(monthly/quarterly/annually)	-No. of monitoring & review meetings conducted -No. of SOs evaluated based on their performance

5.8 Capacity Development of Engineers / Officials under DoWR

(Cost Table Reference: C 3-C)

The Department of Water Resources (DoWR) has seven functional wings namely, Major & Medium irrigation, Minor Irrigation (flow & Lift), Rehabilitation and Resettlement, Land Acquisition, Finance, CAD & WM and Monitoring. Each wing is managed by qualified Engineering staff and other officials. It is pertinent that specialized knowledge as well as core domain knowledge is essential for carrying out various tasks in the department. Considering the gamut of specialized sectors and the activities undertaken by DoWR, it is important to provide specialized need-based training to the Engineering and other key staff of the department for better understanding of their professional commitments aligned to the broader objectives of the department.

The project shall build the capacity of the Engineering staff (other key staff may be covered as per the need) at various levels across different functional wings of the DoWR during the project period based on the capacity development framework and training need assessment. Project shall develop the capacity development framework and assess the training need of the Engineers through a professional agency.

Key Guiding Principles

1. Hiring the services of a suitable professional agency for training need assessment and development of capacity development framework for Engineers;
2. Finalization of the list of thematic trainings to be imparted to the Engineers based on the need including hydrological assessment and analysis;
3. Identification of trainees from various levels of experience, expertise, qualification and official capacity across different functional wings of the DoWR;
4. Collaboration with premier academic/technical institutions (IIS/IITs/etc.) for training of Engineers;
5. Development of training modules through Experts/ Resource institutions;
6. Organization of training programs at the premier institutions as per capacity development framework and training calendar;

External Agency:

1. Initial consultation with PD-OIIPCRA (SPMU) on capacity need assessment and designing a CB framework along with different aspects to be examined during the process;
2. Discussion with Principal Secretary of the Department and head of functional wings of the department to understand their views;
3. Consultation with engineers of department on type of works they handle and their capacity requirements;
4. Organise and facilitate a consultation workshop with selected engineers at the department / SPMU level to understand and map overall perspective;
5. Visit some of the project districts and consult with the engineers of different wings of the dept.;
6. Prepare a draft capacity development framework and need assessment report;
7. Share the framework and assessment report with the PD-OIIPCRA (SPMU) and head of the department (Principal Secretary, DOWR) for review and feedback;
8. Finalise the framework and assessment report, incorporating suggestions of the PD-OIIPCRA (SPMU) and head of the department (Principal Secretary, DOWR).

PD-OIIPCRA (SPMU) / Department:

1. Advertisement for hiring a competent agency for capacity need assessment of engineers as per the procurement guidelines of the project;
2. Scrutiny and selection of competent agency through appropriate process as stipulated in the procurement guidelines;
3. Briefing the hired agency on the project and objective of preparing a capacity development framework for the engineers of DOWR;
4. Support the agency in capacity need assessment process in terms of coordinating with different functional wings of the department;
5. Review the capacity development framework and report on training needs identified by the agency;
6. Suggest to the agency if any modification is required and finalise the framework and training needs;
7. Explore the possibilities of collaboration with different institutions of national / international repute for CB of engineers;
8. Finalise the institution/s for CB of engineers after consultation with interested institutions;

Capacity Development Institution:

1. Prepare a draft training curriculum and session plan, based on the initial consultation with the head of the department and project authority (PD-OIIPCRA);
2. Finalise the thematic areas of training and detail session plan with the department / project authority;
3. Conduct capacity development of the engineers as per the agreed thematic areas;
4. Conduct periodic assessment of learning;
5. Issuing certificate to the engineers at the end of the training.

Table 83: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output		Indicators
	Primary	Secondary			
Hiring the services of a suitable professional agency for training need assessment and preparing capacity development framework for Engineers	SPMU	-	Suitable Professional agency engaged		Engagement of professional agency
			Training need of Engineers assessed		Assessment of training need of Engineers
			Capacity development framework developed		Development of capacity development framework for Engineers
Finalization of the list of thematic trainings	Professional agency	SPMU	List of thematic trainings for the Engineers finalized		No. of thematic trainings finalized
Identification of trainees	DoWR	SPMU	Detail list of trainees finalized		No. of trainees identified
Collaboration with premier academic/technical institutions	SPMU	DoWR	Collaboration with premier academic/technical institutions established		No. of institutions collaborated
Development of training modules	Experts/Resource institutions	SPMU	Training modules developed		No. of training modules developed
Organization of training programs	SPMU	Identified Academic/ Technical institutions	Training programs successfully conducted		No. of trainings conducted
			Engineers trained		No. of Engineers trained

5.9 Strengthening of Extension Service Providers

(Cost Table Reference: WR-20 / C 3-C)

Extension service providers are the real players at the grassroots level for extension of technology, knowledge, modern/innovative practices for development of farming community and enhancement of rural household income. Project shall identify 300 Nos. of extension service providers and practitioners in the project area for strengthening their capacity through training of trainer program who will be involved in capacity development of water user groups/PPs, PFCS, SHGs and FPOs.

Key Guiding Principles

1. Identification of practitioners/extension service providers in the project area;
2. Development of training calendar for training of trainers (practitioners/extension service providers);
3. Identification of resource persons/institutions for training of the trainers (practitioners/extension service providers);
4. Organization of 5-day training of trainers' program for 300 master trainers per year for two years. Training will be imparted on the modules prepared for the capacity development of PP/PFCS/FPO.

Support Organisations:

1. Discuss with different community level institutions to identify potential human resources to function as extension service provider;
2. Discussion with the concerned persons and finalise the list of persons to undergo TOT programme;
3. Collect / prepare the profile of finalised list of persons;
4. Discuss with different stakeholders and prepare a list of trainers having expertise in finalised thematic areas of inputs;
5. Organise and facilitate training of trainers (TOT) programme;
6. Document the training programme and prepare training report;
7. Submission of the training report to the PD-ATMA and SPMU.

PD-ATMA:

1. Providing support to the SO in selection and organisation of TOT programmes;
2. Monitoring the training programme, discuss with the trainees and suggest for any change in approach and process, if so required;
3. Review the training report and share with DLPMT members.

PD-OIIPCRA (SPMU):

1. Design the training curriculum in collaboration with the S-SPU and officials of the line departments associated with the project;
2. Preparing training modules / manuals / learning materials (may engage an external agency for preparing modules / manuals);
3. Piloting of training modules / manuals and its finalisation;
4. Printing and distribution of the training modules / manuals (to project districts)
5. Monitoring visit during the training and assessing the quality of inputs and process appropriateness;
6. Suggest to PD-ATMA / SO for any change that is required in input delivery;
7. Review of training report/s submitted by SO / PD-ATMA

Resource Institution / Resource Persons:

1. Going through the capacity development modules / manuals and understand the delivery mechanism in consultation with the SPMU and PD-ATMA;
2. Pilot the modules in one location to understand executional aspects;
3. Impart TOT of selected persons;
4. Conduct periodic assessment of learning;

Table 84: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Identification of practitioners/extension service providers	PD-ATMA/DLPMT	SPMU	List of (practitioners/extension service providers) finalized	No. of practitioners/extension service providers finalized
Development of training calendar for training of trainers	S-SPU	SPMU Resource Institution/DOA/DOH/DOF	Training calendar developed for ToT	Development of training calendar for ToT
Identification of resource persons/institutions for training of the trainers	S-SPU	SPMU	List of resource persons/institutions finalized	No. of resource persons/institutions finalized
Organization of training of trainers (practitioners/extension service providers)	PD-ATMA Resource Institution	S-SPU SPMU	Training programs as per calendar successfully conducted and the practitioners/extension service providers trained	No. of trainings completed. No. of practitioners/extension service providers trained

5.10 Capacity Development of Farmer Producer Organizations (FPOs)

(Cost Table Reference: C 1.3-B)

Collectivization of producers, especially small and marginal farmers, into producer organizations has emerged as one of the most effective pathways to address the challenges of agriculture sector, most importantly, improved access to technology, inputs and markets. To bring a transformation in agriculture sector to improve the livelihoods of smallholders, FPOs are being formed for interventions in post-harvest handling and marketing of the produce from the farm gate to the consumers. FPOs are owned and governed by shareholder farmers / members and administered by the professional managers. Capacity development of governing members and staff of FPOs are vital for benefit of the farmer members and sustainability of the FPO. Project shall build the capacity of the Board of Directors and staff of the existing FPOs in the project districts through training and exposure on Organizational/Financial/Governance management, Agribusiness management, value addition, processing and marketing.

Key Guiding Principles

1. Identification of trainees from the BoD& staffs from the existing FPOs;
2. Development of training calendar for FPOs;
3. Identification of resource persons/trainers from the subject matter experts and field practitioner;
4. Organization of 1day training program each on FPO Organization & Governance, Agribusiness (Processing, Marketing, etc), Financial Management and Documentation & Book keeping for BoD and staff members of existing 73 FPOs in the project district;
5. Organization of exposure visits for 1095 Nos. of BoDs& staff of existing FPOs each for Agribusiness management and Value addition/Processing/Marketing for 3 years;
6. Development of communication materials (IEC/ICT) through Expert/Resource institutions.

Role and Responsibilities

Support Organisation:

8. Consultation with FPOs on their current activities and future plan for agribusiness activities;
9. Identification of CB needs of the FPOs, including BOD with the help of designed tool/s;
10. Categorisation of FPOs (ranking) as per their current level of performance (criteria based);
11. Compilation of CB needs of FPOs by FPO ranks;
12. Submission of compiled CB needs to PD-ATMA / SPMU for designing capacity development plan;
13. Organising training of FPOs in collaboration with identified resource persons;
14. Preparation of training report and its submission to PD-ATMA / SPMU

PD-ATMA:

4. Preparing CB schedule / training calendar for FPOs (theme based by FPO categories);
5. Facilitate in organising training of FPOs;
6. Participating in different training sessions to understand the quality of inputs, adopted processes for capacity development and suggest if any change is required in the CB strategy.

PD-OIIPCRA (SPMU):

1. Designing training module / manuals / learning materials as per the identified needs in consultation with PD-ATMA / S-SPU;
2. Finalising session plan with the PD-ATMA / S-SPU;
3. Supporting S-SPU / PD-ATMA in selection and finalising resource persons;
4. Support to PD-ATMA in finalising thematic areas, designing session plan, strategizing delivery mechanism etc.;
5. Attending sample trainings to understand the quality of inputs and process followed;
6. Reviewing training reports and suggest to PD-ATMA if any change is required in capacity development.

Table 85: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Identification of trainees	SO/ PD-ATMA/ DLPMT	S-SPU SPMU	List of trainees finalized	No. of trainees finalized for training.
Development of training calendar for FPOs	PD-ATMA S-SPU	SPMU	Training calendar developed	Development of training calendar.
Identification of resource persons / trainers	SO / PD-ATMA / DLPMT	S-SPU SPMU	List of trainers finalized	No. of trainers finalized
Organization of training programs as per training calendar	SO / PD-ATMA / Resource Institution	S-SPU SPMU	Training programs as per calendar successfully conducted and the trainees trained	No. of trainings completed. No. of trainees trained
Exposure visit	PD-ATMA DLPMT	S-SPU SPMU	Identified personals of the FPOs completed exposure visit	No. of FPO personals completed exposure visit
Development of communication materials	PD-ATMA Resource Institutions	S-SPU SPMU	Communication materials developed	No. of communication materials developed.

5.11 Development of Training Module and IEC/ICT Material

(Cost Table Reference: C 3-B)

In order to achieve the objectives of the capacity building program under the project, development of suitable training modules and informative educational communication materials (IEC/ICT) are vital. Project shall engage suitable professional institutions for development of customised training modules and IEC/ICT materials. Project intends to develop 8 training modules and 16 IEC/ICT materials for the PPs, PFCS, FPOs, SHGs and young volunteers in the thematic areas of Crop Water Budgeting, Crop Planning, Water Regulation & Irrigation Management including Participatory Ground Water Management, leadership development, organization & governance management of PFCS, Intensive/Semi-intensive fish management, Pen and cage culture, Value addition/processing/marketing of fish, FPO Organization & Governance, Agribusiness (Processing, Marketing, etc), Financial Management and Documentation & Book keeping. As far as possible training module will be digitized, and specific apps will be developed for providing training, suitable simulated training modules will be developed and used for training of farmers, PP members, PFCS members and FPO office bearers. The project will invest in developing a YouTube channel that will build a digital library of learning material that can be accessed by all project stakeholders at all levels.

Key Guiding Principles

1. Hiring the services of suitable professional institutions for development of training modules/ IEC/ICT materials;
2. Finalization of thematic areas for training module/ IEC material;
3. Development of 8 training modules and 16 IEC/ICT materials (approx.) for the PPs, PFCS, FPOs, SHGs and young volunteers in English and Odia languages;
4. Pictorial presentation of the themes in training modules / IEC materials;
5. Printing of training modules and IEC/ICT material.

Role and Responsibilities:

Technical / Professional Institution:

1. Discuss with the SPMU, S-SPU and other stakeholders (state / project district level) of the project to understand different aspects of capacity development by stakeholder category;
2. Drafting the training module / IEC materials;
3. Sharing the module with SPMU / S-SPU and modify as per the suggestion;
4. Piloting the training module at the project location and identify the gaps, if any;
5. Modify the module / IEC materials as per the field pilot findings;
6. Submission of training modules/ IEC materials to SPMU.

PD-OIIPCRA (SPMU):

1. Preparing module frame (themes / session design / learning objectives etc.) as per the identified capacity development needs;
2. Designing a capacity development frame, including curriculum for different category of officials;
3. Selection of technical / professional institution for developing modules / IEC materials as per the project procurement guidelines;
4. Contracting and consultation with the selected institution for designing and developing modules / IEC materials;

5. Reviewing with the draft modules / manuals / IEC materials developed by the technical agency and providing feedback to the agency;
6. Attending piloting of the module / manuals and ensuring the thematic contents are in line with the identified needs and methodology of delivery of the theme is suitable to the trainees;
7. Finalisation of the modules / manuals / IEC materials with the technical institution and printing of the documents as per the need.

Table 86: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Hiring the services of suitable professional institutions for development of training modules/ IEC/ICT materials	SPMU	-	Suitable professional institutions for development of training modules/ IEC/ICT materials hired	No. of professional institutions hired for development of training modules/ IEC/ICT materials.
Finalization of thematic areas for training module/ IEC material	SPMU	S-SPUs	Thematic areas for training module/ IEC material finalized	No. of thematic areas for training module/ IEC material finalized
Development of training modules/ IEC materials	Resource Institution	SPMU	8 Training modules/16 IEC materials developed	No. of training modules/ IEC materials developed
Printing of training modules/ IEC materials	SPMU		320000 Training modules/108920 IEC materials printed	No. of training modules/ IEC materials printed

5.12 Capacity Development of the Key Officials/Field Functionaries

(Cost Table Reference: C 3-C)

In order to achieve the objectives of the project, role of the officials and field functionaries of the line departments associated with the project is vital. They need to develop their capacity for better guidance, implementation and management of the project. Strategic level capacity development will be undertaken for key selected line department staff on specific areas related enhancing their capacity on the leadership, management and technical side. These will be selective training programs and will be offsite that are offered by institutes of repute and excellence in India and/or abroad. In addition, specific arrangement will be made with premiere management and technical institutes in India to provide training and exposure learning to departmental staff on customized training programs (for example, the Agri-business school at IIM-Ahmedabad could be contacted to develop a three-month agri-business certificate program that will be attended by all ATMA Directors and selected officers from the state level).

Capacity development will be undertaken specifically related to the implementation of the project. These training programs will focus on the staff induction to project components and activities, roll of the project, implementation processes, procurement and financial management, etc. This will be done by inhouse core team of the project or with subject experts as resource persons from outside. Project staff exposure visit to similar project in India or in the region will be included in the capacity development program. As the project design includes participation of several partner agencies for facilitating implementation of project activities at the cutting edge, they would require capacity enhancement support for ensuring that the required technical inputs and project understanding is created for their staff to facilitate project activities. Hence, personal for partner agencies will be eligible to undergo same training and exposures that are to be undertaken for project staff. Project shall organize study tour cum exposure visit programs for the key officials and field functionaries of the project, partner agencies and line departments associated with OIIPCRA at premier academic/research/technical institutions within and outside the country to enhance their intellectual and managerial capability.

Key Guiding Principles

1. Selection of the key officials and field functionaries of the project, partner agencies and line departments for training cum exposure visit based on their association with the project;
2. Selection of female officials from each associated department for capacity development;
3. Identification of premier academic/research/technical institutions within and outside India;
4. Preparation of annual study tour cum exposure visit plan for the officials in consultation with the concern institutions;
5. Organization of study tour cum exposure visits as per plan;

Table 87: CB of Officials

Sector	Within State (No. of Persons)	Outside State (No. of Persons)	Outside India (No. of Persons)
Agriculture	808	303	20
Horticulture	808	61	10
Fisheries	808	61	10
Irrigation	808	61	20

Role and Responsibilities

Line Departments:

1. Selection of persons to be trained as per their association in the project implementation;
2. Deputing officials / field staff for capacity development;
3. Review the learning at the department level after the completion of capacity development measures.

PD-OIIPCRA (SPMU):

8. Conducting Capacity Need Assessment (CNA) of different dept. officials;
9. Designing a capacity development frame, including curriculum for different category of officials;
10. Identification of appropriate institution for capacity development;
11. Finalising collaboration with the institution and scheduling capacity development plan;
12. Reviewing with the trained officials / experts after receiving capacity development inputs.

Technical Institutions:

1. Finalising capacity development frame with the SPMU;
2. Finalising training curriculum and training window with the selected institution/s;
3. Preparation of reading / learning materials for the trainees;
4. Conducting training / capacity development of the officials / field functionaries;
5. Assessment of thematic area wise learning of the participants.

Table 88: Activity Output, Role & Responsibility

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Selection of the key officials and field functionaries	Line Dept./DOA/DOH/DOF/DO WR	SPMU	List of key officials and field functionaries finalized for training cum exposure visit	No. of officials and selected
Identification of	SPMU	Line Dept./	List of premier	No. of premier

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
premier academic/research/technical institutions within and outside India		DOA/DOH/DOF/DO WR	academic/research/technical institutions identified	academic/research/technical institutions identified
Preparation of annual training cum exposure visit plan	SPMU	Line Dept./ DOA/DOH/DOF/DO WR	Annual training cum exposure visit plan for the officials prepared	Preparation of annual training cum exposure visit plan for the officials
Organization of training cum exposure visits as per plan	SPMU	Line Dept./ DOA/DOH/DOF/DO WR	Officials of the line departments completed training cum exposure visits	No. of officials completed training cum exposure visits

5.13 Agriculture Technology Media Lab at OUAT

(Cost Table Reference: C 3-H)

Project shall support to develop an Agriculture Technology Media Laboratory (ATML) with the objective of enabling the stakeholders to use the latest interactive multimedia technology for research, extension and transfer of agricultural technology to ensure higher productivity and sustainability of agri-enterprises. Objectively, ATML will support in technology dissemination and research activities through digitized interactive medium. The ATML will function at two tier level viz., (i) Central Media Lab-cum-ICT Lab at Dept. of Extension Education (OUAT) and Satellite Media Labs at the KVKs in the project districts.

Functions of ATML:

1. Development of e-learning material viz., audio products, video products, Apps etc. for self-supported learnings by stakeholders, including students;
2. A single window facility for packaging of virtual production technology;
3. Consolidation & digitization of available stratified agro-technologies;
4. Preparation of video simulation products / models in farmer friendly formats;
5. Decision support systems in major themes and production systems.

Besides aforementioned functions, media lab may take up other supportive activities, such as;

1. Helping farmers, researchers and other stakeholder to better communicate, understand, and respond to effective information;
2. Capturing and sharing information visually;
3. Fostering stakeholder participation and information flow;
4. Discussing implications of new technologies with researchers / farmers / institutions;
5. Integrating information and services;
6. Supporting farmers network for higher technology adoption;
7. Creative learning experiences, collective learning, transforming data into knowledge;
8. Responsive agricultural environments, practices strengthening environmental parameters;
9. Assisting users by learning from interaction and anticipating needs;
10. Designing scalable systems that enhance learning and experience sharing.

5.14 Strengthening Advisory Support at APC Level

(Cost Table Reference: C 3-H)

The Office of the Agriculture Production Commissioner (APC) will be strengthened through an appropriate strategic support agency. The agency will be selected through a competitive bidding process, as per the procurement plan of the project. The support agency will help to create a strategic support system that will include selected officers of choice from various line departments. The strategic technical assistance support to the APC office will help in policy formulation & convergence; coordination on planning & implementation; knowledge & learning harvesting and concurrent evaluations and analytics. The unit will work in collaboration with SPMU, S-SPU and institutions associated with the project implementation.

An Advisory Committee will be established including members from academic institution(s), center of excellence(s), private sector representatives and individual members of repute from relevant thematic areas to bring in external perspective on strategic policy, learning and implementation aspects. The recommendations from the advisory committee will be used for advocacy and policy change purposes at the project steering committee level headed by the Chief Secretary, through the office of the APC. The advisory support unit at the APC level will organize / facilitate / participate in different workshops / learning events / symposiums that are related to the project objective. Along with this, the advisory body will also provide necessary technical and managerial guidance to the project as per the requirement.

Chapter Six: Component IV: Project Management

6.1 Background

OIIPCRA will be anchored through OCTDMS, a special purpose vehicle under the administrative control of the DoWR. OCTDMS, a society under Society Registration Act 1860, gives reasonable flexibility and autonomy to facilitate the implementation of this project. Considering the fact that, implementation of this project involves several line departments e.g. Agriculture, Fishery and ARD and even some tanks that come under a basin (medium irrigation tanks) and the tanks under PR department for the GCF linked components, a tight governance mechanism has been envisaged. The project governance has been envisaged in the following manner:

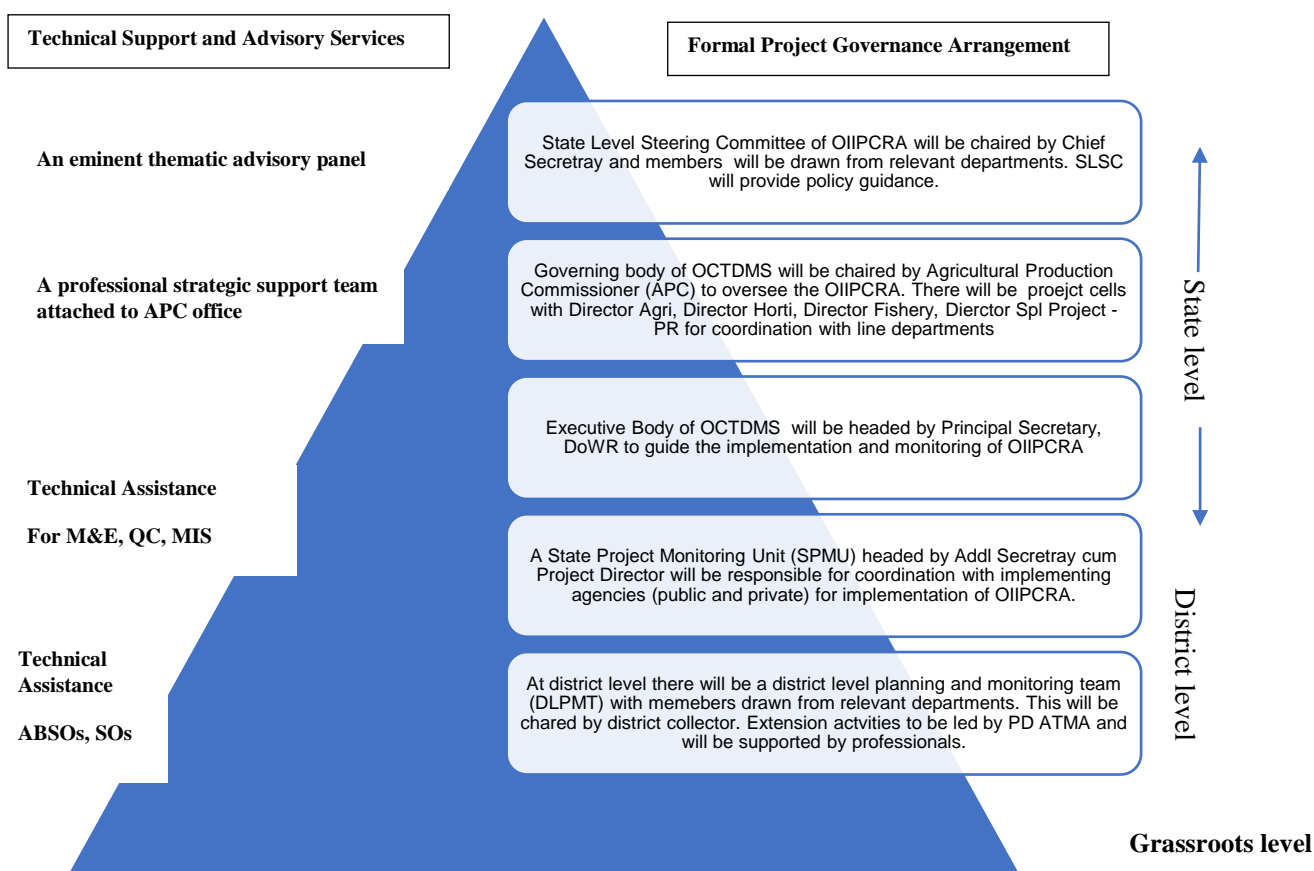


Figure 14: OIIPCRA project governance

The project institutional arrangement both at the state level and district level has been given below:

6.2 Proposed Institutional Framework

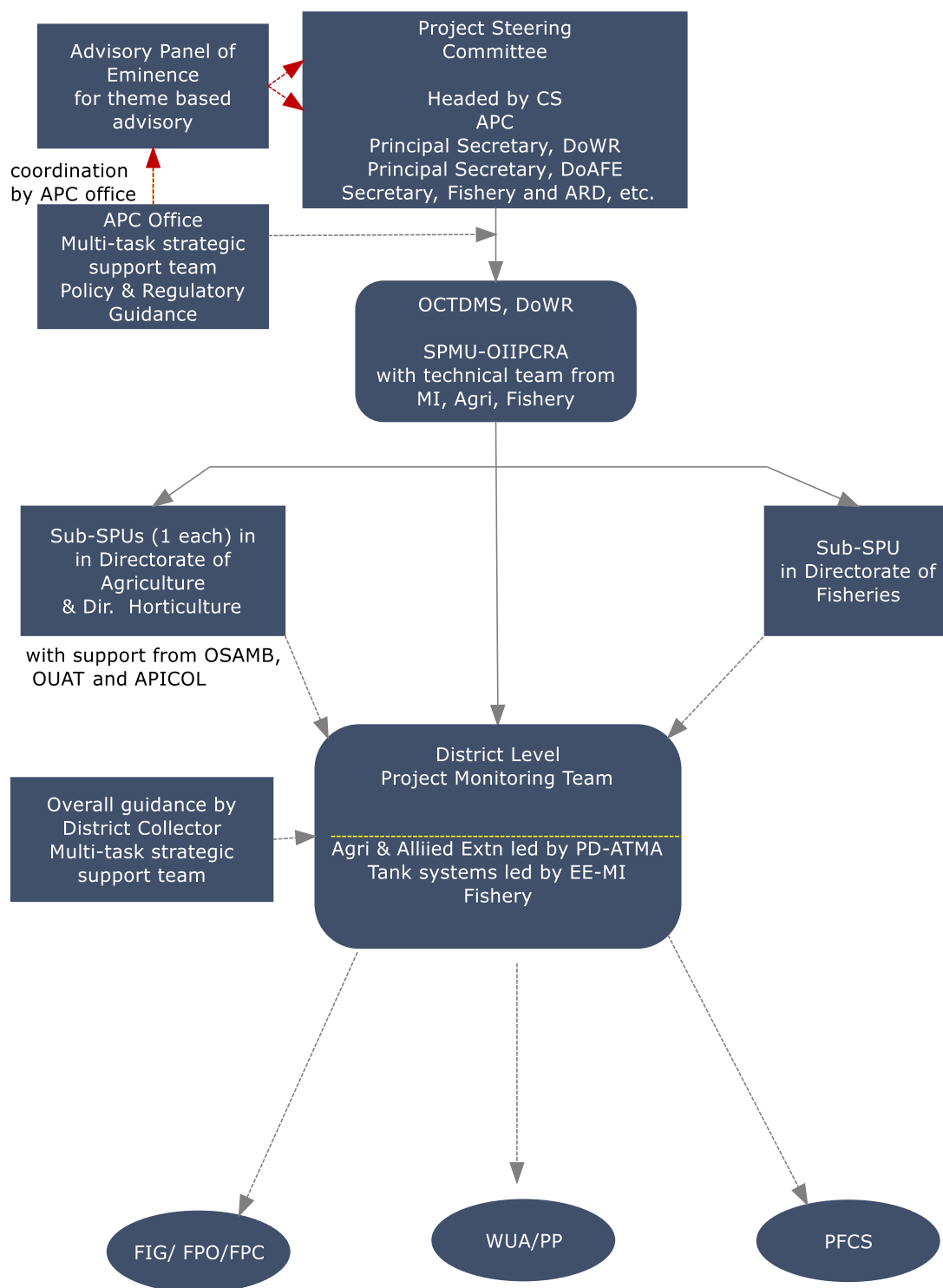


Figure 15: OIIPCRA institutional framework

6.3 Institutional Arrangement, State Level:

Proposed Institutional Framework: State level

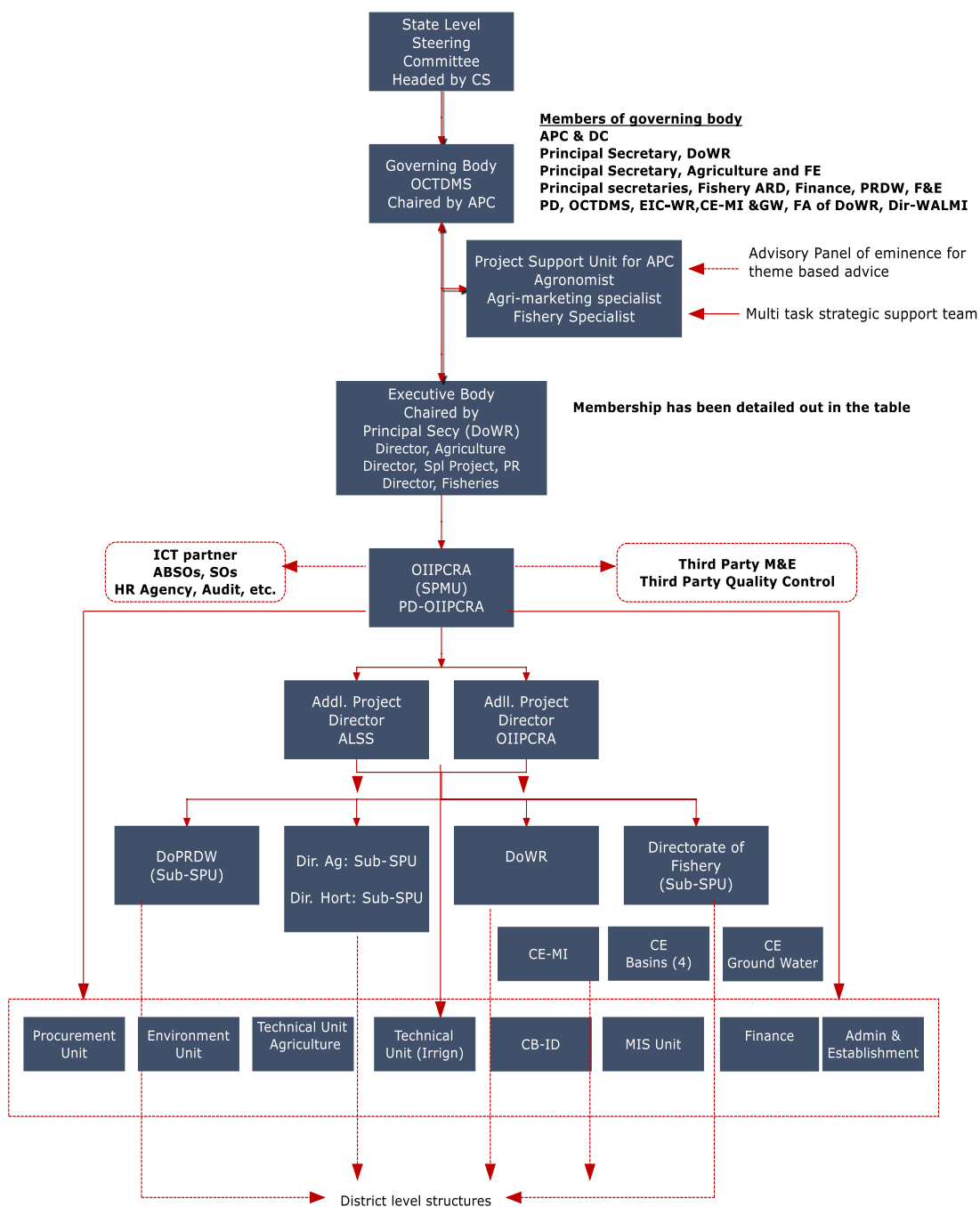


Figure 16: Implementation Arrangement; State Level

Table 89: Human Resource Requirement and its Source

Human Resource Requirement under OIIPCRA				
Sl. No.	Position	No. of Persons	From Govt	From Open Market
State Project Monitoring Unit (SPMU)				
1	Project Director	1	1	0
Sub Total		1	1	0
Technical Support Unit				
2	Addl. Project Director	1	1	0
3	State Technical Expert	1	0	1
4	AEE - Technical	2	2	0
5	EE - Water Resources	1	1	0
6	EE - Monitoring	1	1	0
7	SE/EE - Construction Management	1	1	0
8	Hydrologist	1	1	0
9	AEE - Works	1	1	0
10	Technical Assistant	1	0	1
Sub Total		10	8	2
Agriculture Unit				
11	APD -Agriculture	1	1	0
12	Agriculture Expert (Agronomy)	1	1	0
13	Agri - Extension Coordinator	1	1	0
14	Agro - Economist	1	0	1
15	Agriculture Expert (Agribusiness)	1	0	1
Sub Total		5	3	2
Fisheries Unit				
16	Fishery Expert	1	1	0
Sub Total		1	1	0
Institutional Capacity Strengthening Unit				
17	Institutional Strengthening & Capacity Building Expert	1	0	1
Sub Total		1	0	1
Environment Unit				
18	Environment Specialist	1	1	0
19	Jr. Environment Consultant	1	0	1
Sub Total		2	1	1
Finance Unit				
20	Project Finance Officer	1	1	0
21	Manager Accounts	1	0	1
22	Accountant - cum - Multi Skill Assistant	3	0	3
Sub Total		5	1	4
Procurement Unit				
23	EE - Procurement	1	1	0
24	AEE/ DEE - Procurement	1	1	0
25	Procurement Officer	1	0	1
Sub Total		3	2	1
M&E and MIS Unit				
26	EE - M& QC / Economist/ M&E Specialist	1	1	0
27	MIS / GIS Officer	1	0	1
Sub Total		2	1	1
Office Establishment				
28	Senior Clerk - cum - Office Superintendent	1	1	0
29	Multi Skill Assistants	3	0	3
30	Administrative Assistant	1	0	1
31	Establishment Assistant	1	0	1
32	Messenger	1	1	0
33	Office Attendant	2	2	0
34	Sweeper	1	0	1

Human Resource Requirement under OIIPCRA				
Sl. No.	Position	No. of Persons	From Govt	From Open Market
35	Office Security	3	0	3
Sub Total		13	4	9
Agriculture Production Commissioner (APC)				
36	Expert on Agriculture / Horticulture	1	0	1
37	Expert on Fishery	1	0	1
38	Expert on Agri-Business	1	0	1
39	Accountant - cum - Multi Skill Assistant	1	0	1
Sub Total		4	0	4
Directorate of Agriculture & Farmer's Empowerment (Do A&FE)				
40	Accountant - cum - Multi Skill Assistant	1	0	1
Sub Total		1	0	1
Directorate of Horticulture (DoH)				
41	Accountant - cum - Multi Skill Assistant	1	0	1
Sub Total		1	0	1
Directorate of Fisheries (DoF)				
42	Accountant - cum - Multi Skill Assistant	1	0	1
Sub Total		1	0	1
DLPMT / PD – ATMA				
43	Accountant - cum - Multi Skill Assistant	15	0	15
Sub Total		15	0	15
Chief Engineer Office (MI)				
44	Accountant - cum - Multi Skill Assistant	1	0	1
Sub Total		1	0	1
TOTAL		66	22	44
Total No. of Personnel: 66 Nos.				
Personnel from Government: 22 Nos.				
Personnel from Open Market: 44				

6.3.1 Role and Functions:

Roles and Responsibilities of various committees, partner departments and support organisations have been detailed out below:

Table 90: Institutional Arrangement, State Level

Entity	Function	Membership
State Level Steering Committee	The committee chaired by CS will provide broad policy guidance to the project, help in inter-departmental coordination and approve annual work plan and budget	CS, DC, APC and Principal secretaries of DoWR, Agriculture, Fishery and ARD, Finance, Forest and Environment, PR, Science and Technology It shall meet at least once in a year
Governing Body	<ol style="list-style-type: none"> Provide overall policy guidance and coordination on matters relating to programme implemented by the State Project Management Unit and district level project management teams. To ensure coordination with various departments, agencies and convergence of different activities under various components of the project. To ensure that the project is implemented as per the approved Annual Work Plan, and Budget and Audit Accounts. 	<ol style="list-style-type: none"> APC-cum-Addl. Chief Secretary Chairman D.C-cum-Addl. Chief Secretary Member Principal Secy to Govt. Deptt of W.R. Vice-Chairman Principal Secy. to Govt., Agriculture & FE Deptt.; Member Principal Secv, to Govt. P.R. Deptt. Member Principal Secy. To Govt. Finance Deptt. Member Principal Secy. To Govt. Forest & Env. Deptt Member Commr.-cum-Secy. F &A.R.D.Deptt.

Entity	Function	Membership
	<ol style="list-style-type: none"> 4. To formulate, alter and amend the objectives, rules and regulations of the Society, constitute committees from time to time as and when considered necessary for effective execution of the programmes, and schemes. 5. Delegate powers and function to the employees, committees and the consultants of the Society as needed. 	<p>Member</p> <ol style="list-style-type: none"> 9. P.D, OCTDMS-cum-Addl. Secy.DOWRDeptt. Member Sec. 10. F.A-cum-Addl.Secy. Deptt. of W.R. Member 11. E.I.C., Water Resources; Member 12. Director, WALMI; Member 13. Chief Engineer, Minor Irrigation; Member 14. Chief Engineer, GW; Member 15. Any other by invitation <p>The committee shall be convened at least twice in a year</p>
Advisory body on specific themes	<ol style="list-style-type: none"> 1. A panel of eminent experts will provide strategic advice to state on agriculture and water related issues. The recommendations from the advisory body will be used for advocacy and policy change purposes at the project steering committee level headed by the Chief Secretary, through the office of the APC 	<ol style="list-style-type: none"> 1. The members will be drawn up from a panel of reputed experts who will come at least once in a year to provide their input to senior officials and SPMU staff along identified themes. Members can be from academic institution(s), center of excellence(s), private sector representatives and individual members of repute from relevant thematic areas to bring in external perspective on strategic policy, learning and implementation aspects. The secretariate of APC /SPMU will coordinate this. The project will provide logistics/hospitality and honorarium.
Executive Body (EB)	<p>The key functions of the EB will be as follows:</p> <ol style="list-style-type: none"> 1. Implement the policies / decisions of the Governing Body. 2. Interact with GOI / World Bank and support the implementation of, or directly implement, various activities as well as programmes ensuring participation the communities in different components of the project. 3. Co-ordinate with various line departments, State Govt. and other sectoral/funding partners, resource organisation and support organisations (for social mobilisation, training) and ensure participation communities in different components of the project. 4. Promote adoption of demand driven and participatory approach, service delivery maximizing empowerment of community in decision-making. 5. Monitor and evaluate the implementation of the schemes by the various partner agencies including SOs (NGOs.) 6. Consider and approve the annual accounts ensuring proper auditing of the expenditure by competent authority. 7. Undertake any other activities that are consistent with the aims and objectives of the Society. 	<ol style="list-style-type: none"> 1. Principal Secretary / secretary Department of water Resources 2. Project Director, SPU 3. Project Finance officer 4. APD cum CE, Minor Irrigation, Odisha 5. Chief Engineer, Minor Irrigation, Odisha 6. CE-GW, DoWR 7. Director, Agriculture & FE 8. Director, Fisheries 9. Director, Soil Conservation 10. Director, Horticulture 11. Director, Special Projects, Panchayati Raj Department 12. Director, OREDA 13. Joint Secretary to Govt, Revenue Department 14. Joint Secretary to Govt, Finance Department 15. Director, Planning & Co-ordination Department 16. Invitee members (two Representative of NGOs (to be nominated by State) Govt.), two Representatives of Apex Pani Panchayat (to be nominated by the state) Govt.), two representatives from apex FPOs (to be nominated by state) 17. Anyother member by invitation <p>The committee shall be convened at least once in every quarter</p>

Entity	Function	Membership
Strategic support team to strengthen APC office	1. The Office of the Agriculture Production Commissioner (APC) will be strengthened through an appropriate strategic support team/ agency of repute who can advise APC on holistic sectoral planning and investment opportunities in agriculture, horticulture, agri business development, pricing and regulatory reform.	The strategic team will comprise experts on agriculture, horticulture, agribusiness, economic modelling and price forecasting. Considering the importance of the delivery the members having more than 15 years of relevant experience should be part of the team/agency.
Sub Project Support Units in the Partner Departments (agriculture, horticulture and fishery) at the state level	<p>Apart from the Strategic Support team attached to the APC office, there shall be project cells (sub-project support units) in department of agriculture under Director Agriculture and FE; under Director-Horticulture, under Director Fishery and Director-Special Projects-PR.</p> <p>The key function of these cells (sub PSUs) will be to interface with SPMU and district level departmental officials to give special thrust to activities of the project envisaged under their respective components.</p>	<u>Project cells in departments:</u> These cells will have designated nodal officers not below the rank of Jt. Director from the respective departments. He will be supported by a multi-purpose multi-skilled assistant
Project Director-SPMU	<ol style="list-style-type: none"> The Project Director shall be the Chief Executive Officer of the Society and Member-Secretary of the GB and EB. He shall be officer of the rank of Additional Secretary/Special Secretary as decided by the State Govt. All executive and financial power of the Society shall vest on the Member Secretary who shall be responsible for the planning implementation and monitoring of activities as would be guided and decided by the Society. Will exercise and discharge such other duties as may be delegated to the Secretary by the Society. Will convene the meetings of the Governing Body and record the minutes of the proceedings Will remain in overall charge of planning, implementation and monitoring of all activities of the Society. Will be in overall charge of the funds of the Society and open and operate the Society's accounts in the Banks He/She will be supported by an independent M&E agency, a technical support partner ORSAC for development of MIS, quality control and audit wings 	<p>SPMU will have support from the members of the following units:</p> <p>Technical Support Unit (6 members)</p> <p>Capacity Building and Institutional Development Unit (1)</p> <p>Environmental Unit (1)</p> <p>MIS Unit (1)</p> <p>Finance Unit (2)</p> <p>Procurement Unit (2)</p> <p>Agriculture (2)</p> <p>Fishery (1)</p> <p>Administration and establishment (3)</p>

Roles and responsibilities of the various units in the SPMU have been detailed out below:

Table 91: Role and Functions of SPMU

Name of the unit	Member	Role/Function
Technical Support Unit	CE-MI cum APD	Assist PD in the overall coordination of the project. Lead the technical aspects of the irrigation and tank systems interfacing with the team in SPMU and project districts.
	State Technical Expert	Provide technical guidance in terms of work design, review of work and support to technical unit.
	Supt. Engineer/EE	<ul style="list-style-type: none"> Over all Planning, designing, Coordination, executing, monitoring and reporting tank rehabilitation works Identification and Selection of tanks based on the criteria (both independent and cascades) Guiding on Capacity building support to the technical team of the project Monitoring the implementation of the technical components of the project interfacing with executive engineers from DoWR, basins and PR department in the districts Ensure Compilation of general technical data from all the project districts at the state level Revision and updating specifications and manuals for work as per latest technical developments. Look into the Preparation of plans, estimates, and inspection of works Look into issues of tank/dam safety and detailed project reports for tanks and cascades Management, organizing, supervision and Coordination of Divisional Execution of technical activities relating to the tanks systems, including CAD work Ensure that all divisions maintain all records and special tools and report in time
	Executive Engineer: Water Resource Specialist	<ul style="list-style-type: none"> Water resource planning and management support for project tanks Support in crop water budgeting Preparing technical notes on water sources management Support the technical team as per the need
	Executive engineer (Hydrology)	<ul style="list-style-type: none"> Work on hydrological assessment both at basin and sub-basin level Work on hydrological modelling taking into account the issues relating to climate change Work with GW division to improve conjunctive use of water and water use efficiency. Examine the relevant parameters during planning and implementation
	Asst. executive engineer, Works	<ul style="list-style-type: none"> Assist in planning and scrutiny of the DPRs Assist the Executive Engineer in Follow up on the Hydrological assessment of sample tanks in the project preparatory phase Assist the Executive Engineer to work out interventions for improving tank systems Assist in capacity building Assist in identifying issues of tank/dam safety and recommend ways to overcome problems
	EE-Construction Management	<ul style="list-style-type: none"> Finalising construction parameters / quality control measures Visit to sites and examining construction quality aspects Guidance to the district officials Monitoring and supervision
	Technical Assistant	<ul style="list-style-type: none"> Support the technical team based on the requirement Documentation of project activities
Agriculture Unit	APD-Agriculture Agriculture expert (agronomist)	<ul style="list-style-type: none"> State level planning, implementation, capacity building and coordination of agriculture production activities Dovetail ongoing agriculture plan at tank level Guide DLPMTs in formulation of plan for agricultural component of the project Work closely with department on contingency planning for the project districts Work with SOs for agricultural activities
	Agri-extension Coordinator	<ul style="list-style-type: none"> State level planning, implementation, capacity building and coordination of agriculture production and marketing activities

Name of the unit	Member	Role/Function
		<ul style="list-style-type: none"> • Work with PD ATMA at district level, SAU and other relevant departments for training and demonstration • Assist in developing a comprehensive plan to establish commodity value chain • Work closely with support organisation, Resource Institutions in the state dealing with FPOs/FIGs
	Agro-Economist	<ul style="list-style-type: none"> • Planning for agri-business promotion of project supported commodities • Liaisoning with market players, ABSO and other entities; • Support and guide ABSO in agribusiness promotion • Monitoring and supervision of agribusiness promotion activities • Periodic assessment of agribusiness and market linkage activities • Facilitate training / orientation of stakeholders on agribusiness • Facilitating business planning and credit linkage of FPOs / AEs • Periodic discussion with FPOs / AEs and extension of support • Support in MIS development on agribusiness activities and market linkage
	Agriculture Expert	<ul style="list-style-type: none"> • Agriculture planning support for the project areas • Review agriculture planning and management at project areas • Consult / discuss with PD-ATMA and DLPMT on agricultural activities • Support district level planning for crop diversification & rabi crop planning • Periodic monitoring and supervision • Facilitate training / orientation of stakeholders on agricultural aspects • Support in development of required training modules / manuals • Work closely with DOA & FE for successful execution of planned activities
Fishery Unit	Fishery expert	<ul style="list-style-type: none"> • State level planning, implementation, capacity building and coordination of Fisheries production activities • Dovetail ongoing fisheries plan at district level in consultation with DFeO and DLPMT • Guide DLPMT in formulation of plan for fisheries component in the project district for identified tanks (for fisheries) • Work with support organisations, SAU, PFCS for training and capacity building initiatives
Institutional Development Unit	Capacity Building and Institutional Development Specialist	<ul style="list-style-type: none"> • Over all planning, Designing, guiding and implementing and coordinating institutional development and capacity building strategies proposed for PPs and SOs • Identify resource agencies, partners for the project for capacity building based on the gap analysis exercise conducted from time to time • Ensure formation of Pani Panchayats, FIGs, develop a plan for their effective governance and monitoring • Develop incentive mechanisms for well governed PPs on water saving and adapting resilient practices • Identifying stakeholders and ensuring their participation • Monitoring implementation of the social issues highlighted in ESMF • Designing the community manual and guidelines for the support organization and IEC • Monitoring the activities of the unit • Ensuring timely implementation of capacity building measures
Environment Unit	AEE-Environment (Environment specialist)	<ul style="list-style-type: none"> • Ensuring the implementation of the Environmental component of ESMF and EMP • Ensuring implementation of Dam safety plan • Guide DLPMT and train them on EMP formulation of environment and the compliance
Finance Unit	Project Finance Officer	<ul style="list-style-type: none"> • Will lead in preparation of Financial and Procurement manuals, procurement plan and costing for project. • Budget preparation, ensuring effective and efficient fund flow • Establishing internal and external audit arrangements • Will guide the unit in maintenance of records, books of accounts, registers, files and other related documents. preparing Bank Reconciliation statements. • Accounting for expenditure and generating Monthly Financial Return (MFR) • Preparation and filling of claim for reimbursement to the country office of the

Name of the unit	Member	Role/Function
		<p>World Bank and Getting grant from Govt and other sources if any.</p> <ul style="list-style-type: none"> • Financial vetting and concurrence on procurements, deciding the most competitive bid on financial parameters, participating in financial negotiations. • Capacity building in the finance team of the project • Observing the procurement process and ensuring that it is on line with the procurement manual • Shall be responsible to prepare the financial statement with due audit and shall place the same to the EB. • Shall maintain the accounts, cause due verification of the monthly transactions and monthly receipt and expenditure statement, which shall be put up to the Executive Body when required. • Shall verify the physical and financial usage of the funds disbursed by the Mission to various participating organizations. • Shall ensure that the Society establishes procedures and processes that ensure regular disclosure of annual work plans, Annual reports, budgets, actual transfers, bid documents, • Evaluation of bids, audit statements and any other information considered to be in interests of ensuring complete transparency in the decision making and working of society.
	<p>Manager, Accounts</p>	<ul style="list-style-type: none"> • Checking the payment from financial proprietorship point of view; Sign the cheques • Maintain cash book, cheque issue register, advance register, bill register, payroll register • security deposit and bank guarantee register and other deposit registers; Verifying • taking rectifying efforts with respect to different reconciliation reports including BRS • Getting timely grant from GOI; • Follow up claims for disbursement and its reconciliation; • Monitoring advances for its settlements.
<p>Procurement Unit</p>	<p>EE-Procurement</p>	<ul style="list-style-type: none"> • Lead the process of procurement manual preparation as per the latest World Bank Procurement Procedure / Guidelines • Prepare 18 months procurement plan and PPSD • Develop standard bid documents (EOI, RFP, data sheets etc.) • Review and finalise the bid documents as per the World Bank. Procurement Guidelines; • Closely monitor the procurement process and advise experts and committees in the SPMU on procurement procedures; • Interface with TTL and World bank procurement specialist for necessary guidance
	<p>AEE/DEE-Procurement</p>	<ul style="list-style-type: none"> • Support in project procurement process • Support in developing bid documents (EOI, RFP, data sheets etc.) • Closely monitor the procurement process and advise EE, procurement • Contract Management and Reporting to EE-Procurement as per need
	<p>Procurement officer (Open Market)</p>	<ul style="list-style-type: none"> • Support in project procurement process • Support in developing bid documents (EOI, RFP, data sheets etc.) • Extend support in bid review / scrutiny • Facilitate meeting with bidders and documentation • Any other task assigned by EE-Procurement
<p>M&E and MIS Unit</p>	<p>EE, M & QC / Economist/M&E specialist</p>	<ul style="list-style-type: none"> • Planning and scheduling of M & L events with state and ATMA/ DLPMT staff and external M&E agency • Field based monitoring through regular tank visits • Regular review and monitoring of pilot/operations research activities • Planning, organizing and coordinating training programmes on M & E in close in coordination with Capacity building team member • Feedback on monitoring through presentation in review meetings both at district and state level

Name of the unit	Member	Role/Function
Office Establishment	MIS/GIS officer	<ul style="list-style-type: none"> Putting a good MIS and GIS into place for effective, efficient and real time monitoring of the project Liaison and coordination with MIS/ GIS agency Planning and conducting trainings of DLPMT as well as project cell staff in district collector office for regular reviews with respect to data management systems Uploading case studies, best practices thematic studies to the project portal
	Establishment officer and multi-skilled assistants 1. Senior Clerk cum Office Superintendent; 2. Multi Skill Assistants (MSA-2 Nos.); 3. Messenger (one) 4. Office Attendants (2 Nos.) 5. Sweeper (one) 6. Office Security (3 Nos.)	<ul style="list-style-type: none"> Maintenance of office documents and facilities in an orderly manner Office sanitation Logistics coordination Staff matters and liaison with government for staff under deputation Personal records of project staff in SPMU Liaison with HR service provider for statutory compliance matters

6.4 Institutional Arrangement: District Level

Proposed Institutional Framework: District level

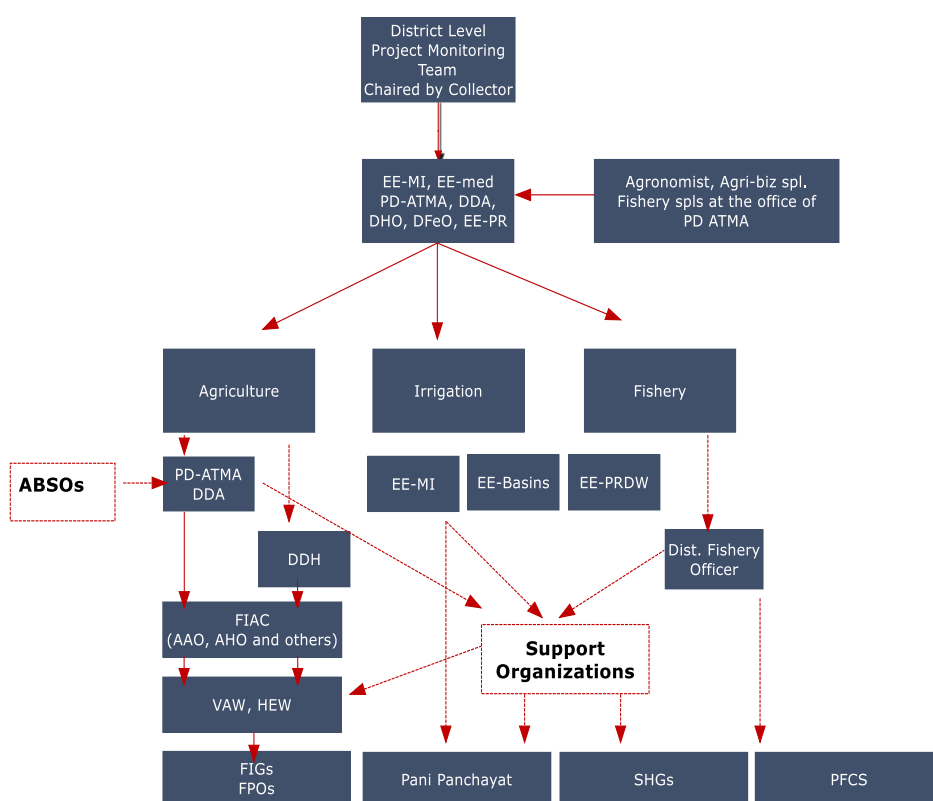


Figure 17: Implementation Arrangement; District Level

6.4.1 Role and Functions; District Level:

Table 92: Institutional Arrangement, District Level

Entity	Function	Members
District level project monitoring team	<p>This team will be responsible for project planning and implementation. This will work on all three key areas of the project irrigation and water management led by concerned EE of the MI division, basin manager of medium irrigation project, the agriculture and horticulture components will be led by DDA/PD ATMA as well as Deputy Director Horticulture. They in turn will coordinate with corresponding officials like AAO/AHO at block level or above. Fishery activities will be coordinated by district fishery officer. PD-ATMA will coordinate with KVKs and SAU in the district for training and demonstration.</p> <p>Considering the project has limited resources, focused time bound implementation of the activities is crucial. This team will try to see that there</p> <p>DLPMT will be chaired by district Collector.</p>	<p>District Collector-Chair EE-MI (for Medium Irrigation project CE-Basins or his rep) PD-ATMA DDH District Fishery Officer EE from Panchayati raj and DW dept.</p>
Project cell in District collector/PD ATMA office	<p>This cell will be responsible for regular tracking of activities and prepare status report for review by collector.</p>	<p>Cell will be strengthened with infusion of certain number of key professionals (agronomy, agribusiness and horticulture) from market as well as on deputation from the line departments. These personnel will provide analytical and decision support inputs on the key outcomes of the project to collector and DLPMT.</p>

6.5 Community Level Institutions

The community level institutions will be both in tank command and outside. Especially for agriculture and fishery sector where the climate resilient value chain approach is being followed and the groups may be outside the tank command.

Institution	Any specific function other than those described above
Pani panchayat in tank command	<ul style="list-style-type: none"> • Micro Planning for crop-water budgeting in Tank systems • Mobilizing membership fees and/or water tax as per the Act including fixation of tax structure for all the users • Plan for maintenance of the irrigation system including Tank renovation, restoration and maintenance; • Manage lift irrigation point • Preparing a cropping programme • Water budgeting and regulation; Economy in use of water • Conflict resolution/management • Conduct social auditing • Annual General Body meetings, Finance and accounting, Annual report preparation and presentation • Govt. Non Govt agency- convergence and contact
Farmer Interest Groups both at tank command and outside depending on the commodity cluster and value chain	<p>Such groups will be formed with commonality of interest in undertaking accessing inputs, technologies and market as per the situational needs. Besides they would be evolved for technology dissemination with farmer to farmer focus.</p>
Primary Fisheries Cooperatives	<p>The existing Fisheries Coop at tank locations would be strengthened to take up improved pisciculture, culture of advanced fish seeds in captive nurseries, operationalise portable carp hatchery and linkage with market.</p>

Ground water monitoring groups Women SHGs	These groups will monitor the ground water and determine the extent of conjunctive use based on the plans made during the cropping seasons Such a forum will be formed at the tank or village level to empower women who are part of SHGs to undertake non-land-based activities and also in some cases to undertake kitchen gardening.
Tribal development groups	Ensure that if it is a scheduled tribal area, the Pani Panchayat has included Tribal welfare in its work programme in terms of livelihoods, trainings, capacity building etc. Create awareness regarding tribal people and their issues, sensitise people towards tribals and so also among the tribals themselves

6.6 Non-government Support Organization

Project will draw support from time to time from community-based support organisations for social mobilisation and capacity building, resource institution for specialised services.

Table 93: Support Organization Role and Functions

Institutions	Level	Roles and Responsibilities
Resource agencies for capacity building and training in specialised areas	District level or a cluster of districts	In their areas of expertise develop modules and materials, to develop skills and expertise of the community representatives who can function later as trainers/facilitators. They should follow practical training of trainer approach with an aim to create a cadre of para professionals and agri-entrepreneurs
Community based Support Organisation	Block level (or a cluster of tanks not exceeding * per SO)	The Support Organisation will play a major role in: <ul style="list-style-type: none"> • Community mobilization and formation of the Pani Panchayat • Handholding and empowering the Pani Panchayat • Conducting PRAs and micro planning, • Assisting the Pani Panchayat to come out with the Tank seasonal and annual work plan • Ensuring that beneficiaries contribute both vash in kind • Training and capacity building of the Pani Panchayat and the community level groups, • Liaise and coordinate with line departments for support, • Ensuring that the provisions under ESMF are adhered to , Tribal Development Plan in the tribal dominated areas are prepared and implemented • Conflict resolution, reporting and documentation
Agri-business Support Organisation (ABSOs)	State Level	<ul style="list-style-type: none"> • ABSOs will be mobilised to extend their skills to FIGs and FPOs on establishing commodity value chain and market linkage. Prior experience in the state in the similar function will be given preference. They will develop model investment plan for a district and also train the smaller ABSOs. • The agencies will not be only advisory agencies in nature and must undertake an action research role with departments. • Agencies having MoU with the Government of Odisha in select sectors, resource institutions active in FIG/FPO promotion in the state will be given preference. They will assist in preparation of business plans, market linkage, credit linkage and technology linkage.

6.7 External Consultancy Organizations

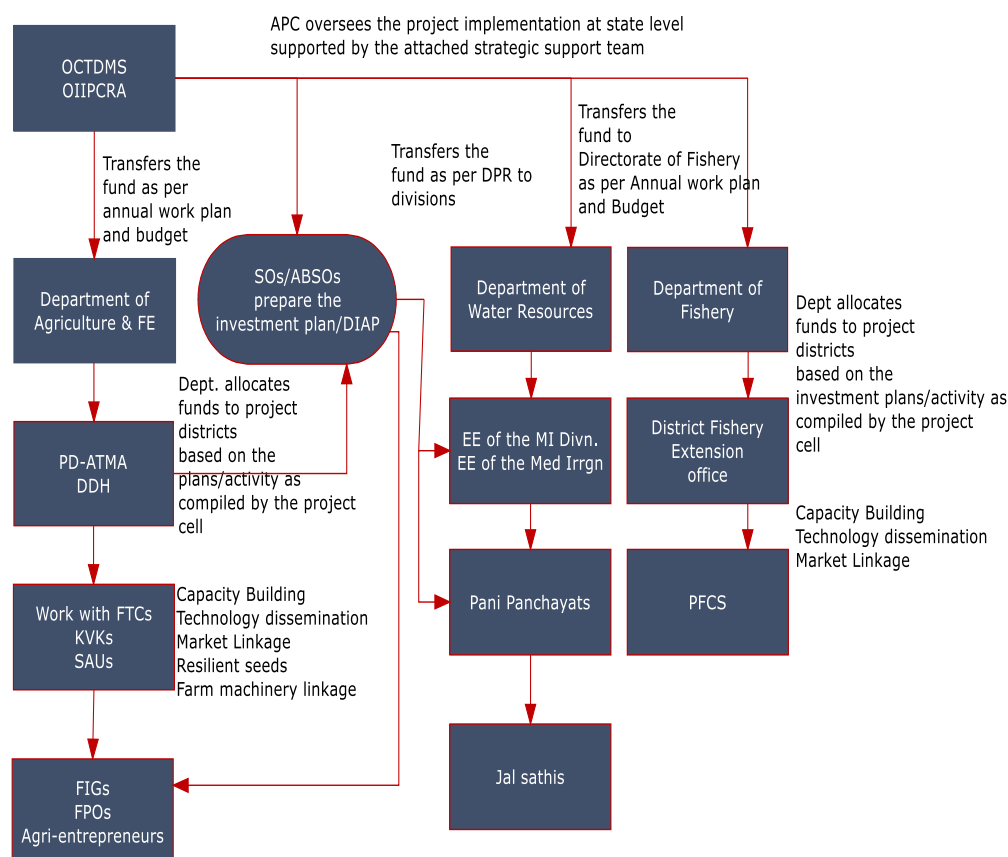
The following external consultancy agencies will be contracted by the project for specific tasks as detailed out below.

Table 94: Role & Functions of External Consulting Organisations

Name of the agency	Roles and functions
External Professional MIS Support Agency	<ul style="list-style-type: none"> OIIPCRA will partner with ORSAC to develop a state of the art MIS and portal for the project.
External Quality Control Consultants	<ul style="list-style-type: none"> To assess and ensure that all the technical works are being carried out keeping in consideration the necessary Quality Control norms. Tests to be done as detailed out in section ** of the technical manual Other control measures
External Monitoring and Evaluation Agency	<ul style="list-style-type: none"> To undertake survey; Data collection and reporting; Process monitoring; Impact/outcome analysis and evaluation; Technical and capacity building support for MLE to other project-related entities as appropriate. Quarterly project cycle monitoring of implementation and outputs; Social and environment management audits; and Systematic monitoring of project impact (both intended and unintended effects)
Thematic partners based on MOU	Project will partner with CIFA, CIFRI, OPDC, College of Fishery (CoF), OUAT, etc.

6.8 Implementation Modalities

Implementation modalities and interface among various entities given in the chart below.



Collector oversees and reviews the project implementation at district level supported by the project team attached to PD ATMA office

Figure 18: Implementation Modalities

Chapter Seven: Monitoring, Learning and Evaluation

The Monitoring, Learning and Evaluation (MLE) is a core component in the project implementation and management. It not only helps the management team in tracking the physical and financial progress concurrently, but also helps in participatory learning and sharing of results. In essence the MLE functions as a system with a monitoring agency and project management units working hand in hand to improve the project outcomes and impacts. The following diagram shows the interplay between various sub-systems within the MLE system.

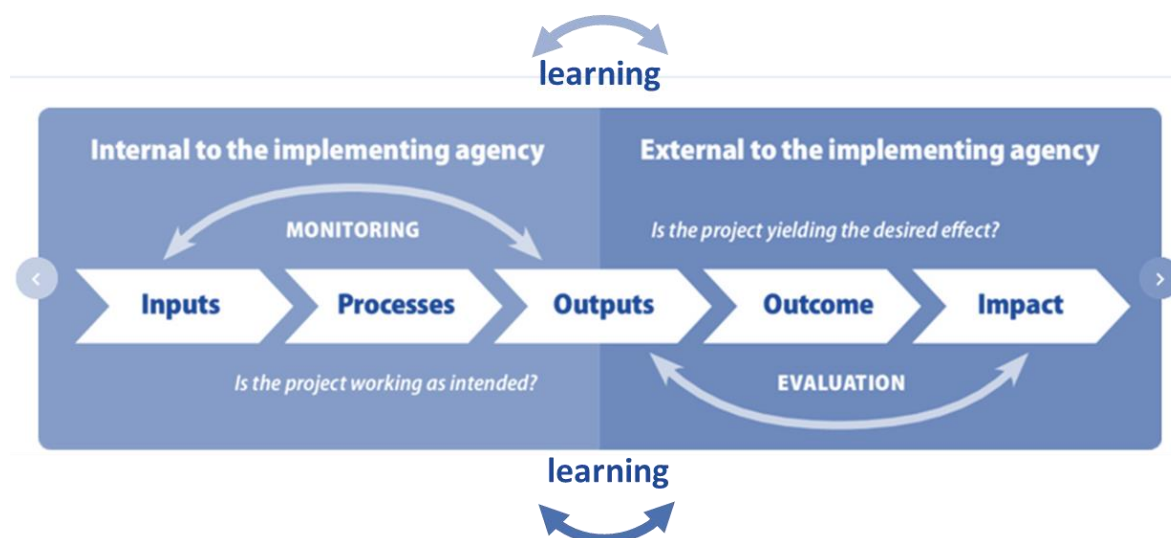


Figure 19: Interplay between sub-systems of MLE

There are certain processes internal to the project implementation and there is also a process of independent assessment that evaluates whether the project is yielding desired effect.

7.1 Objective

Key objective of the Monitoring, Learning and Evaluation (MLE) system is to monitor the results of investments made in various components of the project, assess the effectiveness and impacts of such investments and enhance the learning of key stakeholders during the process through a constructive feedback loop.

The figure above shows how the implementing team and the independent assessment process will complement and supplement each other, complete the feedback loop and improve learning.

MLE system will monitor key processes during implementation as well as the outputs and outcomes of the project. Results based management framework has been adopted to develop the MLE system for OIIPCRA Project.

These include:

- Developing a higher order project development objective and critically assess that all the components ultimately feed to that objective. Facilitating the results-based management process by integrating focus on outputs and outcomes and planning and defining the activities and their phasing accordingly.

- Understand the effects of development interventions and the progress in comparison to the baseline situation assessment through monitoring, evaluation and impact assessment process.
- Setting up a system for baseline data collection, regular updation of progress (both physical, achievement, financial disbursement and reports on process based learning).
- Analysis, evaluation and generation of reports and its monitoring against the identified baseline indicators to understand effects of project interventions and track the progress.
- Setting up of standardized learning and evaluation process for stakeholders at the state, district, tank and community level and dissemination of learning from the development process for use by the stakeholders as well as wider community.
- Conduct, implementation audit, quality audit, monitoring, tracking, impact and outcome analysis, evaluation and provide Technical and Capacity building support to the implementing partners.

7.2 Approach

To achieve the above objective the monitoring cell in the SPMU, comprising of an economist and one MIS/GIS specialist will interface with external MLE agency contracted for the purpose, the district level specialists attached to the district project management team, the MIS agency and the third-party quality control agency. The following entities will partner with state project unit for the MLE process.

Table 95 Various entities in the MLE process

Name of the entity	Role	Level	Nature
MIS service provider (ORSAC)	A GIS based monitoring system with provision for app based updation of physical and financial progress and indicator dashboard	State level with access to district level interface staff	Govt. entity and in partnership with SPMU
Third party M&E agency	To update the baseline after the project is operational, generate process learning reports every six months, conduct mid-term assessment and end term assessment	State level, assessment made on representational sample basis	Independent agency to be contracted by SPMU
Third party quality audit	To audit the process of tank investment effectiveness and guide the PPs for onsite check through simple tools	Site based	Independent agency to be contracted by SPMU

The following table shows the applicability of the MLE to various categories of stakeholders:

Table 96 Applicability of MLE processes for various stakeholders

Level	Stakeholders	Key MLE interface	Activities (Physical progress)	Finances	Procurement	Timeline (milestones)	Progress against indicators	Issues	Future Plans
Tank command	User and dependant communities	Key informants	√	√		√	√	√	√
	Pani Panchayats	PP office bearers and members	√	√	√	√	√	√	√
	Farmer Interest Groups	Lead farmers and members	√	√		√	√	√	√

Levels	Stakeholders	Key MLE interface	Activities (Physical progress)	Finances	Procurement	Timeline (milestones)	Progress against indicators	Issues	Future Plans
District Level	Fishers	PFCS office bearers and members	√	√					
	Support organisations	Key field level resources	√	√	√	√	√	√	√
	District Project Management Team	Facilitation professionals attached to the district	√	√		√	√	√	√
	Line departments KVKs	Specialist in KVK	√	√		√	√	√	√
	Line departments SPMU	Nodal Officers	√	√	√	√	√	√	√
State Level	Project Support Unit with APC	MLE cell Technical resources	√	√		√	√	√	√
	Government of Odisha (Steering Committee)	PD, OIIPCRA	√	√		√	√	√	√
Country Level	World Bank	PD, OIIPCRA	√	√	√	√	√	√	√
	Government of India	Task Team Leader, World Bank	√	√	√	√	√	√	√

7.3 MLE Systems in OIIPCRA

The project will follow the following framework for Monitoring, learning and evaluation.



Figure 20: MLE System in OIIPCRA

7.3.1 Internal MLE System

MLE cell comprising of an economist and a GIS-MIS specialist shall be the core entity in SPMU to anchor the MLE system for OIIP CRA. The SPMU will support the implementation of the MLE system across the project for the stakeholders. (e.g. standardized guidelines, processes and workflows) to allow teams at various levels to monitor and report on the project's physical progress and financial disbursements and other key aspects outlined in the table above. Internal monitoring is critical for the soundness of project implementation. There will be periodic joint MLE exercises with the third-party M&E agency, as well as independent visits by economist. Field visits are not just to cross check the data being collected by the external M&E agency, but also to understand the issues flagged by the agency, study areas/examples of best practices in the project, understand the various rating systems (e.g. PP / WUA self-rating, FPO rating), and provide feedback to various stakeholders. The MLE cell will also work with third party agency to generate periodic (preferably half yearly) project cycle reports.

7.3.2 External MLE Agency

MLE system primary assessment mechanism rests on three inter-related components to assess the effectiveness of the project investment. The SPU will be supported by an external M&E consultancy firm, which will (a) develop the database in consultation with MIS agency and SPMU, (b) will update the baseline survey data for the project (within 1st six months of the project implementation) (c) will undertake process monitoring studies to generate project cycle reports (d) undertake impact evaluation at identified milestones (midterm and end of project). The process studies will provide the program a mechanism to rapidly identify areas in implementation requiring course correction in advance of the mid-term review to inform adjustments in operational design and align with the strategic objectives as outlined in the PDO.

Key responsibilities of external MLE agency shall be as follows:

- To **update the ex-ante baseline data** (within 6 months) available with the project and establish the database
- Integrate the database with MLE indicators with the MIS to generate **project cycle reports** (concurrently every six months) and visualisation of the dashboard (in association with MIS-GIS agency)
- To undertake **Midterm Review** (MTR) (after 3rd year of the project implementation) to check whether the project is performing as per the design and expectation with regards to various indicators and to help the SPMU in deciding whether there is a need for mid-course correction.
- The final or **End term review** will be quite comprehensive and it will not only assess ex-ante and ex-post performance of the project but also would look into the performance of project areas and control areas to have a clear understanding of attribution. Proper sampling method as appropriate and clear understanding of the climate change issues should be the guiding principles to undertake these studies.
- The project would also undertake issue and **theme-based studies** as identified by the joint and six-monthly reviews. These themes/issues are likely to relate to implementation processes, identification of constraints (technical, administrative, and financial) and estimation of project outcomes/impact. Impact of the project on job creation, climate change adaptation benefit and mitigation benefits and changes in soil organic carbon, GHG emission etc. will be covered through a longitudinal study on sample tanks and tracking of sample households in selected tank areas.

The details of indicators that to be tracked by the project and to be reported from time to time has been included in the **result framework** section of this chapter.

Only such agencies that have competence of working on climate change issues with respect to water and agriculture sector shall be mobilized for this purpose as third-party M&E agency.

7.3.2.1 Key Deliverables by the Agency

The following deliverables are to be provided to project by contracted external MLE agency and select service providers.

Table 97 Key deliverables by external MLE agency and service providers

Key ML&E Output	Description	Periodicity
Baseline	Ex-ante baseline survey has been conducted by an agency to populate the baseline value in result framework	One time during the project preparation stage
Updated baseline and database	<p>The mobilised third party monitoring agency will scrutinise the baseline values and update it wherever necessary.</p> <p>The M&E consultancy will prepare a sampling strategy including the proposed methodology, design and sample frame. This will be the basis for discussion, collaboration and finalization with both SPMU. This will be followed by the survey questionnaire, following international best-practices, including pre-post-field-testing, pilot review/field validation, control and intervention group strategy to estimate the ex-post project impact with a scientific basis.</p>	Within the first six months of the operation of the project
Concurrent implementation audit and monitoring studies to generate project cycle report	The following shall be the scope of the concurrent monitoring exercise to be undertaken jointly by the external consultancy along with SPMU and DLPMT. (i) Up-to-date physical and financial expenditure data compared to annual and end-project targets; (ii) Comparison of project performance vis-a-vis the Annual and End-Project Targets including Output, Intermediate and Outcome indicators with respect to the Baseline values (iii) Successes and project implementation (iv) issues/problems encountered during the reporting period with suggestions for remedial actions (v) Summary of social impacts due to the Project intervention and environmental compliance.	Every six months
Benefit Tracking (Longitudinal Study)	The impact of the project on poverty status and income level changes will be covered through a longitudinal study on sample tanks and households tracking in tank areas. The longitudinal study will focus on detailed understanding of progress and changes in the identified tanks by panel sample monitoring of result framework indicators. Specific support will be provided for comprehensive data gathering by installing measuring devices and introducing detailed record keeping of <i>biophysical aspects</i> relating to rainfall, inflows, outflows, etc. and <i>socio-economic aspects</i> encompassing the household information on cropping pattern in head, mid and tail reaches, wage employment at local level, income generated from other tank-based livelihoods, etc.	<p>Data will be collected on a regular basis (<i>six monthly</i>) to monitor identified tanks and gain understanding of overall project results.</p> <p>The households in these tanks will be tracked <i>over the entire project duration</i>.</p>
Theme based studies	The multi-disciplinary interventions under the project as well as the multi-stakeholder partnerships create a need of in-depth understanding of various issues during the project cycle and phasing. Considering this need, the project will conduct a number of issue or theme-based studies to gain a better understanding of the processes and outcomes involved and to learn from experience. These studies will directly contribute to the sum of information on the results/outcomes as well as newer dimensions of the project. The project would undertake a focused study on themes and issues arising out of implementation processes to generate in-depth understanding of various issues. Some of these theme-based studies may be conducted by specialised agencies and some can be undertaken by the monitoring agency.	As per the need of the project and part of the project cycle
Process documentation	Some of the key processes to be tracked on a regular basis during the implementation, especially for PPs and FPOs and cases of successful interventions/enterprises and entrepreneurs. This will	Yearly capsules

Key ML&E Output	Description	Periodicity
Mid-term review	<p>help to generate learning's for the stakeholders.</p> <p>Mid Term Review is primarily a monitoring tool to identify challenges and outline corrective actions to ensure that a project is on track to achieve maximum results by its completion. The MTR would include an impact assessment of the project to date, and also focus on procedures, implementation processes and recommend adjustments in the project design and / or implementation arrangements to overcome identified issues/bottlenecks.</p>	After 3 rd year of the project implementation
End-term Review and Impact Evaluation	<p>The final assessment will focus on understanding the outcomes of project interventions and effect of the same on the target population and compare these with the baseline situation to assess the effectiveness of the project in terms of physical infrastructure development, socio-economic changes environmental impacts as well as institutional strengthening and decentralized management of assets by community members through PPs, The efficacy of the enterprise platform along the selected value chains. The Final Assessment would be a comprehensive overall impact assessment including quantitative and qualitative assessment of progress against project development objectives.</p> <p>The end-term evaluation and impact assessment will update the financial and economic analysis of project returns undertaken at the start of the project. It will also undertake analysis of issues relating to sustainability of project outcomes and impacts. It will also comment on the post-project sustainability and future strategy.</p>	After the 6 th year of the project

7.3.3 MIS and ICT support agency

The MIS will be built with geo-spatial data and mobile enabled platform so that regular updation is easy and transparent. ORSAC a government of Odisha agency will anchor this initiative and assist the MIS development if required engaging appropriate developers. The geographical Information System will provide spatial information and knowledge base as per the location of all minor irrigation tanks, presenting data collected analysis and monitoring. It will also integrate the beneficiary data in the district across the project components. It will automate data from the tanks to cascade and aggregated at the district and state levels. It will track both physical output and expenditure of the project on real-time basis. The database will be inter-operable. The departmental officials/experts and other personnel engaged in implementation will upload data on pre-deigned formats to the project server using appropriate electronic instruments. The MIS Manager at the SPMU will generate location-based queries and reports from this database as necessary. The Project MIS will be very vital tool and will be used for project management through a progress review system on a regular basis. The following modules shall be part of the MIS.

Components	Proposed Items/ Activities/ data to be tracked
For all components	<ul style="list-style-type: none"> • Delivery as well as utilization of project funds for the purpose, physical and financial inputs, monitoring mechanisms, allocations • The outreach of the project in terms of the geographical area (districts, blocks, GPs, village, across agro climatic zones) and socio-economic groups (stakeholders, households, caste groups, vulnerable groups, etc.) that have been mobilized into the project's fold • The flow of project funds for various inputs and monitor the allocation and use of such funds as per the portfolio of sub-projects implemented and the type and value of assets created; • Progress of the project in terms of convergence efforts made with PRIs, Line Departments of government and Civil Society/Philanthropic Institutions. The assets facilities and other benefits provided to the socially vulnerable community and other stakeholders of the tanks system and rainfed areas of the district linked to the project.

Components	Proposed Items/ Activities/ data to be tracked
Component 1: Diversification and intensification for climate resilience	<ul style="list-style-type: none"> Tracking beneficiaries/FIGs/WSHGs/Agri-entrepreneurs in the value chain of identified commodities and processes adopted interventions Improvement in crop production and diversification in selected tanks Improvement in cropping patterns etc. Improvement in fish production and marketing Marketing linkages established for the selected commodity value chain Inputs by line departments Training / Demonstration, etc. delivered as well as utilized at different levels
Component 2: Improving access to irrigation and water productivity	<ul style="list-style-type: none"> Tracking of procurements and contracts for physical investments Progress in tank system renovation, rehabilitation, maintenance and operations in terms of delivery as well as utilization Technical details such as physical dimensions of the tank systems, dam height, The capacity/skill building inputs provided to Pani Panchayats, SPMU and SOcropping patterns, designed and actual ayacut areas Measurement of water delivery as per the crop-water budgeting and IIAP
Component 3: Institutional Development and Capacity Building	<ul style="list-style-type: none"> The delivery of targeted inputs such as project human resources, capacity building, specialized training provision and other services provided and the uptake of the same by those it was delivered to. Progress in institution building in terms of Pani Panchayats, Community Level Groups (Primary Fisheries Cooperatives/Groups, Farmer Interest Groups, WSHGs, PFCS, Ground Water Management Network, Groups for tribal people and others), The capacity/skill building programs for agri-entrepreneurs Tracking details Environmental and social safeguards.
Component 4: Project management	<ul style="list-style-type: none"> Human Resource Management Staff and Salary details Asset details Service provider deliverables and payments Newsletters and reports RTI Information Dissemination and Social media presence of the project
Monitoring, Evaluation and Learning	<ul style="list-style-type: none"> Monitoring and Evaluation core indicators Data collection, analysis and reporting as per project cycle Learning and Knowledge Management
Transparency, Accountability and Governance	<ul style="list-style-type: none"> RTI Grievance Handling Procurement and Financial disciplines, audit Adherence to processes
Finance and procurement	<ul style="list-style-type: none"> Financial and physical tracking across the SPMU, Districts, Tank and Community levels (delivery as well as utilization) with mobile app based integration with modular control Procurement and utilization details

7.3.3.1 Key Guiding Principles for MIS Development

The following key principles are expected to be adopted in the development of MIS for the OIIPCRA.

- The project will have both mobile based and computer-based information sub-systems at the Project Support Unit and a searchable and query enabled project dashboard that would answer state level needs for information to improve project management. This sub-system could mainly be a consolidation module as almost all the actual data entry and implementation tracking is expected to be done at the district and cluster level.
- Information needs and indicators to capture information for the project, the format and presentation style of the web page are to be identified in a participatory manner involving the key stakeholders of the project (the client) and the MIS consultant.
- The potential users of information understand the utility of MIS and their role in collection, recording, transmission and use of information;

- The system provides for a two way flow of information, such that those who collect and transmit the information receive the feedback and the information flow synchronizes with the organizational structure;
- The MIS design should ensure that it does not impose a high work load at any level in the organization and at the same time there is no information/data ‘overload’ at any level. The design should be an intelligent system that can handle streamed data flow to minimize data entry during routine use (e.g. drawing upon lists, dynamic menus/options, avoiding repetitive and unnecessary entries, etc.).
- The system is flexible enough to accommodate internal learning changes in future.
- Develop test procedures for the developed MIS software, which must also include procedures for the overall modular software testing (acceptance). The MIS should be fully tested (at the program level, sub-system level and the overall MIS level) for all functionality before its acceptance by SPMU. The testing should ensure that the MIS linkages between the districts and the PCU work correctly.
- Prepare documentation (A comprehensive technical manual) that will be used for the maintenance of the system. The documentation will also be used as technical reference manual for IT staffs. Develop user guides to go with the system (covering all the sub systems at Cluster/Block/ District and SPMU levels).
- Designed to focus on information on empowerment of the poor, income security and quality of service standards, project components and sub components which would include but not be limited to various aspects of institutional strengthening, livelihoods, project monitoring, learning and evaluation, communication, dissemination of information and disclosure, transparency, accountability and governance, finance, procurement etc.

7.3.4 Participatory MLE System

The participatory monitoring includes both qualitative and quantitative information. The participatory MLE process would aim to involve key stakeholders in developing a framework measuring results, evaluating achievements and learning from the project experience, i.e., as joint originators and evaluators of information. This will also help build up local capacity to reflect, analyse, propose solutions and take actions. Where possible, the process would try to ensure that voices of different sections are heard. The key objective is to empower grassroots based stake holding organisations such as Pani Panchayats, FPOs, SHGS and PFCS to assess their own performances and learn. This exercise will be on a concurrent basis to engage beneficiaries of this multi stakeholder project, with a decentralized implementation structure, in assessing progress and achievements of the project. The various processes will be as follows:



Figure21: Participatory ML&E system

The table below provides the periodicity and use of the PLE methods. The processes are described in various manuals of the project.

Table 98: Participatory MLE System

Sl. No.	Type of Work/ Plan	Method of Monitoring and Evaluation	When it is to be done
1	Plan for Physical Renovation of the Tank(Civil Works)	Okay Cards	On completion of each activity
		Social Audit	End of each cropping season
		Community Project Cards	On completion of each activity
		Pani Panchayat Self Rating	On a Quarterly basis
2	Environment Management Plan	Participatory Assessment	Annual
		Environment Checklist	On a Quarterly basis
		Social Audit	End of each cropping season
		Community Project Cards	On completion of each activity
3	Tribal Development	Pani Panchayat Self Rating	On a Quarterly basis
		Participatory Assessment	Annual
		Social Audit	End of each cropping season
		Community Project Cards	On completion of each activity
4	Institutional Strengthening and Capacity Building Plan work	Pani Panchayat Self Rating	On a Quarterly basis
		Participatory Assessment	Annual
		Social Audit	End of each cropping season
		Community Project Cards	On completion of each activity
5	Crop diversification and intensification	Pani Panchayat Self Rating	On a Quarterly basis
		Participatory Assessment	Annual
		Social Audit	End of each cropping season
		Community Project Cards	On completion of each activity
6	Finance and procurement plan	Participatory Assessment	Annual
		Monthly financial reporting	Monthly tracking and reporting at the district level auditing hub of the project
		Social audit	End of each cropping season

7.3.4.1 Key Guiding Principle:

- The SPMU staff should properly train the SOs on the principles, tools and processes of PMLE
- The support organisations and district level project management team should jointly participate in the capacity building of the community-based groups to make them aware about the processes.
- Key community resource persons from the communities to be identified (from PP, FIG, WSHG, PFCS) to anchor the process in the clusters/cascades/tank command

7.3.5 Quality Audit

The Quality Control, monitoring & assurance work shall be carried out in accordance with the guide lines contained in the codes and publications of the Bureau of Indian Standards (BIS) on different subjects read with relevant provisions of technical manual issued or revised by the department from time to time. The quality control & assurance unit will be a 2-tier system with internal and external monitoring system.

Internal Quality control activities during construction / renovation works will follow standard quality control manual and will be scrupulously monitored by designated staff of TMI (Chief Engineer, Minor irrigation) and the technical staff of the SPMU.

The **external monitoring** will be ensured through the engagement of a **Third-Party quality control and quality assurance consultants**.

The **objective** of this Consultancy shall be:

- To ensure that proper construction materials, conforming to the relevant specifications and Indian Standards, are used for various rehabilitation works involved in the Tank Systems Improvements including the tank safety remedial works in order to achieve the output of acceptable quality standards.
- Accordingly, the Consultant is to provide onsite quality control laboratory testing services through Mobile Quality Control Laboratory System to enable rapid and on the spot testing of inputs and outputs (soils, earthwork compaction, fine and coarse aggregates, stones, cement, water, cement mortar, concrete, shot-Crete etc.) The MQCL system shall greatly help in expediting the quality control tests for determining the suitability of materials to be used in the works, being the pre-requisite requirement.
- To monitor the quality of works during the construction stages to ensure that these are executed as per the approved designs/drawings, technical specifications, contract documents, sound construction procedures, and in a time bound manner with due emphasis on environmental management to ensure that all works are constructed to acceptable construction quality standards and workmanship.

Scope of the work shall be as follows:

The following are the outline of the tasks to be carried out by the Consultant.

- The Consultant shall provide Mobile Quality Control Laboratory services for undertaking the required tests.
- The MQCLs shall function as per the project schedule. MQCLs shall be fully equipped for conducting necessary quality control tests and shall furnish computerized test results to DLPMT / EE_MI and SPMU.
- MQCLs shall be manned and operated by the Consultants staff.
- Period of assignment will be as per the implementation plan.
- The routine quality control test will be conducted by MQCLs at work site by doing multiple visits as per the requirement and the special test requiring laboratory facilities will be carried out at the Consultant's Branch/ Main laboratory.
- To conduct at least 70% of the specified quality control tests independently (based on technical specifications and relevant Indian Standards and as per the frequency of tests agreed with GoO), and in addition, witness and verify at least 10% of tests being conducted by the Quality Control staff of GoO to ensure the accuracy and correctness of testing procedure there-of.
- To ensure, through intelligent perusal of the designs and drawings, as well as the Dam Safety Review Panel's (DSRP) Reports / Recommendation, that the actual construction in the field conforms strictly to the approved drawings and the DSRP's recommendations.
- To promptly bring any deviations and variations observed from the approved designs / drawings (within 48 hours either by e-mail or fax or letter) to the notice of concerned Executive Engineer, SE, DLPMT and SPMU recommending stoppage of work.

7.4 Result Management Framework

The following shall be the result management framework for this project and the following indicators must be tracked during the project life cycle. In addition, the SPMU in consultation with stakeholders identify additional indicators for tracking and that should be reflected in the MIS as well as the MLE system.

Project development objective: To intensify and diversify *agriculture production* and enhance *climate resilience* in selected districts of Odisha.

Table 99: Project Result Framework

Indicator Name	DLI	Baseline	End Target
PDO: To Intensify and Diversify Agricultural Production in Selected Districts of Odisha			
Increase in productivity of selected agricultural commodities supported by the project (Metric ton)		0.00	0.00
Paddy (Metric ton)		2.64	2.90
Green gram (Metric ton)		0.00	0.00
Brinjal (Metric ton)		0.00	0.00
Marigold (Metric ton)		0.00	0.00
Groundnuts (Metric ton)		0.00	0.00
Increase in productivity of selected agricultural commodities supported by the project produced by female beneficiaries (Percentage)		0.00	20.00
Increase in productivity of water use at tank level (Percentage)		0.00	20.00
Share of non-rice commodities in total production in project areas (Percentage)		33.00	38.00
Share of non-rice products in total production in project areas produced by female beneficiaries (Percentage)		33.00	38.00
Share of target beneficiaries with rating “Satisfied” or above on process and impact of project interventions (Percentage)		0.00	50.00
Share of target female beneficiaries with rating “Satisfied” or above on process and impact of project interventions (Percentage)		0.00	50.00
To enhance climate resilience in selected districts of Odisha			
Farmers adopting improved agricultural technology (CRI, Number)		0.00	28,800.00
Farmers adopting improved agricultural technology - Female (CRI, Number)		0.00	12,000.00
Farmers adopting improved agricultural technology - male (CRI, Number)		0.00	16,800.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	End Target
C1. Climate-Smart Intensification and Diversification of Production			
Share of beneficiary farmers' produce that is marketed (Percentage)		10.00	30.00
Share of female beneficiary farmers' produce that is marketed (Percentage)		10.00	30.00
Increase in share of project beneficiary farmers with access to resilient seeds (Percentage)		15.00	30.00
Increase in share of female beneficiary farmers with access to resilient seeds (Percentage)		15.00	30.00
Community fingerling production units operating in tanks supported by the project (Number)		0.00	30.00
C2. Improving Access to Irrigation and Water Productivity			
Area provided with new/improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	72,805.00
Area provided with new irrigation or drainage services (CRI, Hectare(Ha))		0.00	24,833.00
Area provided with improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	47,972.00
Project-supported cascades with operational PP federations (Number (Thousand))		0.00	50.00
Share of project-supported schemes meeting at least 50% of scheme performance targets (Percentage)		0.00	50.00
Increase in area under crops that are less water demanding. (Percentage)		0.00	30.00
Proportion of project supported PPs with women representation (Percentage)		0.00	35.00
C3. Institutional Capacity Strengthening			
Government staff trained through project support (Number)		0.00	200.00
Percentage of government staff trained through project support – Female (Percentage)		0.00	50.00

7.5 Summary of the Implementation Modalities of the MLE Process in OIIPCRA

The following table summarises the implementation modalities of the MLE process in OIIPCRA

Table 100: MLE Process in OIIPCRA

MLE Component	Type of Monitoring	Methodology	Who will Lead this component	Who will use this information	Link to other MLE components
Participatory monitoring at community level	Self-rating by WUA/FIGs Participatory Assessment Project Cards	As described in the components	WUA with facilitation from Support Organizations	WUA for actions planning, Project team, Joint Review teams, DLPMT, SPMU and External M&E and MIS agency	Joint / Participative monitoring review
Quality monitoring of works	Civil works quality monitoring	Random site selection and quality monitoring checking.	Third party quality m	DLPMT, engineering staff, PP and SPMU, MI Division, Dam Safety Panel	Joint/Participative monitoring reviews
MIS & GIS	Periodic tracking of data and information	Finance linked voucher-based monitoring of inputs, reports on inputs against the annual action plans standard formats prepared output information collected through reporting formats based on the strategic result monitoring framework web enabled system to facilitate data entry and access to information at various level.	SPMU teams with support from Team of DLPMT.	SPMU and DLPMT level for progress monitoring and management decision making, reporting	PP / WUA Self-rating, six monthly audit and annual evaluation
Field Visit based monitoring	Six Monthly Audit	PP / WUA of other tank areas will review the performance	PP / WUA with support from facilitating organization (SO) and District MLE	PP / WUA for learning from other PP / WUAs	Joint monitoring reviews
Participatory Assessment		Quantified participatory assessment methodology Sequence and process monitoring	Officer for scheduling An external M&E agency	Project team to understand the status and sequencing of events	Theme based studies, joint monitoring
		Six monthly processes will be taken by SPMU and DLPMT/ PD-ATMA to understand the progress and process of work based on MIS and GIS report after the field visits mentioned above. The indicators of results monitoring framework as	S-SPU and DLPMT, SOs, MLE resource person and World Bank team will participate in two events per annum.	SPMU, DLPMT and World Bank.	Joint monitoring review Theme based studies

MLE Component	Type of Monitoring	Methodology	Who will Lead this component	Who will use this information	Link to other MLE components
		well as Input-Output monitoring will be used.			
Periodic review and tracking	Field survey and tracking of identified tanks and households	Tank level assessment and Household level survey of identified poor households to understand the impact of intervention of poverty	S-SPU MLE team with support from an external M&E agency	SPMU, DLPMT and World Bank.	
Theme based studies	Issue and theme based studies	Themes based on project cycle and issues emerged from the results of on-going MLE.	SPMUMLE team and the External M&E agencies input can be used by Specialized agencies (other than third party M&E).	Results from thematic studies will be used to inform management on the topics and issues being researched in order to learn lessons from the experience and to improve the approach and results being obtained at operational and governance levels	
Process Documentation	Participatory Monitoring	Implementing team and MLE team will documents the field visit reports with reasons of success, failures, gaps, case studies, documentation of proceedings of various meetings at S-SPU &DLPMT. Analysis of the information generate to document the processes Specific subject experts visiting the field to understand critical processes and documentation of the same members	Project team members, external subject experts, resource persons etc.	World Bank	Theme based studies, joint monitoring reviews
Baseline and Impact Evaluation	Baseline study	Initial study to be taken up in first four months of project initiation covering baseline situation of tanks, tank stakeholders with respect to livelihoods and economic levels, issues relating to water management etc. Control group also to be covered in the sample	An external M&E Agency	SPMU , DLPMT and World Bank to refine the implementation on strategy of the project and for use in monitoring and comparing changes through	Midterm and Impact Evaluation

MLE Component	Type of Monitoring	Methodology	Who will Lead this component	Who will use this information	Link to other MLE components
	Mid Term Evaluation	Mid-term review and learning of achievements of the project, constraints, gaps to achieve the objectives. Review of strategies for implementation through field assessment, sample. An external agency in consultation with S-SPU and DLPMT staff household surveys, analysis of project information and consultative workshops	An external M&E agency	results monitoring framework S-SPU, DLPMT and World Bank to plan for mid-course corrections and finalizing future implementation strategies	Baseline study and Impact Assessment
	Impact Evaluation	Study to be taken up at the end of project covering sample tanks including control group and assess changes with respect to baseline situation, identify areas for sustaining the change	An external M&E agency	WR department, PP and the government staff and World Bank for generating learning for future planning	Baseline study and Mid-term evaluation

The operational responsibility for planning and coordinating MLE activities would rest with the state level State Project Monitoring Unit (SPMU). The data and information would be consolidated and managed by SPMU at state and by PD-ATMA / EE-MI / Associated Dept. / DLPMT at district level.

Table 101: Internal and External Monitoring System

Internal Monitoring System	External Monitoring System
<ul style="list-style-type: none"> State Project Monitoring Unit (SPMU) Sub-State Project Units (Line Dept.) District Level Project Monitoring Team (DLPMT) Support Organization (SOs) WUA / PP 	<ul style="list-style-type: none"> External Monitoring Agency World Bank

The management of the MIS & Web MIS will be the responsibility of PD-ATMA / EE-MI and DLPMT technical staff. Computerization support will be provided at each division office, where the primary data entry will be done by a data entry operator. Project MIS development will be taken up by MIS Expert and if required, support of a professional agency will be hired for the purpose. The MIS will provide information for project management as per the project cycle. The web enabled MIS/GIS will facilitate use of information at various levels. Data compilation and feedback to the users will be coordinated by the MLE staff through joint reviews and DLPMT interactions.

Quarterly and Six-monthly reviews will be undertaken by the state and district MLE teams together prior to the joint review by the World Bank Supervision Mission. The SPMU will constitute teams of two or three members from among S-SPU Experts and SPMU members who will undertake field visits every month. Each S-SPU/ SPMU team will visit at least two districts every month and cover about 5-6 tanks per month. The SPMU teams will coordinate visits with implementing line departments whenever possible. Each team will visit one or two tanks/cascades per day. After the field visits, the team will report to the District Collector about the progress of work and

implementation issues. Considering the project phasing and sampling proposed, these teams will visit each district twice a year. Supplementation of the MLE teams with subject matter specialists will facilitate integration and comprehensive review of project activities at the tank/cascade level. It will also facilitate the specific subject review based on field visits by the subject specialist.

An External Monitoring & Evaluation Agency will be involved in undertaking concurrent monitoring as well as half-yearly, midterm and end project impact assessment on a sample basis. The Agency will develop the sampling methodology and field visit plan in consultation with the M&E Specialist and will be approved by the SPMU. External monitoring will focus on understanding the progress on outcomes/results of project interventions and their effect on the participating families in the tank areas. Along with the regular data collection, the agency will be involved in undertaking process monitoring, assessment of sequencing of activities as per the project cycle phasing and household surveys. Review of the capacity building interventions, institution building processes, and SO performance assessment will also form part of the concurrent monitoring as a component of reviewing the project support systems and enabling environment. The regular monitoring of the project activities will include monitoring of progress on indicators specified in the Social and Environmental Management Framework. The External M&E agency would also monitor the implementation activities under ESMF. During mid-term and end project audits, specific focus would be required on resettlement plan, tribal development plan, dam safety measures, cultural property plan, gender action plans, and INM/IPM plans.

The external M&E agency will undertake detailed monitoring of a selected set of households from beginning to end of the project to understand the impact of project interventions on, inter alia: (a) production patterns and incomes; (b) access to and efficiency in use of water resources; (c) skill formation as well as (management) capacity for community resource management; (d) distribution of benefits across various categories of land holders and different socio-economic groups. The methodology as well as sample selection for this analysis will be agreed in advance with the SPMU.

Research Internships: The project will offer internship (3 to 12 months duration) to graduate students from reputed Indian and foreign universities, colleges, or institutions to work with the Project for conducting short term studies, data analysis and writing of case studies, research papers, or assignments in partial fulfilment of degree/diploma requirements. The Project may provide a fellowship/honorarium/stipend as suitable to support deserving candidates in addition to access to data and logistical support. Institutional sponsorship will be necessary and any resulting report/publication shall acknowledge the support of the Project.

7.6 Capacity Building for MLE

It is envisioned that the Monitoring, Learning and Evaluation system for this project would require active participation from different stakeholders at the tank, district and state levels. The processes for Monitoring, Learning and Evaluation being technical and specialized, wherein various tools will be used for capturing, analysing, reporting, monitoring and dissemination data, information and knowledge, it is required that the persons involved in it have requisite competency and skills. Capacity building interventions for MLE will cover training programmes on overall approach of MLE, result based management, participatory monitoring and learning, process monitoring etc. The orientation trainings will be provided to all staff members. The specific skill trainings such as various tools on participatory MLE, ICT driven web enabled MIS, etc. will be provided specifically to the MLE and MIS staff so as to cater to the project needs. Major focus of capacity building on MLE will be laid on creating and facilitating mechanisms and instruments promoting analysis of data gathered, generating learning's from MLE processes and event and promoting two-way information flow. The learning and dissemination component of MLE will require a number of theme based workshops, experience sharing by other agencies at state and national levels.

Table 102: Training and Workshops for MLE

Stakeholders	Six monthly Reviews	MIS	Participatory Monitoring and Learning	Baseline and impact assessments
Project staff – State level	Orientation	Training	Orientation	Workshop
District Support Unit	Orientation	Training	Orientation	Workshop
District MLE staff	Training	Training		Workshop
Department staff	Orientation	Exposure visits	Orientation	Workshop
Support organization	Orientation	Training	Training	Workshop
PP / WUAEC	Orientation		Exposure visit, training	Workshop
PP / WUA members	Orientation		Orientation	Workshop

Chapter Eight: Compliance Procedures: Financial Management

8.1 Financial Management System

A sound Financial Management system is critical for the efficient and effective decision-making required for the success of the project. This includes proper planning, budgeting, accounting, financial reporting, internal control, auditing, control, disbursement and physical performance of the project with the aim of managing the project resources properly for achieving the project objectives. Proper financial management revolves around the basic principal that all financial transactions are in accordance with the established procedures of the project, are transparent and are duly accounted, for future review and audit.

8.2 Objective

The primary objective of sound financial management is (a) to ensure smooth flow of funds to the different levels of executing agencies so that there are no delays in the implementation of activities, (b) all financial transactions are as per rules and procedures and in line with the norms of the project, (c) all such transactions are duly accounted for in the prescribed formats and (d) all payments due to be made to any service providers are done in efficient, speedy and transparent manner. Since the implementation arrangement for the project is at different levels, it is important that there is a coherence and formality in book keeping, accounting policies, procedures, transactions, audit, procurement, financial report and project monitoring etc. aligned with the norms of the World Bank. In this regard, a Financial Manual is prepared for the financial management of the project with the objective of guiding all the project implementing authorities and participants in general and the finance persons in particular, in the financial operational issues of the project. The financial management of OIIPCRA aims at producing real time, relevant and reliable financial information, that would allow the project executives to plan and implement the project, monitor compliance with agreed procedures, and guide the project progress towards the set objectives. Some of the important objectives of the Financial Management Framework are enumerated below:

1. Efficient use of scarce resources – proper fund flow
2. Efficient accounting system
3. Insuring the use of IT for reliable, relevant, real time and online financial reporting system
4. Proper and useful utilization of fund
5. Compliance of applicable rules and laws
6. Establishment of accounting and responsibility
7. Proper forecasting and budgeting
8. Timely alarm for financial problem
9. Timely preparation and submission of disbursement report
10. Financial evaluation of the project both - pre and post
11. Ensuring sufficient fund availability for the project
12. Pre audit of expenditure
13. Use of information technology in financial management and procurement

8.3 Salient Features of the Financial Management System

The financial management system would encompass the followings;

- Planning and Budgeting
- Fund Flow Management
- Accounting

- Delegation of Power
- Reporting
- Audit
- Financial Management Staffing
- World Bank Disbursement
- Pani Panchayat Financial Management

8.4 Implementation Arrangements

Following staff will discharge the financial management function at different levels of OIIPCRA.

8.4.1 State Level (SPMU)

1. **Project Finance Officer:** From Odisha Finance Service (OFS) of the rank of Deputy Secretary or above appointed by the Govt. of Odisha.
2. **Manager Accounts:** Hired on contractual basis from open market
3. **Manager Procurement:** Hired on contractual basis from open market or Rank of Executive Engineer from GoO.
4. **Multi-skill Assistant:** hired on contractual basis from open market.

8.4.2 District Level (PD-ATMA)

1. **Project Director ATMA:** Deputy Director Agriculture /PD-ATMA with additional charge of PD of the concerned ATMA;
2. **Executive Accounts:** Hired on contractual basis from open market.

8.4.3 Pani Panchayat / WUA Level

1. Finance Assistant to PP / WUA: Appointed by Support Organisation (SO) at the PP level or any person appointed at PP level for the purpose.

8.5 Role of Finance and Accounts Team at SPMU

1. Preparation of annual budget; release of funds for the project received from GoO; receipt and accounting for the grant.
2. Verification of requisition and timely transfer of fund to different implementing entities;
3. Audit and scrutiny of payment claims received from suppliers/ contractors and consultants.
4. Preparation and scrutiny of Establishment bills of the staff paid from the project budget.
5. Maintenance of records, books of accounts, registers, files and other related documents.
6. Classifying and grouping expenditure on the basis of
7. Budget heads
8. Component and subcomponents of account
9. Preparation of monthly Bank Reconciliation statement and annual Financial Statements
10. Preparation and processing of interim unaudited financial reports on a monthly/quarterly basis for reimbursement from the IDA Credit/ IBRD Loan
11. Preparing regular financial progress reports indicating variances from budgets for different cost centres under the project
12. Ensuring compliance with relevant statutory financial rules with respect to deduction of taxes and filing of tax return

13. Examining all claims for payment from the project budget.
14. Maintenance of Fixed assets record, compilation of fixed assets record for the whole project.
15. Financial vetting and concurrence on procurements, deciding the most competitive bid on financial parameters, participating in financial negotiations.
16. Arranging External and internal audit and ensuring compliance with and settlement of audit observations.
17. To provide any other financial information as and when required for proper progress of the project.
18. Capacity building in the finance team at all levels
19. Planning and implementing Information technology tools for accurate, reliable, relevant, real-time and online access of the project financial information as required by the stakeholders.
20. Ensuring acceptable quality of financial management at Pani Panchayat level and arranging for adequate accounting support

8.6 Role of Finance and Accounts team at ATMA

The roles and responsibilities will be similar to SPMU, with the difference that its sphere and scope of work is limited to the District level activities.

8.7 Financial Management at the Tank Level

At Tank Level, the Executive Committee of the Pani Panchayat headed by the President and assisted by the Secretary and Treasurer of the PP will be primarily responsible for the financial management of all transactions at that level. If needed they will be assisted by the functionaries of the Support Organisation (SO) in maintaining books of accounts, accounting as per procedures etc. To achieve the levels of capabilities, the capacity building of the PP will be done through regular trainings by the SO. The functionaries of the PD-ATMA / EE_MI / DLPMT will also help the PP in proper financial management during the project period, so that the PP's reach a level of self-sufficiency in adhering to the financial and accounting procedures for their future needs.

8.8 Funds Flow Arrangement

1. Project Director, OIIPCRA will prepare and submit the Budget Estimates to the Water Resources Department based on action plan and estimates from other Departmental Authorities namely: Director of Agriculture, Director of Horticulture, Director of Fisheries etc.
2. The funds available in the budget will be placed by the Grant Controlling Officer with the Project Director, OIIPCRA after enactment of the Appropriation Act who will then place it with the concerned authorities for Scheme and Capital work related expenditures.
 - I. **Fund flow for capital work related expenditure:**

The capital work related provisions will be placed with C.E., Minor Irrigation by P.D., OIIPCRA using works expenditure model of IFMS. The Chief Engineer, M.I. will further distribute the funds to the executing agencies using the IFMS. The executing agencies will use WAMIS&IFMS for preparation of bills, payment to Contractors/Vendors, accounting of vouchers as per the extant process.
 - II. **Fund flow for Scheme related provisions:**
 - (i) The Project Director, OIIPCRA will distribute the funds among the Controlling officers such as Director of Agriculture, Director of Horticulture, Director,

Fisheries under intimation to the respective Secretaries of the Department. All the above Controlling Officers will distribute the funds to their field formations responsible for implementation of the project using IFMS.

- (ii) The Director, Agriculture and Director, Horticulture will distribute funds to the Deputy Director, Agriculture/Horticulture using IFMS. The DDAs will then release funds to community level institutions i.e. FIACs as decided and requested by PD, ATMA under intimation to FIAC who will monitor the utilizations of funds at community level. The FIACs will submit utilization certificates of funds used by them to the DDA/DDH and PD, ATMA. PD, ATMA will submit the UCs received through the Deputy Director, Agriculture/ Horticulture for submission to P.D., OIIPCRA through Director, Agriculture/ Horticulture respectively.
 - (iii) The Director, Fisheries will distribute funds to the District Fisheries Officer using IFMS who will then release funds as decided by P.D., ATMA to Fish Famers groups under intimation to FIAC and PFCS respectively. The FFs groups will submit UC of funds utilized by them to P.D., ATMA and DFOs. The P.D., ATMA will then submit the UCs received through the DFOs to P.D., OIIPCRA through Director, Fisheries.
 - (iv) The above institutions shall maintain appropriate supporting documents evidencing the actual expenditure for providing necessary UCs.
3. Funds to SPMU, OCTDMS Society for Project Management expenditures will be drawn by CE, M.I. as DDO and transferred to the Bank Account of the Society.
 4. The quarterly IUFRR reports for seeking reimbursement from the IBRD loan will be prepared based on the IFMS generated reports and OCTDMS financial statements.

Audit Arrangement:

1. A.G. (A&E), Odisha in course of their regular Audit may be advised to look into all project expenditures incurred through IFMS.
2. A Chartered Accountant will also audit the accounts of the Society as per law.

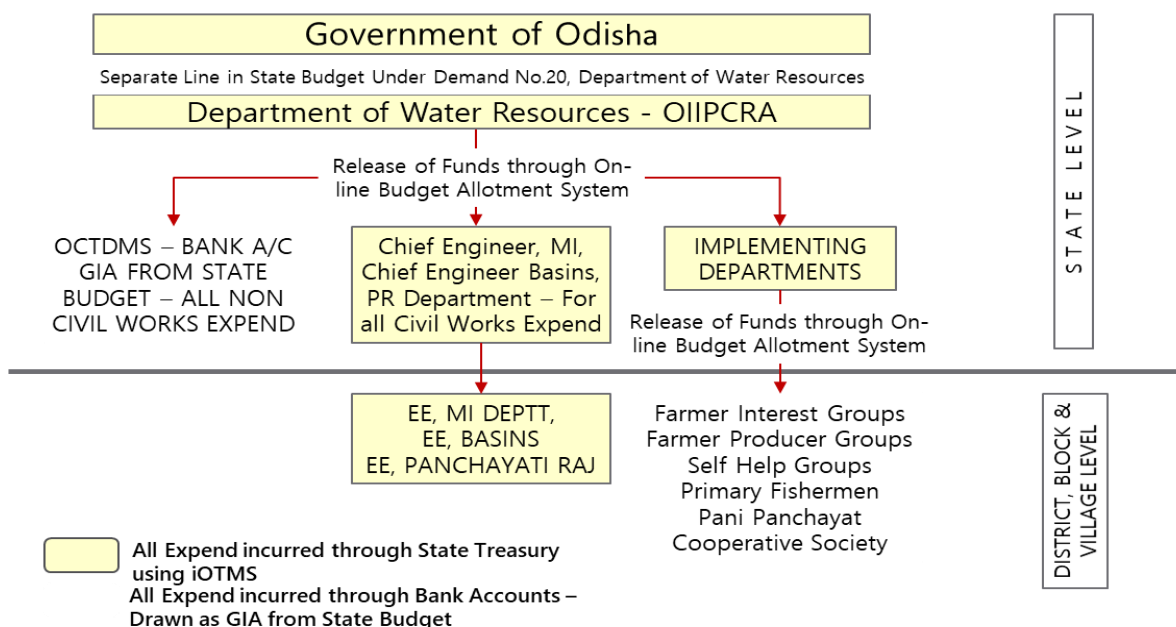


Figure 22: Funds Flow Arrangement

8.9 Internal Control

Segregation of responsibilities: The role and responsibility of accounts staff, procurement staff & drawing and disbursing officer should be segregated and one person cannot hold two responsibilities. All bank accounts shall be operated by signature of two persons.

Verification by SPMU and Project Director: Frequent and random visits of the SPMU staff/ Project Director to ATMA will be made to review and monitor progress in operation. On monthly basis review will be done at SPMU, ATMA and PP level regarding opening balance of funds along with the next month plan of expenditures with component/sub component wise.

Surprise Cash Check: The cash in hand will be checked at least once in a month in a random basis. The Project Director at SPMU and ATMA or his nominee will carry out such checks. The person who deals with the cash account should not deal with the cash book & bank book.

Physical Verification of Stock: All stocks and assets of the project will be physically verified at least once in a year by a committee of three persons nominated by the Project Director at SPMU and ATMA. The report of the physically verification will be submitted to the executive committee in its meetings.

Signing of day books: Early entry in the Cheque issue register should be attested by the signature of the authorized signatories of Cheques. Similarly, the cash book entry should be attested by the Project Finance Officer. Each project accounting unit will close the books within a specified number of days of the end of the month and forward the same to the SPMU to consolidate. The SPMU will have the responsibility for qualitative and timeliness aspects of the financial reporting.

8.10 Audit

8.10.1 Internal Audit

The project will appoint a CA firm to undertake internal audit of the project on a quarterly basis. The internal audit will cover the SPMU and all department/ATMA/MI offices and will include a selected sample of Pani Panchayats. The report of the internal audit will be placed before the Executive committee. The internal auditors will submit their report within 45 days of completion of audit at the end of eachquarter.

8.10.2 External Audit

Through the State Principal Accountant General, the CAG will conduct the external audit of the project related expend incurred at the departmental level. Statements of expenditures at all project levels will be submitted to the State AG by June 30 each year to allow adequate time for the audit, which will be conducted in accordance with terms of reference agreed by the CAG for audit of the project. Audit reports will be submitted within six months of the end of each financial year.

OCTDMS will engage a firm of chartered accountants to conduct the annual statutory audit as per the agreed TOR. OIICPRA will submit two sets of annual audit reports (departments and OCTDMS) to the World Bank within nine months of the close of each financial year. (*Refer the Financial Manual for Details*)

Chapter Nine: Compliance Procedures: Procurement

9.1 Procurement Objective

The Project Procurement Development Objectives (PPDO) are (1) to ensure procurement efficiency and value for money that contributes to agricultural productivity, business promotion, access to finance and enhances market linkages in selected districts of Odisha., (2) To ensure appropriate market participation at district level that is critical for realizing project development objectives, and (3) Placing the risk with party best able to manage the risk and minimizing risk of supplier failure and/or incompetence.

9.2 Procurement Policy

Procurement of all goods, works and services will be carried out in accordance with the World Bank Procurement Framework. The details pertaining to procedures and methods to be followed for procurement are detailed in the procurement manual. In case of any contradiction between the Bank procurement guidelines and project/state guidelines for procurement, the Bank guidelines will supersede.

9.3 Methods of Procurement

9.3.1 Goods and Works:

The following are the usual methods of procurement of goods and works to be adopted in the Project:

- a) Request for Proposal
- b) Request for Bids
- c) Request for Quotations
- d) Direct Selection
- e) Framework Agreement
- f) Force Account

9.3.2 Consultancy Services:

The following are the usual methods of procurement of goods and works to be adopted in the project.

- a) Quality and Cost based selection
- b) Fixed budget-based selection
- c) Least cost-based selection
- d) Quality based selection
- e) Consultants quality-based selection
- f) Direct selection

9.4 Procurement Plan

Procurement plan/ Schedules including the description of goods, Works and services to be procured along with their value and consistent with technically and administratively approved estimate, are required to be prepared for the first and subsequent years, in accordance with the budgetary provision. The actual procurement is to follow the approved plans.

During preparation of the procurement plans, packaging should be appropriately done. Items of similar nature, which can be supplied by the same set of firms, should be packaged together to achieve economies of scale. They should be evaluated on slice cum package basis after taking into account cross discounts offered. Aggregate value of total package will form the basis for determining the procurement method as well as the review requirement of the World Bank.

The SPMU with involvement of associated departments (PIUs/IPs) will prepare a tentative procurement plan for the first 18 months based on the projected activities in the Project Implementation Plan. The Procurement Plan will include description of goods, works and non-consultant and consultant services to be procured (year-wise over the implementation period) along with their values which are consistent with technically and administratively approved cost estimates and milestones for all procurement activities. List of goods, works and services to be procured under the project year-wise, with estimated cost and method of procurement have been mentioned in the format specified by the Bank. The Procurement Plan including their updates shall set forth at a minimum the following:

- i. a brief description of goods, works and non-consulting services/ or consulting services required for the project for which procurement action is to take place/ invitation for proposals are to be issued during the period in question
- ii. the proposed methods of procurement/ selection as permitted under the Financing Agreement
- iii. the Bank review requirement and thresholds
- iv. the time schedule for key procurement activities
- v. any provision for the application of domestic preference in case of goods & works procurement by International competition
- vi. any other information that the Bank may reasonably require

9.5 Prior Review Threshold

Type of Procurement	Method threshold (Million US\$)	Prior Review Thresholds for Moderate Risk (million US\$)
Works	International Open Procurement ≥ 40 National Open Procurement <40 National Request for Quotation ≤ 0.1	15
Goods, IT and Non-Consulting Services	International Open Procurement ≥ 3 National Open Procurement <3 National Request for Quotation ≤ 0.1	4
Consultant Firms	CQS <0.8 LCS, FBS – in justified cases QCBS, QBS - in all other packages	2
Consultant Individual	As per section 7.34	0.4
Direct Selection	With prior agreement based on justification	0.1

9.6 Procurement Agencies at Different Levels

9.6.1 State Level (SPMU Level)

All the consultancy services, related to the project components, will be procured by the SPMU at the State level. A major procurement will be done for civil works under this project and all civil contracts will be carried out through e-procurement by SPMU. The three-line departments will carry out their respective procurement of all low value items by themselves and all high value items will be procured at the SPMU level with technical assistance from the experts of the line departments.

9.6.2 District Level

At district level the major procurement will be for extension services and record keeping of the field level activities. Analysing the above requirements, the project plans to keep Agriculture/Horticulture/Fisheries manager to mobilize respective activities in their areas. These officials will be trained by the Procurement specialist at the SPMU level on basic record keeping for the procurement activities and the tendering procedures.

9.6.3 PP / WUA Level

There are no major procurements at the Pani Panchayat level. If any low value procurement at this level is required, then it will be mainly by the RFQ method. The formats will be prepared by the state procurement officer.

9.7 Procurement Risk Mitigation Action Plan

9.7.1 Procurement Manual:

This Procurement Manual has been prepared to provide clarity on procurement process and to ensure consistency. It describes all the steps in procurement procedures, i.e. preparation of bid documents/RFP, evaluation reports, pre-bid minutes, bid opening minutes, contract information, checklists etc.;

9.7.2 Procurement Plan:

All the associated departments (Sub-SPUs) will send their annual procurement plans to State procurement cell for review and vetting. Subsequently State procurement cell shall ensure its updating in STEP system for Bank clearance. The Bank clearance and coordination with departments / directorates shall be the responsibility of State Procurement Cell of SPMU.

9.7.3 Procurement Trainings:

The SPMU will arrange procurement trainings with the support of procurement experts for the associated institutions / agencies / govt. entities.

9.7.4 State level Procurement Cell:

The procurement cells at State level will constantly guide the ATMA/departments procurement cells and periodically carry out review at the offices of the implementing units and provide guidance with regard to all procurement aspects including record maintenance. It will also be equipped with trained personnel, who will maintain the procurement MIS and also train the personnel involved in the procurement at ATMA/dept. level, as needed.

9.7.5 Record Keeping:

State level procurement cell will provide guidance to ATMA/Depts. to ensure that all records regarding procurement activities under the project are kept in an indexed and safe manner and will be readily available for the review of the World Bank.

9.7.6 Disclosure Policy:

The SPMU will ensure the public disclosure as required under the Bank Regulations and State Government Policy.

9.7.7 Grievance Redress Mechanism:

In order to deal with the complaints from bidders, contractors, suppliers, consultants and general public at large a complaint handling mechanism will be set up at the state level. The Complaint handling mechanism will be established in Project website. Immediate action will be initiated on receipt of complaints to redress the grievances. All complaints will be registered and handled at a level higher than that of the level at which the procurement process is being undertaken and the allegations made in the complaints will be thoroughly enquired into and if found correct, appropriate remedial measures will be taken by the concerned authorities. A register of complaints redress will be prepared and maintained by the administration unit at a given level. (*Refer the Procurement Manual for Details*).

Chapter Ten: Compliance Procedure: Citizen Engagement and Grievance Redressal

10.1 Institutional Arrangement:

Broadly the following grievance redressal mechanism will be followed in the project:

1. All the project staff related matters and their grievance procedures will be in line with the procedure laid down either in their contract and as per government rules. At SPMU level, project director will constitute a Grievance Redressal Committee with at least one women member;
2. For all conflicts at the village level, every attempt should be made to resolve all conflicts at that level itself through the PPs, failing which, through the Gram Sabha. The SOs and KrushiMitras will facilitate the villagers in this regard;
3. The DLPMT will resolve the conflict among PPs, PFCS and FPOs and service providers. the affected parties dissatisfied with the decision of DLPMT, they may appeal to Additional District Magistrate (ADM) / Collector and District Magistrate for amicable solution;
4. If either party is dissatisfied with decision of the ADM / Collector & DM, the party may appeal to GRC at the state level.

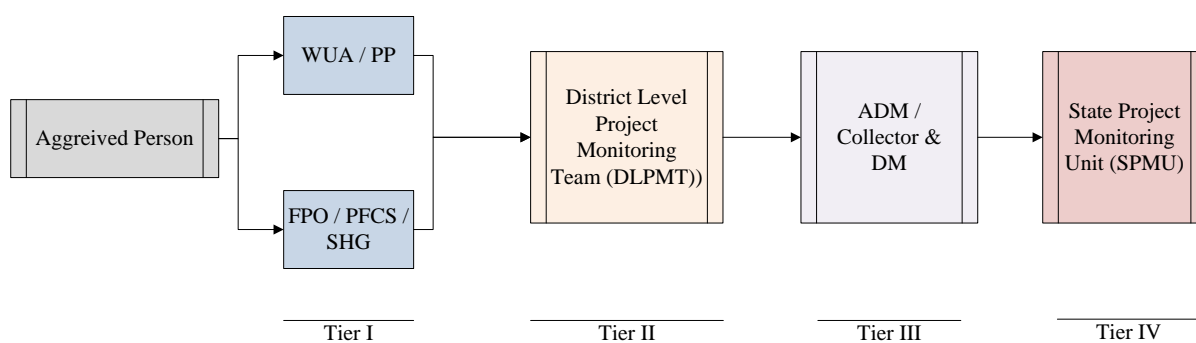


Figure 23: Grievance Redressal Mechanism

Tier I: The project will have different community based institutional structures, such as PP / WUA, FPO, PFCS etc. to execute different project activities at the village level. Such institution of people will be the first point of grievance redressal (Tier I). Any grievance arising at the village level, due to the execution of the project, will be sorted out amicably at the village level with the support of these community level institutions.

Tier II: Any issue, which the local institutions is not able to address amicably, will be referred to the District Level Project Monitoring Team (DLPMT). The district level Tier II structure (DLPMT) for grievance redressal will comprise of (1) Collector and DM as the chairperson, (2) PD-ATMA as the Nodal Officer, (3) Executive Engineer, Department of Water Resources, (4) Deputy Director, Agriculture, (5) Deputy Director, Horticulture, and (6) District Fishery Officer. The concerned department along with DLPMT will take up the issue and will attempt to address it. All such issues, referred by local community institutions (PP / FPO / PFCS / SHG etc.) will be recorded and settled amicably.

Tier III: Any aggrieved person, not satisfied with the decision of the DLPMT, may forward his / her grievance to Additional District Magistrate / Collector and District Magistrate of the concerned district for solution. The Additional District Magistrate / Collector and District Magistrate will consult with the DLPMT / concerned departmental officials / sub-SPU for amicable settlement of the dispute.

Tier IV: If any such situation emerges, the aggrieved person, not satisfied with the decision of the Additional District Magistrate / Collector and District Magistrate, may forward his / her grievance to the Grievance Redressal Committee (GRC) of the SPMU-OIIPCRA for amicable settlement. The grievance redressal committee, after examining the relevance of the case, will settle the issue in a time bound manner.

10.2 Toll Free Number for Grievance Redressal

The project will introduce a toll-free number for receiving grievances and its timely redressal. Any member, having any grievance related to the project can use the toll-free number and communicate with the appropriate authority of the project. After reviewing the details of his/her grievances and field facts, appropriate authority will communicate to the concerned person and solve his/her grievance. The SANJOG help line of the Department of Water Resources may also be used for grievance redressal.

10.3 IT based Grievance Redressal Mechanism

The project will extensively use IT platform for receiving grievances, its processing and addressing the issue. Any person having any grievance related to the project can use the IT platform to share his / her grievance to the appropriate project authority for amicable solution. The decision, made by the appropriate authority, based on available facts and figures will be communicated back to the concerned person using the same platform.

In the official web site of the project, there will be a space for placing grievance. An aggrieved person can post his/her grievance in the specified space and submit it. Posting of grievance in the specified area will be structured and the aggrieved person has also to upload the decisions of the local institutions for solution. Areas of grievance may be selected from a pre-designed dropdown list (district, block, GP, Tank, list of anticipated grievances type etc.) or it may be kept open for persons to fill-up (will be finalized based on the design of the web site). The GRC at the state level will examine each case and appropriate step will be taken by the GRC.

10.4 Recording of Grievances and its Dispose-off

From PP / FPO to DLPMT, at every stage the grievances received, number of grievances addressed, time consumed for decision making and decision of the PP / FPO and other community institutions related to the raised grievance would be documented. In case of IT based grievance redressal mechanism or use of toll-free number, such aspects will be electronically recorded for future review.

10.5 Addressing Grievances of Service Providers

The grievances of service providers, procured as per the World Bank Procurement Guidelines and resource agencies partnering with PMU through MoU will be governed as per their contract conditions and condition of the MoU.

Chapter Eleven: Environment and Social Safeguard Measures

11.1 Environment Management Framework:

An environmental assessment was carried out to develop a management framework to address any adverse environmental impact, that may origin due to the implementation of the project. Baseline, both for physical as well as biological environment within tank and tank command area were thoroughly assessed to ascertain significant environmental issues which may cause threat to project or vice versa. During preparation of the environmental management framework (EMF), stakeholder consultations and discussions were held with community-based organizations such as Pani Panchayat (PPs), Farmer Producer Organizations (FPOs), women's groups, fisherfolk etc. Discussions were also held with key institutions of Government of Odisha, including Department of Water Resources, Directorate of Agriculture and Food Production, Directorate of Horticulture, Directorate of Fishery, State Dam Safety Organization (SDSO) among others. The safe guard policies of the world bank triggered by the project are (1) environmental assessment (OP/BP 4.01), (2) natural habitat (OP/BP 4.04), (3) pest management (OP 4.09), (4) physical cultural resources (OP/BP 4.11), (5) indigenous people (OP/BP 4.10) and (6) safety of dams (OP/BP 4.37).

The assessment finds that irrigation coverage of the minor irrigation projects (MIPs) have decreased significantly due to accumulation of aquatic weeds and silt deposit. MIPs to be re-sectioned and aquatic weed to be removed to maintain sustainable irrigation supply and promotion of aquaculture in MI tanks.

The key risks associated with the project financed activities include; the incremental use of pesticide and fertilizer, safety of existing large dams, water quality impacts associated with aquaculture and pesticide and fertilizer application, general construction impacts, and silt management associated with civil works in the rehabilitation of tanks and irrigation systems. The focus of the project is to rehabilitate and modernizing existing irrigation systems, hence activities will be limited and localized and managed with proper mitigation measures and good engineering design and construction management practices. A detailed analysis of safeguard issues and impacts associated with the project has been carried out as part of the preparation of Environmental Management Framework. The assessment reveals no large scale, significant and/or irreversible impacts due to the proposed project interventions. The project will avoid undertaking any activities that will cause negative impacts on natural habitats and sensitive environmental receptors.

The state has an effective dam safety programme in place, with a dam safety panel constituted, and institutional arrangements have been agreed with Govt. of Odisha (GoO) for OIIPCRA. The project will need to implement a robust capacity building programme across all implementing agencies to support an effective environment, health and safety management practices, dam safety and construction. Further, an environmental management plan has been prepared for all civil works, which will be integrated in the contractual documents. The EMF addresses the policy requirements on Dam Safety, Integrated Pest Management and Integrated Nutrition Management. The World Bank guidelines on Environment Health and Safety management will be followed to strengthen safeguards during implementation of civil works. Detail mitigation measures to address all related environmental issues like disposal of silt, weed waste and C&D waste generated from construction and renovation work is developed. Management plan for integrated pest and nutrition management, aquaculture is also developed to promote modern sustainable climate resilient practices.

Construction management plan, that is prepared for the project will be adhered to address anticipated adverse environmental impact due to construction related activities proposed under OIIPCRA. The

project will follow the dam safety management plan which includes regular maintenance and monitoring of dam safety related issues of 13 MIPs that are having dam height more than 10 meters.

Eventually, project will adopt certain avoidance principle to eliminate any adverse impact on forest and catchment area. Construction of any new canal, any intervention in forest land, eco-sensitive zone will entirely be avoided. Implementation responsibility of these management plan is given mainly to associated implementing departments, their successor entities or contractors.

The State Project Monitoring Unit (SPMU) established for the implementation of the project will be responsible for day-to-day management and coordination of project activities. At the SPMU level, there will be Environment Expert who will monitor the environment safeguard principles and report to the Project Director on periodic basis. The sub-SPUs will support in implementing the safeguards and monitoring the safeguard measures taken at local level. At the district level, the District Level Project Monitoring Team (DLPMT) will look after the environmental aspects along with PD-ATMA. The environmental expert will support implementation of the EMF at state level, and will carry out the requisite monitoring, reporting, and capacity building activities. The project will have a detail capacity building plan to enhance capacity of officials and member of community organizations for successful implementation of mitigation measures. Training will be provided to farmers, members of PP, SHG, PFCS, etc. on implementation of Integrated Pest and Nutrition Management Plan (IPNM), sustainable climate resilient agriculture and pisciculture practices.

Periodic monitoring of environmental parameters will be carried out by the Executive Engineer of respective Minor Irrigation (MI) divisions. The environmental parameters to be assessed are air quality, surface water quality, soil and noise quality while implementation work is in progress.

11.2 Social Management Framework:

As a part of preparing Social Management Framework, social assessment was objectively carried out to assess the social impacts of the project. The assessment was followed by preparation of management frameworks, including Tribal People's Plan Framework (TPPF) and Gender Action Plan as a part of overall Social Management Framework (ESMF) of the project, adhering to the Government Acts / Policies, World Bank Operational Policy (OP) and need of the project. The Social Assessment (SA) was carried out, to identify and assess potential social risks and prepare social management framework (SMF) to avoid and mitigate potential adverse social impacts of the project, if any. Along with this, the overall objective also suggests interventions to enhance the potential positive social impacts of the project interventions. In TPPF, attempt is made to ensure inclusion of tribal in the overall development process and initiating appropriate measures to protect their interest in accordance to the constitutional safeguard measures.

The Social Assessment (SA) results revealed that the program interventions will not affect adversely to the people in general and community level stakeholders in particular. Impacts shall be positive which is widely acknowledged by the people in tank command villages. However, the project will have planned effort for inclusion and equity so as to ensure that marginal and small farmers, women farmers, fishers, women in general, tribals and other marginalized groups participate in the project and derive positive benefits. Accordingly, the Social Management Framework (TPPF) is developed to address key social issues identified in the process within the scope of the project.

The assessment finds different concerns and expectations of people of which some of the needs that are within the scope of the project are like (1) reorganization of the PP, (2) conducting regular election of the PP and its strengthening, (3) participation of women in PP governance, (4) inclusive targeting of women farmers and tribals under project activities, (5) strengthening PFCS through capacity building measures, (6) access to different schematic provisions of government, facilitated by PP, (7) provisioning supportive livelihood options, (8) improving water availability during Kharif (dry

spell) and Rabi, (9) improving farm mechanization, (10) organizing farmers for improved market access etc.

With reference to the expectations of the people in general and farmers and other stakeholders in particular, project will take certain measures that will benefit the people in a longer term. Key project measures cover (1) consultation and local planning to address the key issues pertaining within the scope of the project, (2) improving participation / representation in the local institutions, (3) appropriate targeting for inclusion of women, tribals and other marginalized sections in different project framed activities, (4) capacity building of marginal and small farmers, women farmers, women fishers, tribals in different aspects such as climate resilient farming system, fish farming, post-harvest management, agribusiness etc., (5) facilitating convergence with existing schemes / programs of the Govt., (6) strengthening community institutions of people like PP / WUA, FPOs, PFCS, women SHGs etc. for effective governance and quality service delivery, (7) creating infrastructural facilities for post-harvest management and agribusiness to enhance income of the farmers, (8) harvesting fishery potentials of the tanks and involving local PFCS, (9) greater association of women fishers in ornamental fish production and marketing, (10) reducing input cost by promotion of vermicompost, integrated nutrition management, integrated pest management, farm mechanization etc. (11) improving livelihood of women and poor households through supportive horticultural measures, such as mushroom cultivation, establishing small processing units, promoting nutritional garden, lemon grass cultivation and oil extraction etc.

The CB & ID Specialist at the SPMU level will be the responsible person to guide the overall process related to social inclusion, equity, participation of different category of people in the project activities and their greater association in the development process. The district / sub-district level implementing agencies will execute and monitor different aspects of the social management framework in consultation with the specialist. She / he will be associated in the screening process of such activities that require greater involvement of women and tribals and/or need special focus on women / tribal / marginalised section's involvement. She/he will monitor the processes followed in execution of the planned activities and realisation of key social development indicators.

The project will have grievance redressal mechanism in place to take care of grievances of the people, if any arises during the life of the project. The overall framework for redressal of grievances at appropriate levels of the project implementation structure are (1) Tier I: at the local community level through people's institutions such as PP, FPO, PFCS etc., (2) Tier II: at the district level through DLPMT, (3) Tier III: at the ADM / Collector & DM level, and (4) Tier IV: at the state level through project authorities.

Table 103: Social Management Framework by Social Dimensions

SN	Social Dimensions	Project Approach and Strategy
1	Inclusion and Equity	<ol style="list-style-type: none"> 1. Conducting local level planning and identification of Poor / Vulnerable families through local planning process; 2. Consultation with identified vulnerable sections to map their key expectations and linking it with project provisions for wider coverage; 3. Appropriate targeting for inclusion and equity; 4. Additional support provision under the project as per the schemes / program guidelines (schematic support / subsidy); 5. Monitoring / tracking of project benefits accessed by the identified marginalised / vulnerable sections; 6. Encouraging participation of such sections in different community level institutions / organisations;
2	Participation and Ownership	<ol style="list-style-type: none"> 1. Sensitisation / awareness creation on project objectives, activities and its expected outcome;

SN	Social Dimensions	Project Approach and Strategy
		<ol style="list-style-type: none"> 2. Special drive for participation of marginal & small farmers, women farmers and tribals in the meetings, trainings etc.; 3. Facilitate representation in different community organisations for their participation in decision making; 4. Consultation from time to time during implementation of activities and addressing their needs within the project frame; 5. Involving them in local level benefit monitoring and supervision;
3	Transparency and Accountability	<ol style="list-style-type: none"> 1. Wall writing / display of key activities, target mass and its benefits; 2. Proactive disclosure of information to the local people through display and sharing of information; 3. Providing information to people asking for information; Sharing information in EC meeting and GB meeting of the PP / FPO / PFCS; 4. Conducting audit on annual basis and appraising the audit findings with the members;
4	Strengthening People's Institutions	<ol style="list-style-type: none"> 1. Assessment of local institutions, such as PP, FPO, PFCS, SHGs etc. and identification of areas that have the potential to improve their functioning; 2. Facilitate in making people's institutions representative in nature from different social groups and economic backgrounds (marginal / small farmers, women farmers, tribal etc.); 3. Capacity building of the institutions to strengthen their functioning (training, exposure, demonstration); 4. Hand holding support to the institutions as per the requirement; 5. Periodic assessment of their functioning, identification of gaps and organising refreshers from time to time.
5	Tribal Development	<ol style="list-style-type: none"> 1. Consultation with tribals in general and particularly with tribal farmers, tribal women and fishers from tribal community; 2. Adequate consultation with tribals in scheduled area; 3. Facilitation and support to local planning for tribal inclusion; 4. Collaboration and convergence with tribal development schemes, where ever feasible, in scheduled areas; 5. Representation of tribal in local level institutions like PP, FPO, PFCS etc. including dispersed tribals in non-scheduled areas; 6. Adherence to schematic and constitutional provisions stipulated for tribal welfare and development; 7. Inclusive targeting for greater inclusion and accessing project benefits;
6	Participation of Women	<ol style="list-style-type: none"> 1. Consultation with women farmers, women groups (SHG and their federations) and other stakeholders like women fishers, traders, entrepreneurs etc. from different economic and social groups; 2. Preparation of local plan covering women component and their greater participation in different project activities; 3. Collaboration and convergence with women development schemes, where ever feasible; 4. Facilitation for higher representation of women in local level institutions like PP/WUA, FPO, PFCS etc.; 5. Prevention of girl child involvement in civil / construction works. 6. Adherence to women safety and security principles in work

SN	Social Dimensions	Project Approach and Strategy
		places; 7. Application of equal wage for equal work norm in all project activities; 8. Promotion of women friendly farm machineries (in CHC) and agricultural technologies; 9. Appropriate targeting for greater inclusion of women in accessing project benefits; 10. Special livelihood promotion drives for women groups / individual women entrepreneurs in shape of nutritional garden, mushroom culture, lemon grass cultivation, establishment of small / mini processing units etc.
7	Capacity Development	1. Capacity need identification of different stakeholders (Marginal farmers, small farmers, women farmers, tribal farmers etc.), including local level institutions (PP, FPO, PFCS, women SHGs etc.); 2. Designing capacity building plan, considering the identified needs of different stakeholders; 3. Preparing training modules / manuals and imparting training; 4. Exposure visit to demonstrated successful ventures for learning, adoption and replication; 5. Handholding support to individuals, community institutions / organisations for effective functioning; 6. Periodic assessment and organising refresher training / workshops;
8	Collaboration and Convergence	1. Need based collaboration with related line departments / private institutions / ICAR institutions / NGOs etc. as per the requirement of the project; 2. Fostering convergence with related schemes for wider coverage and outcome.

Note: Refer EA-EMF and SA-SMF for details.

Chapter Twelve: Project Budget

12.1 Budget Abstract

Table 104: Budget Abstract

Component	Sub-Components	Pre-Appraisal Budget (million US \$)	New PAD (million US \$)	After Appraisal Costs (million US \$)	Component Cost	Component Share (Percentage)
A	A1.1	31.96	32.3	32.23	74.44	31.78
	A1.2*	5.48	5.5	5.54		
	A1.3**	39.35	39.5	36.67		
B	B	137.21	142	137.42	137.42	58.67
C	C	11.06	5	9.55	9.55	4.08
D	D	12.87	10	12.83	12.83	5.48
Total		237.9	234.3	234.2	234.2	
(**) Business Plan financing under comp A1.3 (USD Million)				26.31		
(*) Stage-II funding under Aquaculture comp. A1.2 (USD Million)				0.86		

12.2 Budget for Component 1: Sub-Component 1.1

Table 105: Budget for Sub-Component 1.1

S N	Activities	Unit	Physical						Unit Cost	Financial (In lakhs)					
			2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024- 25		Total	2019- 20	2020- 21	2021- 22	2022- 23	2023- 24
A	Strengthening Extension Delivery System														
A.	AE Network Development (for 500 AEs)														
1	Hiring of a Support Organisation for AE mobilisation / Incubation														
	CB Module development for Agri Entrepreneur & Extension Service Providers	No.	2					2	5	10.0	0.0	0.0	0.0	0.0	10
	Service charge to other institutions for specialised training to Agri Entrepreneur (Classroom trainings)/a.5	LS							50						50
	Procurement of smart devices for the AEs and Software Development	AE No.	350	150				500	0.1	35.0	15.0	0.0	0.0	0.0	50
	Honorarium for the AEs under training (for 54 days- 12+42)	AE No.	350	150				500	1.2	420.0	180.0	0.0	0.0	0.0	600
	Honorarium for the AEs under Incubation (for 1 year@5000 INR / Month)	AE No.	350	150				500	0.6	210.0	90.0	0.0	0.0	0.0	300

Project Implementation Plan: OIIPCRA

S N	Activities	Unit	Physical						Unit Cost	Financial (In lakhs)							
			2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024- 25		Total	2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024 -25	
	TA for review of AE Model	LS							10	10	5				25		
	Sub-Total								685.0	295.0	5.0	0.0	0.0	0.0	1035.0		
A.	Strengthening existing extension system through																
2	ATMA / FIAC / KVK's																
	Audio Visual Equipment to KVKs /a6	LS							10	10	10				30		
	Equipment and Maintenance cost for FIAC office /a7	LS							431.2	235.2	235.2	235.2	235.2	235.	1607.2		
	Sub-Total								441.2	245.2	245.2	235.2	235.2	235.	1637.2		
															2		
B	Promotion of Climate Resilient Seed Varieties																
	Stakeholder Consultations (Demand estimation and Action Plan) /a.4	LS	1			1			10.0			10.0			20.0		
	Engagement with Partners (NRRRI, IRRI, OUAT, ICARDA, etc.)	LS															
	Seed demonstration / Testing / Production Support / Certification / Distribution	LS							1500.0	1500.0	1500.0	1500.0	500.0	0.0	6500.0		
	Sub-Total								1510.0	1500.0	1500.0	1510.0	500.0	0.0	6520.0		
C	CROP DIVERSIFICATION & DEMONSTRATION																
	Integrated Farming System	No.		102	102	102	34	341	0.38	0.0	38.4	38.4	38.4	12.8	0.0	128	
	<i>On Farm demonstration</i>																
	Demonstration of Climate Resilient Crops/Varieties	No.		512	512	512	171	1707	0.450	0.0	230.4	230.4	230.4	76.8	0.0	768	
	Varietal Demonstration (illustrative list only)																
	Hybrid vegetable cultivation	No.		660	660	660	220	2200	3	0.0	1650.0	1650.0	1650.0	550.0	0.0	5500	
	Demons. For diversification of ID crops	No.		512	512	512	171	1707	0.50	0.0	256.0	256.0	256.0	85.3	0.0	853	
	Agronomic Practice/Package of practice (illustrative list only)	No.		1712	1712	1712	571	5707	0.40		684.8	684.8	684.8	228.3	0.0	2283	
	Soil Fertility Management (illustrative activities only)																
	INM/IPM	No.		512	512	512	171	1707	0.40	0.0	204.8	204.8	204.8	68.3	0.0	683	
	Sub-Total								0.0	3064.4	3064.4	3064.4	1021.5	0.0	10214.8		
E	Capacity Building of Farmers / Producers (by DOA & FP)																
	Farmer Field School training(FFS) /a.1	No.	484	1211	1211	968	968	0	4842	0.40	193.7	484.2	484.2	387.4	387.4	0.0	1936.8
	ToT /a.2	LS									50.0					50.0	
	Farmers Training on Climate Resilient Agricultural	Batch	40	100	100	80	80	0	400	1.80	72.0	180.0	180.0	144.0	144.0	0.0	720.0

Project Implementation Plan: OIIPCRA

S N	Activities	Unit	Physical						Unit Cost	Financial (In lakhs)							
			2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024- 25		Total	2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024 -25	
	Practices/a.3																
	Training of Lead farmer (including Krushak Sathis, etc.)	Persons	1500	2000	2000	2000	0	0	7500	0.011	16.5	22.0	22.0	22.0	0.0	0.0	82.5
	Exposure visit of farmers	Persons	1000	500	500	500	50		2550	0.048	48	24	24	24	2	0	122
	Sub-Total										332.2	686.2	686.2	553.4	531.4	0.0	2911.7
F	Project Management																
F.1	Incremental Cost (Agriculture)																
	Office Accessories (State Level) (Computer / Printer / Laptop etc)	LS									5	1	1	1	1	1	10
	Hiring of Vehicle (State Level)	LS									2.4	2.4	2.4	2.4	2.4	2.4	14.4
	Travel Allowance (TA/DA)	LS									15.0	15.0	15.0	15.0	15.0	15.0	90.0
	Operating Cost	LS									1.0	1.0	1.0	1.0	1.0	1.0	6.0
	Sub-Total (F1)										23.4	19.4	19.4	19.4	19.4	19.4	120.4
F.2	Incremental Cost (Horticulture)																
	Office Accessories (State Level) (Computer / Printer / Laptop etc)	LS									5	1	1	1	1	1	10
	Hiring of Vehicle (State Level)	LS									2	2	2	2	2	2	14
	Travel Allowance (TA & DA)	LS									15	15	15	15	15	15	90
	Operating cost	LS									1	1	1	1	1	1	6
	Sub-total (F2)										22	18	18	18	18	18	120
	Sub-Total (E1+E2)										45.8	37.8	37.8	37.8	37.8	37.8	240.8
	Total										3037.6	5848.0	5558.0	5420.2	2345.2	292.4	22559.5
	*a.1 3 crops with 3 trainings for 538 tanks Stationaries, contingencies, utilities & Services																
	*a.2 Some of this fund will be used for Training of Trainers, materials printing, training centre booking, lodging/boarding, miscellaneous .																
	Office Refurbishment																
	a.3 No. of batches = 373, i.e.10% (56000*2.5 acre/1.25*30), where 1.25 acre is the average land holding and 30 is the batch size. The cost is inclusive of module preparation and printing of training materials. Around 11200 farmers will be trained																
	Furniture																
	*a.4 Engagement with Partners (NRRI, IRRI, ICARDA, OUAT, OSSC, etc.																
	Vehicle																
	*a.5 This includes printing of training material																
	Mobility Charges (TA/DA)																
	*a.6 There are around 15 KVKs in the project area																
	Desktop/Laptop/Accessories/maintenance																
	*a.7 There are 98 FIAC office in project area																
	Other Office Equipment and Maintenance																

12.3 Budget for Component 1: Sub-Component 1.2

Table 106: Budget for Sub-Component 1.2

SN	Activities	Unit	Physical							Unit Cost	Financial (In Lakhs)						
			2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total		2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total Cost
A	FISH SEED PRODUCTION																
A.1	Infrastructural Support to OPDC- Modernizing Fish Hatchery - at Chiplima, Katphal and Bhanjanagal by OPDC	Nos.	1	2	0	0	0	0	3	15	15.00	30.00	0.00	0.00	0.00	0.00	45.00
A.2	Portable Community Fish Hatcheries - at 30 locations in the project area by Communities	Nos.	10	10	10	0	0	0	30	1.5	15.00	15.00	15.00	0.00	0.00	0.00	45.00
A.3	Pure line breeding: Germ Plasm improvement programme by OPDC in 10 select hatchery locations in the project area	Nos.	1	0	0	0	0	0	1	50	50.00	0.00	0.00	0.00	0.00	0.00	50.00
A.4	Fish Seed transportation system - 3 Nos of seed transportation vans with carrier crates at Chiplima, Katphal and Bhanjanagal by OPDC	Nos.	1	2	0	0	0	0	3	10	10.00	20.00	0.00	0.00	0.00	0.00	30.00
A.5	Fish feed for Seed production	No.	3	0	0	0	0	0	3	25	75.00	0.00	0.00	0.00	0.00	0.00	75.00
	Sub-total										165.00	265.00	15.00	0.00	0.00	0.00	245.00
B	FISH FEED																
B.1	Establishment Of Mini Fish Feed Mill by OPDC	No.	4	4	4	0	0	0	12	2	8.00	8.00	8.00	0.00	0.00	0.00	24.00
	Sub-total										8.00	8.00	8.00	0.00	0.00	0.00	24.00
C	FISH PRODUCTION																
C.1	Tank Culture Of IMC(Indian major carps) - MI: It is presumed that no production is currently undertaken in these tanks- to be implemented by CIFA / CIFRI / OPDC / and other ICAR Institutes like IIWM	Ha.	200	200	200	100	100	0	800	1.5	300.00	300.00	300.00	150.00	150.00	0.00	1200.00
C.2	Polyculture with Mola / Scampi in selected MI tanks along with IMC covering 1000 Ha of the tank by CIFA / OPDC	Ha.	100	150	200	250	150	150	1000	0.3	30.00	45.00	60.00	75.00	45.00	45.00	300.00
C.3	Demonstrations to be supported																
	(i) Gift Tilapia Culture demonstration in select areas by OPDC	Ha.	0	10	10	20	20	20	80	1.5	0.00	15.00	15.00	30.00	30.00	30.00	120.00
	(ii) Pangasius culture demonstration in select tanks in the project area by OPDC	No	10	10	10	0	0	0	30	4	40.00	40.00	40.00	0.00	0.00	0.00	120.00
	(iii) Climate resilient aqua - culture production models demonstration by CoF, OUAT	No	2	0	0	0	0	0	2	20	40.00	0.00	0.00	0.00	0.00	0.00	40.00
	(iv) Cage culture demonstration in 1 large MI tank by CIFRI / other ICAR Institutes like IIWM	No	0	1	0	0	0	0	1	354	0.00	354.00	0.00	0.00	0.00	0.00	354.00
	(v) Integrated Farming system demonstration by CoF - Including Duckery in 16 select tanks	No	0	4	4	4	4	0	16	5	0.00	20.00	20.00	20.00	20.00	0.00	80.00
C.4	Stocking of self-replicating species by OPDC	No	20	20	20	0	0	0	60	2	40.00	40.00	40.00	0.00	0.00	0.00	120.00
C.5	Strengthening Women Fisher SHG through promotion of Ornamental Fish Culture through FNGOs / Central Institute of Women in Agriculture	No	2	2	2	0	0	0	6	10	20.00	20.00	20.00	0.00	0.00	0.00	60.00
C.6	Net Barricading by CIFA / CIFRI / OPDC / and other ICAR Institutes like IIWM	Mt.	210	220	220	120	120	20	910	0.002	0.42	0.44	0.44	0.24	0.24	0.04	1.82
C.7	CoF pilots	No	1	0	0	0	0	0	1	200	200.00	0.00	0.00	0.00	0.00	0.00	200.00

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Sub-total										670.42	834.44	495.44	275.24	245.24	75.04	2595.82	
D PROCESSING AND VALUE ADDITION																	
D.1 Supply Of ICE Boxes by FISHFED																	
	50LTS	No.	50	50	50	0	0	0	150	0.02	1.00	1.00	1.00	0.00	0.00	0.00	3.00
	100LTS	No.	50	50	50	0	0	0	150	0.075	3.75	3.75	3.75	0.00	0.00	0.00	11.25
	200LTS	No.	50	50	50	0	0	0	150	0.15	7.50	7.50	7.50	0.00	0.00	0.00	22.50
D.2	Establishment of fish processing units in selected locations for value added products (Eg. Filleting, Pickle making, Cutlrl making etc.) - through CIFT / CIWA / FISHFED and any other identified CBOs / NGOs / Agencies	No.	0	1	0	0	0	0	1	25	0.00	25.00	0.00	0.00	0.00	0.00	25.00
D.3	Strengthening Value chain infrastructure - Hygienic fish / fish product transportation - through CIFT / CIWA / FISHFED and any other identified CBOs / NGOs / Agencies (total 4)	No.	0	2	2	0	0	0	4	15	0.00	30.00	30.00	0.00	0.00	0.00	60.00
D.4	Strengthening Marketing Infrastructure - modernization of 2 model kiosks for fish and fish product retailing in PPP mode - through CIFT / CIWA / FISHFED and any other identified CBOs / NGOs / Agencies	No.	2	0	0	0	0	0	2	15	30.00	0.00	0.00	0.00	0.00	0.00	30.00
D.5	Market study by Consulting Agencies through SPU, OIIPCRA	No.	1	0	0	0	0	0	1	20	20.00	0.00	0.00	0.00	0.00	0.00	20.00
Sub-Total										62.25	67.25	42.25	0.00	0.00	0.00	171.75	
E CB of Fishery department																	
E.1 Exposure/ CB of Institutions																	
	Intensive / Semi-intensive fish farming (PFCS)	Fishers	309	309	309	309			1236	0.06	0	18.54	18.54	18.54	18.54	0	74.16
	Scientific Aquaculture Management (PFCS)	Fishers	309	309	309	309			1236	0.06	0	18.54	18.54	18.54	18.54	0	74.16
	Value Addition / Processing / Marketing (PFCS)	Fishers	309	309	309	309			1236	0.06	0	18.54	18.54	18.54	18.54	0	74.16
	Exposure of Women SHGs on Processing/Marketing	Fishers	309	0	0	0			309	0.06	0	18.54	0	0	0	0	18.54
Sub-Total			1236	927	927	927			4017	0	74.16	55.62	55.62	55.62	0	241.02	
F	Support to Fish Tanks in Extra Water Spread Area Created through rehabilitation (Based on assessments and planning in PY4 onwards)	LS											300	300		600	
Sub-total													300	300		600	
Grand Total (A+B+C+D+E+F)										905.67	1248.85	616.31	630.86	600.86	75.04	3877.59	
<i>OPDC: Odisha Pisciculture Development Corporation</i>																	
<i>CIFA: Central Institute of Fresh Water Aquaculture</i>																	
<i>CoF: College of Fisheries</i>																	
<i>Fish Fed: Fish federation</i>																	
<i>CIFT: Central Institute of Fisheries Technologies</i>																	
<i>CIWA: Central Institute for Women in Agriculture</i>																	
<i>CIFRI: Central Inland fisheries research Institute</i>																	

12.4 Budget for Component 1: Sub-Component 1.3

Table 107: Budget for Sub-Component 1.3

SN	Activities	Unit	Physical					Unit Cost	Financial (In Lakhs)								
			2019-20	2020-21	2021-22	2022-23	2023-24		2024-25	Total	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total Cost
A PRODUCE MARKETING SUPPORT																	
	Hiring of Agri-Business Support Organizations (ABSOs)	Nos.	1	1	1	1	1	1	250.0	250.00	250.00	250.00	250.00	250.00	250.00	1500.00	
	Hiring an agency for Thematic Studies (Value Chain Assessment etc)*a.4	No.	1	1	1	1	1	1	150	150.00	150.00	150.00	150.00	150.00	150.00	900.00	
	Technical Assistance (OSAM Board) /a.1	LS								1000.00	500.00	500.00	50.00	50.00	50.00	2150.00	
	Sub-Total									1400.00	900.00	900.00	450.00	450.00	450.00	4550.00	
B TRAINING AND CAPACITY BUILDING FOR FARMER GROUPS																	
Training																	
	FG Organisation and Governance	No.		73	73				146	0.20	0.0	14.6	14.6	0.0	0.0	29.2	
	Business Management / Marketing skills	No.		73	73				146	0.20	0.0	14.6	14.6	0.0	0.0	29.2	
	Statuary (Financial Management/Book Keeping /Documentation)	No.		73	73				146	0.20	0.0	14.6	14.6	0.0	0.0	29.2	
	Need Based Skills Training (Aquaculture, Specialised training, etc.)	No.		73	73				146	0.20	0.0	14.6	14.6	0.0	0.0	29.2	
	Sub-Total									0.0	58.4	58.4	0	0		116.8	
Exposure Visits																	
	Within State	Persons	0	1095	1095	1095	0		3285	0.21	0.0	200.0	200.0	200.0	0.0	600.0	
	Outside State	Persons	0	1095	1095	1095	0		3285	0.21	0.0	230.0	230.0	230.0	0.0	689.9	
	FG training Total									0.00	429.95	429.95	429.95	0.00	0.00	1289.85	
C BUSINESS PLAN FINANCING IN PRIORITISED CATEGORIES																	
Productive Investments																	
i	Investment plan financing	Ls							500		500.00	2000.00	4300.00	4700.00	5000.00	3200.00	19700.00
	Total									1900.00	3388.35	5688.35	5579.95	5450.00	3650.00	25656.65	

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SN	Activities	Unit	Physical					Unit Cost	Financial (In Lakhs)							
			2019-20	2020-21	2021-22	2022-23	2023-24		2024-25	Total	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	*a.1 This includes Buyer-Seller Interface to strengthen the productive alliance, Linking Agriculture Markets with E-NAM / Other electronic marketplace.															
	*a.2 Primary processing unit for vegetables, fruits, lemon grass, dal mill, oil mill, millet processing and any other processing unit as per requirement. This also includes Functional Pack house and cold room solar.															
	*a.3 Rural Haats/Procurement shed/Transit point storage and Other demand driven rural marketing infrastructure															
	*a.4 Note: Thematic Studies															
	Soil Organic Carbon and Carbon Foot Print of the Project															
	Water Management and Water Productivity															
	Basin / Sub-Basin Planning and Its Management															
	Farmer's Income Growth and Sectoral Share															
	Crop Water Budgeting, Irrigation Automation and Its Implication on Water Availability															
	Climate Resilient Practices, Its Adoption and Impact															
	Traditional Vs Integrated Farming System and its Economic Outcome															
	Cost-Benefit Analysis of Natural Farming System															
	Current and Potential of Commodity Specific Value Chain															
	Any other study as identified during the project Implementation															
	*a.5 Support such as Perforated Van/Refrigerator Vehicle (Solar)															

12.5 Budget for Component 2:

Table 108: Budget for Component 2

SN	Activities	Unit	Physical					Total	Unit Cost	Financial (In lakhs)						
			2019-20	2020-21	2021-22	2022-23	2023-24			2024-25	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
A	Improving access to Irrigation and Water productivity - Tank System Improvement															
	Civil Works	Ha	11240	22480	16860	5620		56200	1.44	16185.6	32371.2	24278.4	8092.8	0.0	0.0	80928.0
	Quality Control	Ls								100.0	100.0	100.0	100.0	100.0	100.0	600.0
	Catchment treatment and Cascade Level Organization provision while implementing cascade plan	Ha	6000	12000	9000	3000		30000	0.35	2100.0	4200.0	3150.0	1050.0	0.0	0.0	10500.0
	Sub-Total (1)									18385.6	36671.2	27528.4	9242.8	100.0	100.0	92028.0
B	Consultancies															
	Cascade Planning, Preparation of DPR and PP mobilisation /a.5	LS	1							400.0			0.0	0.0	0.0	400.0
	IWRM Pilot	LS	1							400.0						400.0
	Improving Service delivery through PPP mode in Medium and Large-scale tanks	LS										700.0				700.0
	Support to State Dam Safety Expert Panel	Visits	78	78	78	78	78	468	0.4	31.2	31.2	31.2	31.2	31.2	31.2	187.2
	Support for the preparation of groundwater regulation	LS		1						600.0		600.0				600.0
	Sub-Total (2)									831.2	631.2	31.2	731.2	31.2	31.2	2287.2
D	SUPPORT TO WATER USER / PANI PANCHAYAT Members															
	Support to the PP cell at State									50	50	50	20	20	20	210
D.1	Training															
	Training of SO for Baseline preparation (4 day)/a.2	Persons	100					100	0.06	6.4	0.0	0.0	0.0	0.0	0.0	6.4
	Development of baseline & PP/WUA of the 538 tanks by SO	Tank	163	200	175			538	0.03	4.9	6.0	5.3	0.0	0.0	0.0	16.1
	Training need Assessment by SO with technical support from SPMU	Tank	163	200	175			538	0.05	8.2	10.0	8.8	0.0	0.0	0.0	26.9
	Commission oB23:B32f modules (ToT/development of training calendar etc)															
	Training of PP/WUA /a	Persons	4890	6000	5610			16500	0.07	352.1	432.0	403.9	0.0	0.0	0.0	1188.0
	Monitoring and Learning meeting at PP/WUA /a.3	Meetings	1956	4356	6600	6600	4644	2244	0.005	9.8	21.8	33.0	33.0	23.2	11.2	132.0
	Sub-Total (3)									431.3	519.78	500.92	53	43.22	31.22	1579.44
	Exposure and Learning Visit for PP members/a.4	Persons		2750	2750	2750	0	0	0.036	0	99	99	99	0	0	297
	Subtotal (4)									0	99	99	99	0	0	297
	Pani Panchayat Sub Total (3+4)									431.3	618.8	599.9	152.0	43.2	31.2	1876.4
	Total									19648.1	37921.2	28159.5	10126.0	174.4	162.4	96191.6
	*a Water Regulation and Irrigation Management, Leadership programme, Need based training to Young volunteers (6 day training programme)															
	*a.2 2 days practical training in the field,2 days at the state level															
	*a.3Monthly Meeting at the PP organized by PP															
	*a.4 Exposure and Learning visit will be undertaken of the selected members of PP inside and outside the state on good practices on water budgeting, natural farming, O&M etc															
	*a.5 This will include IWRM planning															

12.6 Budget for Component 3:

Table 109: Budget for Component 3

SN	Activities	Unit	Physical						Unit Cost	Financial (In Lakhs)						
			2019-20	2020-21	2021-22	2022-23	2023-24	2024-25		Total	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
A	Project Orientation Programme															
	Induction training for project personal (3 days) /a.10	Events	8					3	24							24.00
	Project Launch and consultation workshop at the state level /a.11	Events	1					5	5							5.00
	Consultation meeting at district level /a.12	Events	15					0.6	9							9.00
	Sub-total (1) - TSO Total								38.00	0.00	0.00	0.00	0.00	0.00	0.00	38.00
B	Training Module Development															
	Module Preparation /a.2	Modules	8					8	5	40.00	0.00	0.00	0.00	0.00	0.00	40.00
	Development of Training Materials/a.3	LS								132.40	0.00	0.00	0.00	0.00	0.00	132.40
	Digital communication /a.4	Number								50.00	25.00	25.00	0.00	0.00	0.00	100.00
	Printing of posters/wall paintings etc	Copies								10.00	10.00	10.00	10.00	10.00	10.00	60.00
	Sub-Total (2)									232.40	35.00	35.00	10.00	10.00	10.00	332.40
C	Department official capability enhancement															
C1	Technical Training of field officials of Agriculture, Horticulture, Fisheries from district and block level															
	Training of project officials (3 days) /a.9	Persons	399					0.07	27.93	0.00	0.00	0.00	0.00	0.00	0.00	27.93
C.2	Irrigation															
	Development of CB framework	Number	1					1	10.0							10.0
	Advanced Technical trainings in Hydrology/related discipline of the Engineers (Training at premier institution, departmental institutions or any other identified agencies)	Trainings		1	1	1	1	4	150	0.0	150.0	150.0	150.0	150.0	150.0	750.0
	Sub-Total (3) (C1+C2)									37.93	150.00	150.00	150.00	150.00	150.00	787.93
	Exposure Visit															
C.2	Agriculture															
	Training, Study tour of technical staff/ field functionaries															
		Within state	Persons	20	20	20		60	0.060	0.00	1.20	1.20	1.20	0.00	0.00	3.60
		Outside state	Persons	30	30	30		90	0.500	0.00	15.00	15.00	15.00	0.00	0.00	45.00
		Outside India	Persons	10	10			20	6.00	0.00	60.00	60.00	0.00	0.00	0.00	120.00
	Sub-Total (4) (Agriculture)									0	76.2	76.2	16.2	0	0	168.6
C.3	Horticulture															
	Training, Study tour of technical staff/ field functionaries															
		Within state	Persons	10	10	10		30	0.06	0.00	0.60	0.60	0.60	0.00	0.00	1.80
		Outside state	Persons	10	10	10		30	0.500	0.00	5.00	5.00	5.00	0.00	0.00	15.00
		Outside India	Persons	5	5			10	6	0.00	30.00	30.00	0.00	0.00	0.00	60.00
	Sub-Total (5) (Horticulture)									0	35.6	35.6	5.6	0	0	76.8
C.4	Fisheries															
	Training, Study tour of technical staff/ field															

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SN	Activities	Unit	Physical							Unit Cost	Financial (In Lakhs)						
			2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total		2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total Cost
	functionaries																
	Within state	Persons		20	20	20			60	0.06	0.00	1.20	1.20	1.20	0.00	0.00	3.60
	Outside state	Persons		20	20	20			60	0.500	0.00	10.10	10.10	10.10	0.00	0.00	30.30
	Outside India	Persons		5	5				10	6	0.00	30.00	30.00	0.00	0.00	0.00	60.00
	Sub-Total (6) (Fisheries)										0	41.3	41.3	11.3	0	0	93.9
	<i>(7) Sub Total (3+4+5+6) (Capacity Building of Officials) Total</i>										37.93	303.10	303.10	183.10	150.00	150.00	1127.23
D	Incentive to PP	No. of PP	30	30	30	30	30	30	180	1	30	30	30	30	30	30	180
E	Engaging SO's for social mobilization and coordination with different stakeholders during project implementation	No.	7	7	7	7	7	7	7	0	670.88	656.88	656.88	656.88	656.88	656.88	3955.28
F	Cascade council /a.6	Meetings			3	3	3			1.7			5.1	5.1	5.1	0	15.3
G	Knowledge Management /a.7	No.	1	1	1	1	1				30	30	30	10			100
H	Strengthening Advisory Support at APC level	LS									200.0	200.0	100.0	100.0			600.0
	Strategic Engagement/Promotion cost for APC	LS									50.0	50.0	30.0	30.0			160.0
	<i>/*a.5</i>																
	Agriculture Technology Media Lab (OUAT)	Number	1	1	1	1	1	1	6		50.0	50.0	20.0	20.0	20.0	20.0	180.0
	Sub-Total (8)										1030.9	1016.9	872.0	852.0	712.0	706.9	5190.6
	GRAND TOTAL (1+2+7+8)										1339.2	1355.0	1210.1	1045.1	872.0	866.9	6688.2
Note:																	
Crop Water Budgeting & Crop Planning																	
O&M of Irrigation System																	
Participatory Ground Water Management																	
Cascade/Tank Level Planning (All Sectors)																	
Other Modules as per Need																	
SIRD -State Institute of Rural Development																	
*a SO will be facilitating the formation of the PFCS																	
*b This will be a 1 day training highlighting all the past training activities																	
*a.2 Agencies will be hired as per the subject area.																	
*a.3 Preparation of videos, films																	
*a.4 Digital content development, short films, social media, YouTube channel etc																	
*a.5 Round table conferences, Knowledge events, brainstorming etc.																	
*a6 minimum 3 meetings/training per year , 2 days training each, inclusive of miscellaneous cost																	
*a.7 This include events such as agri fintech etc, content development and consultancy for technical support																	
*a.8 Brainstorming among state officials																	
*a.9 This will include state leve, district level and FIAC level officials, the cost includes training +miscellaneous																	
*a.10 This includes officials SPU staff, SO staff, OIIPCRA cell, department cell, PD-ATMA and team, ABSO team (300 people approx..). Budgeted for 400 people to include all miscellaneous cost.																	
*a.11 This includes District level (15*6) people, 50 state level officials, 10 eminent personalities,miscellaneous 30 around 200 people + Documentation cost																	
*a.12 This includes consultation meeting at all districts																	

12.7 Budget for Component 4:

Table 110: Budget for Component 4

SN	Activities	Unit	Physical						Unit Cost	Financial (in Lakh)						
			2019-20	2020-21	2021-22	2022-23	2023-24	2024-25		Total	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
A	HR COST															
	<i>SPU and DPU level</i>															
	Salary component for Contractual staff	LS														3704.4
	Sub-Total (1)															3704.4
B	Preparation of Integrated Irrigation Agriculture Plans (IIAP)															
	Assessment Study	ls								10.0	0.0	0.0	0.0	0.0	0.0	10.0
	Consultancy for preparation of IIAP	DIIAPs	5	10	0			15	20	100.0	200.0	0.0	0.0	0.0	0.0	300.0
	Sub-Total (2)									110.0	200.0	0.0	0.0	0.0	0.0	310.0
C	Consultancies															
	Baseline Survey	No.	1					1	50	50.0						50.0
	Environmental & Social Assessment	No.	1					1	40	40.0						40.0
	External M & E Consultancy	LS								100.0	100.0	150.0	100.0	100.0	150.0	700.0
	Preparation of PIP / Manuals	No.	1					1	50	50.0						50.0
	Thematic Studies															
	Internal Audit (by CA firm)	LS								25.0	25.0	30.0	30.0	35.0	40.0	185.0
	External Audit (CA firm)	LS								12.0	12.0	12.0	12.0	12.0	12.0	72.0
	HR agency for recruitment of staffs	No.	1					1		111.1						111.1
	Sub-Total (3)									388.13	137.00	192.00	142.00	147.00	202.00	1208.13
D	Establishment Cost															
	APC															
	Stationaries, contingencies, utilities & Services	LS								12.0	12.0	12.0	12.0	12.0	12.0	72.0
	Travel/stay expenses for eminent advisory panel /a.1	LS								10.0	10.0	10.0	10.0	10.0	10.0	60.0
	Office Refurbishment	LS								50.0						50.0
	Furniture	LS								10.0	10.0	10.0	2.0			32.0
	Mobility Charges (TA/DA)	LS								6.0	6.0	6.0	6.0	6.0	6.0	36.0
	Desktop/Laptop/Accessories/maintenance	LS								10.0	3.0	3.0				16.0
	Other Office Equipment and Maintenance	LS								10.0	1.0	1.0	1.0	1.0	1.0	15.0
	SPMU and S-SPMU															
	Stationaries, contingencies, utilities & Services	LS								24.0	12.0	12.0	12.0	12.0	12.0	84.0
	Office Refurbishment	LS								50.0						50.0
	Furniture	LS								20.0	20.0	10.0	10.0			60.0
	Vehicle	No.	2						10	20.0						20.0
	Mobility Charges (TA/DA)	LS								10.0	10.0	10.0	10.0	10.0	10.0	60.0
	Desktop/Laptop/Accessories/maintenance	LS								30.0	5.0	5.0	5.0	5.0	1.0	51.0
	Other Office Equipment and Maintenance	LS								30.0	5.0	5.0	5.0	5.0	5.0	55.0
	ATMA/MI Office *a.2															
	Stationaries, contingencies, utilities & Services	LS								36.0	36.0	36.0	36.0	36.0	36.0	216.0

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SN	Activities	Unit	Physical						Unit Cost	Financial (in Lakh)								
			2019-20	2020-21	2021-22	2022-23	2023-24	2024-25		Total	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total Cost	
	Furniture	LS								30.0	7.5	7.5	7.5			52.5		
	Mobility Charges (TA/DA)	LS								102.0	102.0	102.0	102.0	102.0	102.0	612.0		
	Desktop/Laptop/Accessories/maintenance	LS								30.0	5.0	5.0	5.0	5.0	5.0	55.0		
	Other Office Equipment and Maintenance	LS								18.0	18.0	18.0	18.0	18.0	18.0	108.0		
	Sub-Total (4)									508	263	253	242	222	218	1705		
E	Capacity Building/Workshop/Seminars																	
	Project orientation Training/Workshop																	
	Technical Training																	
	Training of Field Level Officials / SPMU Experts/Dept Cell Experts /a.3	Persons		100	100	100	50		350	0.09	0.0	9.0	9.0	9.0	4.5	0.0	31.5	
	National Level Exposure Visit/Seminars/Workshops etc	Persons		25	25	25	10	0	85	1	0.0	25.0	25.0	25.0	10.0	0.0	85.0	
	Overseas Exposure of Experts / Officials (SPMU/S-SPU)	Persons		5	5	5			15	5	0.0	25.0	25.0	25.0	0.0	0.0	75.0	
	Sub-Total (5)			0	130	130	130	60	0	450	6.09	0	59	59	59	14.5	0	191.5
F	Project Management (Review & Monitoring)																	
	Monthly and Quarterly Review Meeting (SPMU/Dept-Cell/District)	LS									4.0	4.0	4.0	4.0	4.0	4.0	24.0	
	Quarterly Monitoring (SPMU/Dept-Cell)	LS									3.0	3.0	3.0	3.0	3.0	3.0	18.0	
	Annual State level Review Meeting	LS									5.0	5.0	5.0	5.0	5.0	5.0	30.0	
	Sub-Total (6)										12.00	12.00	12.00	12.00	12.00	12.00	72.00	
G	MIS / GIS																	
	Equipment and Software	LS									100.0	50.0	25.0	25.0	25.0	25.0	250.0	
	Sub-Total MIS (7)										100.0	50.0	25.0	25.0	25.0	25.0	250.0	
H	Documentation & Dissemination																	
	Documentation of Success Stories	LS									5	5.0	5.0	5.0	5.0	5.0	30.0	
	Audio-Visual Documentation	LS									10		30.0		30.0		60.0	
	Dissemination Workshops	No.			1		1				5		5.0		5.0		10.0	
	Awareness through Electronic Media	Seconds	18000	18000	9000	9000			54000	0	79.2	79.2	39.6	39.6	0.0	0.0	237.6	
	Sub-Total (8)										20.00	84.2	84.2	79.6	44.6	40.0	5.0	337.6
I	ESMF Budget																	
	ESMF Implementation										200.0	200.0	200.0	200.0	200.0	200.0	1200.0	
	Sub-Total (9)										200.0	200.0	200.0	200.0	200.0	200.0	1200.0	
	TOTAL (1+2+3+4+5+6+7+8+9)										1292	805	820	724	661	662	8978	
	*a.2 Total 15 district office																	
	*a.3 Programme management/Leadership programme																	

Annexure

Annexure I: **Terms of Reference (ToR) for Strategic Support to APC Office**

1.0 Background:

The Department of Water Resources (DoWR), Government of Odisha has applied financing from the International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA), The World Bank in the form of a loan or credit towards the cost of Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA). The Project Director, OIIPCRA-OCTDMS-DoWR, Government of Odisha implementing agency of the Client, intends to apply a portion of the proceeds of this loan to eligible payments under the contract for which this Expression of Interest / Request for Proposals is issued. The Client now invites EOI / proposals to provide the consulting services for External Monitoring and Evaluation during the OIIPCRA Project Period (2019-2020 to 2025-2026).

The Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA), funded by World Bank, would be implemented over a period of 6 years in 15 districts of Odisha. The total project cost is 234.70 million US \$.

The **Project Development Objective**(PDO) is “to intensify and diversify agriculture production, and enhance climate resilience in selected districts of Odisha”. The project beneficiaries will include small and marginal farmers, Pani Panchayats, farmer producer organizations and other agro-entrepreneurs.

2.0 Objective:

Office of the Agriculture Production Commissioner (APC), Department of Agriculture and Farmers' Empowerment is the coordinating department for several directorates that is responsible for agricultural development for the state. Considering the importance of the sector for the state, it has been proposed under OIIPCRA to provide support to APC office to help in achieving the intended objective of the project. Office of APC requests for proposal for engagement of a strategic Consulting Firm/ Agency to provide Advisory Support for a period of 3 years. Under this RFP, Agriculture Production Commissioner, Department of Agriculture and Farmers' Empowerment shall select the Consulting Firm for the entire contract period as mentioned in this RFP.

3.0 Scope of Work:

The following are the broader scope of work for consultancy under this program –

A. Agriculture & Allied Sector diagnostic study: The consultants will conduct a baseline survey for detailed assessment of agricultural resources of the State in the following areas

- ▶ Impact assessment of major government schemes and programmes in last 10 years;
- ▶ Ascertain existing marketable surplus of various agricultural, horticultural commodities;
- ▶ A reliable econometrics driven Price forecasting system;
- ▶ Challenges in agriculture & allied sector including likely reforms;
- ▶ Infrastructure availability & need assessment;
- ▶ Opportunities in Trade, Export & Food Processing;
- ▶ Skill Development towards Rural Job Creation in Agribusiness & Food Processing;
- ▶ Policy benchmarking and stakeholders expectation mapping.

B. 5-year Integrated Development Plan for Agriculture & Allied Sector: Based on the findings of diagnostic study, consultants will develop 5-year perspective Plan for 30 districts of Odisha for agriculture & allied sector. Consultants will define Key Performance Indicators for each 30 individual districts based on ranking mechanism.

C. Implementation, Monitoring & Evaluation Support: Consultants would develop an online convergence platform for Agriculture & allied sectors for monitoring & evaluation of the progress.

D. Promotion of Brand Odisha on National & International platforms towards attracting investment and boost private sector participation: Consultants will target 20 major produce in Odisha and shall work towards creating new market linkages through Trade and Export promotion activities (productive alliance). Consultants would reach to top Indian and global institutional buyers to leverage the surplus availability. Consultants would also work towards participation of Odisha in national and international Trade Fairs and Sector events for Joint Ventures, Trade & Export Promotion and Market Linkage.

E. Capacity Building Plan for Department Officials on changing trends in sector as per Global standards: In order to make Odisha Industry and Market ready, Department officials need to be updated on changing global trends and practices. Consultants would prepare Skill Development & Training Calendar customized for local needs.

F. Mentoring support to departmental officials in the PMU, on the business planning, agri-investment promotion, branding and MIS.

The following personnel shall be placed in the PMU:

Position	Role	Qualification and experience
Program Manager	Full time	Minimum 15 Years of experience in Consulting <ul style="list-style-type: none"> • Post-Graduate degree / diploma in Agribusiness / Agriculture Extension Management or related discipline • Domain experience such as Program Management, Agri Business, business development and market linkages, Agribusiness Extension
Agribusiness Expert	Full time	Minimum 10 Years of experience in retail agriculture/consulting and market research <ul style="list-style-type: none"> • Post Graduate in Agribusiness/ Agriculture or related field • Domain experience such as Agri Business, project management, business development and market linkage
Analysts (2)	Fulltime	Minimum 5 Years of experience in Consulting/market research Post Graduate in Business Management
Capacity Building Expert	Fulltime	Minimum 10 Years of experience in Consulting especially in FPO promotion, agri-value chain development <ul style="list-style-type: none"> • Post Graduate in Agri-Business Management or related discipline • Domain experience in Training and Capacity building
IEC expert	Fulltime	Minimum 10 Years of experience in Consulting <ul style="list-style-type: none"> • Post Graduate in Business Management/ Media Management • Domain experience in IEC and awareness Campaigns
Resource Pool		
Economist/Agri-economist	On demand	Proven credential in agri-economics field especially on agri-policy reform, price forecasting, commodity market. Minimum experience 15 years
Climate resilient agriculture planning and policy	On demand	Proven experience in climate resilient agriculture, climate resilient value chain analysis adaptation planning. Minimum experience 15 years
Transaction Advisor	On demand	Minimum 10 Years of experience in Consulting <ul style="list-style-type: none"> • Post Graduate in Business Management • Domain experience in Transaction Advisory, PPP projects
Legal expert	On demand	Minimum 10 year experience on food safety, GI, patent, WTO issues

Annexure II: Terms of Reference for Engagement of Support Organization

1.0 Project Background

The Department of Water Resources, Government of Odisha is in the process of implementing “Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA)” with the support of the World Bank. The Project Development Objective is “**to intensify and diversify agriculture production, enhance climate resilience and improve water productivity in selected cascades of Odisha**”. The proposed project will focus on small and marginal farmers, Pani Panchayats (PP), Farmer Producer Organizations (FPO / FPC), fishers cooperatives (PFCS) and other agricultural entrepreneurs, including women and other vulnerable groups.

The project has four components, i.e., (1) **Project Component A:** Climate-Smart Intensification and Diversification of Production, (2) **Component B:** Improving Access to Irrigation and Water Productivity, (3) **Component C:** Institutional Capacity Strengthening, and (4) **Component D:** Project Management. The Component (A) has three sub-components, i.e., (1) **Sub-component A.1:** Support to Improved Productivity and Climate Resilience, (2) **Sub-component A.2:** Support to Aquaculture Production and (2) **Sub-component A.3:** Support to Diversification and Produce Marketing. Component (B) has two sub-components, i.e., (1) **Sub-Component B.1:** Support to Water Sector Reforms, and (2) **Sub-Component B.2:** Support to Investments in Cascades.

The project is planned to be executed in 15 districts of the State which is 50.0 percent of the total districts of the State (Odisha is having 30 administrative districts). The project has identified 538 minor irrigation tanks which will be taken up for intervention, covering a total geographical area of 1.03 lakh ha. spread over 101 blocks. The project intends to minimize the current gap ayacut, improve water use efficiency, enhance water productivity, strengthening participatory irrigation management system and support in facilitating climate resilience in the tank command and beyond.

2.0 Rationale for Engaging Support Organizations

The State Project Management Unit (SPMU) of the OIIPCRA project intends to engage the services of qualified and competent local agencies as “Support Organisations (SO)” for effective implementation of project activities.

Under the project, SOs will be actively involved in planning, implementing and monitoring of project activities at the Pani Panchayat (PP)/ Water User Association (WUA) and Cascade level. The project envisages engaging SOs for a maximum period of 36 months (three years) initially, which may be extended up to 48 months to facilitate implementation of a series of activities identified concurrent with

the Project Implementation Cycle. During this period, all the tank/cascade-based activities are to be carried out by the PP / WUAs with the direct involvement of SOs (community mobilization, sector specific activities, agribusiness promotion etc.). Each SO may be assigned with 20-25 PP / WUAs in selected cascades or as per the decision of the SPMU, looking at the operational feasibility to facilitate implementation of project activities.

3.0 Eligibility Criteria

11. The organization should be a registered body under the relevant national / state Act and is active and operational continuously for the last 3 years on the date of application;
12. The organization should have maintained its books of accounts / accounting records and have them properly audited. Annual statements of income and expenditure should have been prepared;
13. The organization should have at least 5 years of relevant experience in carrying out social mobilization, livelihood promotion, agribusiness activities and facilitating / promoting community level organizations;
14. The organization should have working experience in farmer's issues, irrigation promotion, agriculture / horticulture and agribusiness;
15. The organization should have a minimum annual turnover of Rs. 50 lakhs, on an average for last three years (as per annual audit statements);
16. The organization should not be on any blacklist of any government (Union and/or State), Ministry / Department / Organization / Multinational Donor NGO or any other donor/partner organization in the past;
17. The agency should be non-political and secular in nature;
18. The agency should have demonstrated experience in community development and in training and capacity development in convergence with government departments and agencies.
19. The organization should have registered office in the State of Odisha. Working experience of the agency in project districts will be added advantage;
20. The Organisation shall have required number of human resources to depute / deploy for project activities.

4.0 Scope of Work

The Support Organization (SO) shall undertake the following specific tasks towards ensuring that the project activities are implemented as per the plan and PP / WUAs become self-sustaining entities managing their tanks in the defined cascade in partnership and with the support of the Water Resources Department. The scope of work of the SO includes, but not limiting, to the followings.

18. **PP / WUA capacity building:** Strengthen the PP / WUAs in achieving each of the activities listed below by assessing their capacity building needs and by providing required inputs.
19. **PP / WUA Book Keeping:** Build the capacity of PP / WUA functionaries in maintaining and regularly updating the PP / WUA level records, including financial records.

20. **PP / WUA meetings:** Ensure that the PP / WUA organizes its monthly meetings, GB meeting and other meetings with the required percentage of participation regularly and maintains proper minutes of the same.
21. **Support for Corpus Fund Generation:** Facilitate the PP / WUAs to raise 100% water user fee and to prepare and implement development plan.
22. **Agriculture and Horticulture Sub-Components**
 - a. Assist in identification of target mass for different project activities and facilitate implementation of crop demonstrations, vermicompost promotion, shadenet nurseries, training, exposure visits etc.
 - b. Coordinate with FIAC, PD-ATMA and respective line departments for mobilizing farmers for the execution of different activities and facilitate its implementation;
 - c. Support farmers to adopt the best practices demonstrated under the project;
 - d. Collect season wise crop productivity and technology adoption data and updating the database periodically;
 - e. Facilitate in selection of agri-entrepreneurs, their training, exposure and promotion of agribusiness activities in project supported commodities;
23. **Fisheries development:** The SO staff shall support the fisheries department in implementing the fisheries sub-component plan in tanks selected for the activity.
24. **Water management and related record keeping:**Facilitate each PP / WUA in undertaking crop planning activity before Kharif and Rabi and organize water management and irrigation scheduling that is rigorously recorded. Support PP / WUA in updating and maintaining farmer-wise, season-wise, crop-wise and cultivated area wise data for both Kharif and Rabi.
25. **Agricultural Production Data to be collected:**
 - a. **Area irrigated:** Collect season-wise time-series data on area irrigated for each tank.
 - b. **Data on average yield:** Collect season wise average yield particulars for three (3) major crops in the identified tank ayacut and in the influence zone (in case of PGM tanks).
26. **Agribusiness and marketing:** Facilitate the FPO / PP / WUA / AEs to promote and strengthen agribusiness activities such as preparation of agribusiness / business plans and implementation of the plan. The SOs will extend required support to Agri-Business support organization (ABSO) and other institutions / organisations associated in the project to strengthen agribusiness activities.
27. **Participatory MLE Activities:**
 - a. **PP / WUA self-rating:** Facilitate the quarterly self-rating exercise by PP / WUAs of their performance.
 - b. **Community feedback:** Seek PP / WUA/community feedback on access and availability of project services on a regular basis so that all PP / WUAs are covered once in six months and report this feedback to PD-ATMA and SPMU on monthly/quarterly reports.
28. **Preparation of IIAP:** The SO will facilitate preparation of Integrated Irrigation and Agriculture Plan (IIAP), covering all the project supported tanks and all the villages within the project

jurisdiction. In the IIAP, SO would facilitate in preparing the plans in agriculture, horticulture, fishery etc.

29. **Project completion documents:** Prepare Project Completion Document, with reference to the IIAP, and its submission to PD-ATMA and SPMU for review and approval.
30. **Reporting:** The SOs have to submit monthly and quarterly action plan and progress report for the preceding month by 5th of every month to FIAC with a copy to PD-ATMA for information.
31. **Success Stories:** The SOs shall prepare and document case studies / documentation of good practices and submit the same to PD-ATMA.
32. **SOs staff** shall work full time exclusively for the project work to accomplish the specific targets fixed by the project on a monthly and quarterly basis. They shall not work in any other project of the SO itself or other Govt./ Private organizations once they are working in this project.
33. **SO staff** shall carry out the project work in consultation with the FIAC under the guidance of the PD-ATMA.

5.0 Staffing:

Each SO is expected to manage all the tanks, within a geographical jurisdiction of around 50 Km. radius. The number of tanks under the geographical jurisdiction may vary based on the concentration of MI tanks. Each SO will deploy 3-5 Cluster Facilitation Team (CFT) at the project locations, based on the requirement of the project. Each CFT will have 4 members team and each one with minimum experience of 5 years in relevant field. Apart from CFT, the SO will also have a Project Management Team to guide the CFT. The core team will comprise of (a) Team Leader (one), (b) Agriculture Expert (one), (c) Agri-Business Expert (one), (d) Fishery Expert (one) and (e) Multi-Skill Assistant (one). Minimum qualification and experience of Project Management Team is presented below.

Position	Minimum Qualification	Experience
Staffing of Cluster Facilitation Team (CFT)		
Team Leader	Graduate in Agriculture or Allied Sectors	<ol style="list-style-type: none"> 1. Minimum 10 years of experience in agriculture / allied sector activities; 2. Experience in project planning and Management; 3. Working experience in Government projects / Externally Aided Projects; 4. Demonstrated capability in imparting training, organizing meetings and facilitating workshops; 5. Working experience with community organisations like producer groups / Primary Fishermen Cooperative Societies / PACS etc. 6. Functional Computer Skills. 7. Proficiency in Odia (added advantage)
Agriculture Expert	Diploma in Agriculture or graduate in Agriculture	<ol style="list-style-type: none"> 8. Minimum 5 years of experience in agricultural activities out of which three years of experience of

Position	Minimum Qualification	Experience
		working at the community level on agriculture / horticulture promotion. 9. Strong training and documentation skills. 10. Functional Computer Skills. 11. Proficiency in Odia
Agribusiness Expert	Degree in agribusiness / agriculture marketing	1. Minimum 3-years' experience in agribusiness 2. Working experience with producer organisations / farmer interest groups / similar other organisations functioning at community level. 3. Strong listening and documentation skills. 4. Functional Computer Skills. 5. Proficiency in Odia
Fisheries Expert	Graduate in Fishery Discipline	1. Minimum 5 years of experience in fishery promotion; 2. Working experience with fishery cooperatives / primary fishery cooperative societies; 3. Strong training and documentation skills. 4. Functional Computer Skills. 5. Proficiency in Odia
Multi-Skill Assistant	Graduation in any Discipline; Diploma in Computer Application	Five years of experience as Office Executive

6.0 Change of Project Staff:

Frequent change of SO staff will not be permitted. Any change, if necessitated, shall be with the prior approval of the PD-ATMA, based on the recommendation of FIAC (if so required).

7.0 Payment to SO:

The SOs will be paid on quarterly basis by the SPMU after submission of invoices / required bills and vouchers (reimbursable expenses) along with quarterly progress report.

8.0 Reporting Requirements:

SO shall submit following reports / documents to PD-ATMA with a copy to FIAC and SPMU.

1. Project inception report, within one month of signing the agreement with the project;
2. Quarterly plan and quarterly progress report
3. Half yearly progress report;
4. Annual plan and annual progress report;
5. Learning cases / good practices document (with photographs)
6. Any other report / document as per the need of the project and communicated by PD-ATMA / SPMU

9.0 Duration of the Assignment:

The total duration of engagement of the Support Organization shall be for a maximum period of 36 months initially, which may be extended up to 48 months. However, there will be annual extension of contract, based on the performance of the SO which will be assessed from time to time by the PD-ATMA.

10.0 Support from the Project:

The Project will undertake the following activities to support SOs in delivering its functions.

1. Provide project related documents to help the SO team to understand the project and its components;
2. Orientation to the SO team, Including Cluster Facilitation Team;
3. Designating a SPMU and PD-ATMA official to co-ordinate and guide the SO's on regular basis;
4. Provide required guidelines and information during the course of the assignment;
5. Other technical support and guidance as and when requested.

Annexure III: Terms of Reference for Agribusiness Support Organisation (ABSO)

1.0 Project Background

The Department of Water Resources, Government of Odisha is in the process of implementing “Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA)” with the support of the World Bank. The Project Development Objective is “**to intensify and diversify agriculture production, enhance climate resilience and improve water productivity in selected cascades of Odisha**”. The proposed project will focus on small and marginal farmers, Pani Panchayats (PP), Farmer Producer Organizations (FPO / FPC), fishers cooperatives (PFCS) and other agricultural entrepreneurs, including women and other vulnerable groups.

The project has four components, i.e., (1) **Project Component A:** Climate-Smart Intensification and Diversification of Production, (2) **Component B:** Improving Access to Irrigation and Water Productivity, (3) **Component C:** Institutional Capacity Strengthening, and (4) **Component D:** Project Management. The Component (A) has three sub-components, i.e., (1) **Sub-component A.1:** Support to Improved Productivity and Climate Resilience, (2) **Sub-component A.2:** Support to Aquaculture Production and (2) **Sub-component A.3:** Support to Diversification and Produce Marketing. Component (B) has two sub-components, i.e., (1) **Sub-Component B.1:** Support to Water Sector Reforms, and (2) **Sub-Component B.2:** Support to Investments in Cascades. The project intends to minimize the current gap ayacut, improve water use efficiency, enhance water productivity, strengthening participatory irrigation management system and support in facilitating climate resilience in the tank command and beyond.

2.0 Project Area

The project is planned to be executed in 15 districts of the State. The project has identified 538 minor irrigation tanks which will be taken up for intervention, covering a total geographical area of 1.03 lakh ha. spread over 101 blocks.

3.0 The Project Period:

The project duration will be of 6 years, starting from 2019-20 and the expected project cycle in each tank / cascade will be of 3to 4 years, depending upon the nature of interventions.

4.0 Need for Agri-Business Support Organisation (ABSO):

The objective of the proposed consultancy assignment is to facilitate and support the implementation of Agribusiness promotion and facilitation activities under OIIPCRA project. The outcomes to be achieved

by the end of the consultancy period are as below. The project will hire the services of suitable Agribusiness Support Organization (ABSO) based on the specified eligibility criteria and as per the need of promoting agri-enterprise / agribusiness activities. The ABSO will be placed at the state / district level and responsible for agribusiness promotion and agri-enterprise support. The ABSO will work in collaboration with producer groups / agri-entrepreneurs etc. and will provide technical and managerial support, as per the needs.

1. Identification of feasible agribusiness investment areas in project districts by carrying out detail assessment and preparation of investment plans;
2. Facilitate modern and commercial practices for sorting, grading, storage, packaging, processing and market linkages of agricultural and horticultural commodities to enhance the value of their produce in order to realize increased income levels for the producers;
3. Development of value-chains of project supported commodities to sustainably increase the income level of farmers of the project areas;
4. Promotion and scaling up of cluster approach by farmers for bulk production of project supported agricultural and horticultural commodities in order to develop an effective model for dissemination of technology & collective marketing of produces;
5. Facilitating implementation of AE model in project,strengthening producer groups and related producers' institutions and upgradation of skill and knowledge base of the stakeholders on agribusiness.
6. Activities related to agribusiness promotion will be taken up by the ABSO, such as conducting diagnostic study, value chain assessment of identified commodities in the project districts, developing model investment plan for the district addressing the gaps in infrastructure / market / technology / input supply based on the diagnostic study /value chain assessment of identified commodities, development of business plans for FPO / FIG / producer groups / agri-entrepreneurs, facilitate in organizing buyer-seller interface on periodic basis, involving the FPOs / PP / entrepreneurs and buyers; establishing forward linkages with potential buyers, business houses, exporters etc.; and facilitate and promote agri-enterprise in project districts, including providing hand holding support.

5.0 Area of Operation

The project will engage one Agribusiness Support Organisation (ABSO) for the specified purpose. The contracted agency, during the contract period, will cover all the 15 project districts and intervention pockets.

6.0 Scope of Work:

The project will engage one Agribusiness Support Organisations (ABSOs) at the State level with outreach to project districts to facilitate agribusiness activities. The ABSO will facilitate, coordination and manage agribusiness activities of all the project districts based on the market potential of different commodities. The ABSO will be selected, following below mentioned criteria.

1. The agency must be having a minimum of 10 years of experience in facilitating / executing agribusiness activities, including business plan preparation, forward and backward linkage establishment, establishing market linkages with national and state level markets, value chain assessment and product specific value chain promotion;
2. Having requisite human resources including experts in agribusiness, finance and marketing;

3. Experience of working in the project State (Odisha);
4. Demonstrated ability in promotion of producer groups, management and business linkage of producer groups.

7.0 Key Roles of ABSO:

Under the scope of the project, the ABSOs will perform following role;

District Level Functions of ABSO:

11. Development of model investment plan for the district addressing the gaps in infrastructure/market/technology/input supply based on the diagnostic study/value chain assessment of identified commodities i.e. (i) Pulses (Green gram, Black gram), (ii) Oil Seeds (Groundnut), (iii) Millets (Finger millet), (iv) Vegetables, and (v) Flowers (Marigold);
12. Providing guidance to FPOs / PP / agri-entrepreneurs on regular basis on post-harvest management, supply chain management and value addition;
13. Establishing market linkage with state and national markets for different agricultural / horticultural commodities;
14. Tracking market price of different commodities and support in linking with remunerative markets;
15. Support FPO / PP / entrepreneurs in building their capacity and management of agribusiness infrastructures;
16. Coordinate with the FPO / PP / entrepreneurs and buyers at the state and national level for supply chain management / supply of agricultural commodities / value added commodities;
17. Assist in preparation of business plans, market linkage, credit linkage and technology linkage;
18. Organize buyer-seller interface on periodic basis, involving the FPOs / PP / entrepreneurs and buyers from state and national level.

State Level Functions of ABSO:

10. Prepare assessment guidelines / value chain assessment frame for project supported and other potential commodities for value addition and market linkage;
11. Facilitate / prepare model investment plan for the project districts, based on the assessment;
12. Support in selection of AEs, their training and monitoring their business performance;
13. Coordinate with state and district level institutions on agribusiness and value chain promotion;
14. Undertaking action research, identifying critical gaps and taking measures to bridge the gaps;
15. Support buyer-seller interface on periodic basis, involving the FPOs / PP / agri-entrepreneurs and buyers from state and national level;
16. Tracking market price of different commodities and support in linking with remunerative markets;
17. Facilitate E-NAM linkage of farmers / FPOs along with OSAMB;

8.0 Key Personnel:

The ABSO will engage following persons for successful implementation of the project activities.

S N	Key Experts	Qualification & Experience
1	Team Leader (Agribusiness Expert):	Will head the team at State level and have expertise in agribusiness planning with at least 10 years of experience.
2	Agriculture/Horticulture Expert:	Will be a qualified and experienced person in agri/horti field, with at least 7 years of experience.
3	Agribusiness & Marketing Expert	Should have ample knowledge and experience in Agribusiness or Agriculture Marketing, with at least 5 years of experience.
4	Institutional Building Expert	Will be a qualified social and institutional expert, with at least 7 years of experience.
5	Agribusiness & Marketing Expert (District Level)	Should have ample knowledge and experience in Agribusiness or Agriculture Marketing, with at least 5 years of experience.

9.0 Period of Service

The period of service of ABSO will be for four years from the date of signing of contract. The consultancy contract will be reviewed on an annual basis and extended only subject to satisfactory performance. Further extension of the contract, if required, beyond the four-year period will be subject to a mutual consent of both of the parties.

10.0 Performance Review:

The performance of ABSO will be reviewed on half yearly basis by a review committee which will comprise following members.

1. Project Director, OIIPCRA - Chair Person
2. Agribusiness Expert of SPMU - Convener
3. PD-ATMA of Selected Project Districts - Member (Maximum of 5 members)
4. Representatives from Directorate of Agriculture, Directorate of Horticulture and Directorate of Fishery - Members (selected / nominated by concerned directorates; one person from each directorate)

11.0 Reporting Requirements:

The ABSO shall submit following reports / documents to the SPMU.

1. Project inception report, within one month of signing the agreement with the project;
2. Quarterly plan and quarterly progress report;
3. Half yearly progress report;
4. Annual plan and annual progress report;
5. Learning cases / good practices document (with photographs);
6. Database developed on agribusiness promotion and market linkage aspects;

7. Any other report / document as per the need of the project and communicated by SPMU

12.0 Functional Relationship with SPMU, OIIPCRA-OCTDMS:

The contracted ABSO will work in close collaboration and coordination with the SPMU of the project and PD-ATMA office at the district level. While the ABSO will be directly responsible for facilitating and managing the process of agribusiness development and product marketing, it will work primarily with the communities / community organisations / associations / registered producer groups etc. within the project villages (if required outside) already identified by the project. The ABSO has to work in close collaboration with the local Support Organisation/s, Pani Panchayat, Water User Associations and local FIG and FPOs etc.

13.0 Support to the ABSO by the Project:

The project will provide key background documentation to the selected ABSO, after signing of the contract for reference and preparing the plan for agribusiness promotion. The Project will undertake the following activities to support ABSO in delivering its functions.

1. Provide project related documents to help the SO team to understand the project and its components;
2. Orientation to the ABSO team, including district level team members;
3. Designating one SPMU official to co-ordinate and guide the ABSO on regular basis;
4. Provide required guidelines and information during the course of the assignment;
5. Other technical support and guidance as and when requested.

Annexure IV: Terms of Reference for Hiring of Consultancy Agency for Integrated Irrigation and Agriculture Plan (IIAP) Preparation

1.0 Introduction:

The Department of Water Resources (DoWR), Government of Odisha has applied financing from the International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA), The World Bank in the form of a loan or credit towards the cost of Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA). The Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA), funded by World Bank, would be implemented over a period of 6 years in 15 districts of Odisha. The total project cost is 235.40 million US \$.

2.0 Project Implementation Arrangement:

The project will be implemented by three line-departments, i.e., (1) Department of Water Resources, Government of Odisha, (2) Department of Agriculture and Farmers Empowerment, Government of Odisha, and (3) Department of Fishery and Animal Resource Development, Government of Odisha, with clearly defined role and responsibilities. The State Project Unit (SPU), located within the Minor Irrigation Department office, will lead the implementation. A Technical Steering Committee, headed by the Chief Secretary, Government of Odisha will be the overall review and policy support system. At the district level, the office of the Collector and District Magistrate will be the nodal to steer the project and there will be a district level committee, in the name of District Level Project Monitoring Team (DLPMT) to monitor and supervise the project activities.

3.0 Project Objectives:

The project development objective is “to intensify and diversify agriculture production, enhance climate resilience in selected districts of Odisha”. The project beneficiaries will include small and marginal farmers, Pani Panchayats, farmer producer organizations and other agro-entrepreneurs.

4.0 Project Components:

The project is designed for implementation through the following components and subcomponents:

- Component 1: Climate-Smart Intensification and Diversification of Production (US\$74.5 million)
 - Subcomponent 1.1: Support to Improved Productivity and Climate Resilience (US\$32.1 million)
 - Subcomponent 1.2: Support to Aquaculture Production (US\$5.6 million)
 - Subcomponent 1.3: Support to Diversification and Produce Marketing (US\$36.9 million)
- Component 2: Improving Access to Irrigation and Water Productivity (US\$137.9 million)
 - Subcomponent 2.1: Support to Water Sector Reforms (US\$6.0 million)
 - Subcomponent 2.2: Support to Investments in Cascades (US\$132.0 million)
- Component 3: Institutional Capacity Strengthening (US\$9.7 million)
- Component 4: Project Management (US\$12.09 million)

- Component 5: Contingent Emergency Response (US\$0 million)

5.0 Requirement of the Assignment:

Project proposes to prepare an “Integrated Irrigation and Agriculture Plan (IIAP)” for the entire command of the tank / cascade. With IIAP, the project envisages to prepare a detail plan of action for the best utilization of available resources such as water, cultivable land and finances within the command in an integrated manner.

7. Improving irrigation coverage through structural and distribution measures following command saturation principles;
8. Enabling optimum utilisation of available water resources for enhanced cropping intensity;
9. Facilitate water budgeting and crop planning during Kharif and Rabi;
10. Strengthening local contingency planning and improve irrigation support system during dry spells;
11. Improve water productivity, water use efficiency and promote equity in water distribution and management;
12. To evolve an action plan for achieving sustainable agricultural growth that is responsive to climate variability, suitable cropping system, improving farmers’ income and ensuring food security.

Besides, the plan will also have analysis of ongoing as well as new schemes and programmes to foster convergence. Apart from irrigation and agriculture plan, the IIAP will also have command specific plan for execution of all the project activities.

6.0 Objective of the Assignment:

The overall objective of the assignment is to prepare integrated irrigation and agriculture plan for the tanks covered under OIIPCRA project in 15 project districts of Odisha.

7.0 Scope of Work:

The agency will mainly be designing the planning process, developing assessment tools, conducting field survey / studies, collection of required and relevant data for planning, conducting consultation meetings with the PP / WUA / FIG-FPO / PFCS and other stakeholders, consolidation and analysis of data, preparation of detail plan, sharing the plan with stakeholders, presenting the plan to PD-ATMA, EE-MI, DLPMT members and SPMU, and finalising the plan in consultation with the SPMU.

No.	Action Items	Planning of the preferred action
1.	Hydrological Aspects of Major Works	Understanding the local hydrology and climatic situation and identify the factors which affect water supplies and irrigation demands. Data collection that would be useful include (1) hydrology, (2) water availability and (3) climate information such as precipitation and temperature.
2.	Land Capability for Irrigation	<ol style="list-style-type: none">1. Identify main water sources, collect available data on rainfall and flows. Review data and if necessary, visit stations to assess data quality.2. Collect and study available data on groundwater occurrence and use. Identify areas worthy of further

No.	Action Items	Planning of the preferred action
3.	Civil and Irrigation Engineering	<p>exploration in command area.</p> <ol style="list-style-type: none"> <li>1. Outline main water sources and irrigable land. Define areas of swamp or seasonal inundation. Prepare preliminary estimates of irrigation water requirements for possible typical cropping patterns. Link present or potential irrigation demands with possible water sources. Hence identify possible schemes for irrigation, drainage, or flood control. Prepare outline designs of the options. <li>2. Preliminary cost estimation (including O&M) for engineering works, on farm development.
4.	Agricultural development and marketing	<ol style="list-style-type: none"> <li>1. Understanding the agricultural details (cropping systems) is key to develop a sound management plan. Data that should be collected include (1) acreage under each crop during Kharif and Rabi (household and plot specific information), (2) irrigation coverage and methods, and (3) soil, topography, and drainage <li>2. Review general policies for irrigated crops, rainfed crops, food versus industrial crops, general assumptions on crop yields, cropping intensity. List local crops. Note development constraints (lack of water, seeds, O&M, extension, research, finance, markets etc.). Preliminary recommendations on strategy for irrigated agricultural development: cropping patterns, intensity, needs for extension and other services.
5.	Incremental Agricultural production benefits	<p>Preliminary estimates of incremental benefits from irrigation, on the basis of representative models for the typical crops and cropping patterns.</p>
6.	Participation and Water Users Association	<ol style="list-style-type: none"> <li>1. Involvement of stakeholders in evolution of development concepts and comparison of investment options through interviews and participative approaches/workshops. <li>2. Consultations with farmers directly or through local authorities/village councils etc. <li>3. Finalisation of project planning with all stakeholders, from farmers' representatives to financing institution at concluding workshop.
7.	Data collection and coalition	<ol style="list-style-type: none"> <li>1. The plan will involve alignment to the existing policies of the Government which covers (1) water delivery procedures / mechanism, (2) water pricing structure, (3) water allocation etc. It would also include operation of irrigation sources, main canal operations, timing of use of different sources, groundwater extraction policies, flood control policies, facilities maintenance etc. <li>2. Estimation of economic and financial returns. Risk and sensitivity analysis. Effect on balance of payments and government budget. Impact on income distribution and poverty alleviation. <li>3. Finalization of financial requirements

*The agency will be implementing the project in 15 districts of the project area.

10. Each project cascade / tank will have an Integrated Irrigation and Agriculture Plan.
11. Planning will be done for the designated command and adjacent non-command area under the project, for Kharif and Rabi
12. The irrigation and agriculture planning exercise will be dynamic in nature and to be conducted and finalise before the onset of agricultural seasons (Kharif and Rabi) in each of the project year;
13. In the process of preparation of IIAP, local people's institutions like Pani Panchayats (PPs) / Water User Associations / FPOs / FIGs / PFCS, etc. will be involved along with Support Organization (SO). During preparation of IIAP, consultation meetings should be organised with the technical institutions like ICAR / SAU / KVKs / IMAGE / DOA&FP / DOH along with the guidance of other officials / experts;
14. The IIAP should take in to account the current situation of irrigation coverage, agricultural practices, identify the critical gaps and would support in improving irrigation coverage and preparation of crop plan by each plot in the command;
15. The IIAP will be formally approved by the PP / WUA general body for implementation;

8.0 Eligibility Criteria:

1. The agency should be a registered legal entity in India with at least 7 years of institutional experience of working in Odisha (should attach the incorporation / registration certificate and list of Board of Directors, office address details etc.);
2. Should not have been blacklisted by any Department of Government of India or Government of Odisha;
3. Should have a turnover of at least Rs 3.0 crores (three crores) in three preceding years (should furnish three years audited statement of accounts);
4. Should have worked in at least three World Bank financed projects in India;
5. Agency should have more than 5 years of consulting experience in the area of climate change related advisory services;
6. Should have experience in two irrigation planning and two agriculture/agribusiness planning projects (more than one state preferable);
7. The agency should have experience in hydrology assessment in and outside state of Odisha.

9.0 Team Composition:

Key Staff	Number	Minimum Requirement
Team Leader	1	1. PG in Social Sciences, Agriculture, Engineering with 10 years of experience.
Agriculture Expert	1	1. Graduate in Agriculture 2. 10 years of experience in agriculture and farming systems and having knowledge of both traditional practices and modern techniques for improving water use efficiency and agricultural productivity. 3. Experience on business model development for agriculture and marketing, post-harvest technology, value chain studies is desirable.
Engineering Expert	1	1. Postgraduate in Civil Engineering 2. 10 years of experience in water sector in irrigation planning, tank restoration & management, Participatory ground water management, crop water budgeting
Social Scientist	1	1. Postgraduate in Social Sciences. 2. 10 years of experience in water and agriculture sector, community-based organizations, gender & tribal issues, and

Key Staff	Number	Minimum Requirement
Field Surveyors	15	rehabilitation and resettlement issues. 1. PG in agriculture/Social/Environment 2. Information gathering and organising it in a way that is helpful in problem-solving along with bridging information gaps and uncertainties
Data Manager/Analyst	1	1. Experienced research data manager with minimum 5 years of experience 2. Good experience of statistical analysis.

10.0 Schedule of Delivery and Payment:

No	Activities	Schedule of delivery (from the date of awarding of contract)	Payment Schedule
1.	Inception report on IIAP	15days	10%
2.	1 st Draft report on IIAP	120 days	30%
3.	1 st draft sharing workshop	125 days	
4.	2 nd Draft report on IIAP	150 days	30%
5.	2 nd draft sharing workshop	160 days	
6.	Submission of final IIAP report with incorporation of all comments	180 days	30%

Note: The agency will have to submit 5 sets of black and white draft reports and 15 sets of colour final report.

Annexure V: Terms of Reference for Preparation of a Management and Development Plan in the Kharakeri sub- Basin in the Rushikulya River Basin

1.0 Background and Brief Description

The Government of Odisha in partnership with the Government of India will implement the World Bank assisted project “Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA)”. The OIIPCRA project aims to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected cascades of Odisha.

As development in Odisha accelerates and the impact of climate change becomes increasingly visible, competition over water between water users increases and water allocation becomes increasingly challenging. In response to these challenges, countries are progressively adopting the principles of Integrated Water Resources Management (IWRM). IWRM provides a comprehensive framework for quantifying water resources, establishing a participatory stakeholder participation process for allocating these among users while recognizing economic, social and environmental considerations, and identifying and planning water related investments. The OIIPCRA project will introduce IWRM in a pilot catchment. The Kharakeri sub-basin in the Rishikulya basin has been identified as the pilot catchment. If successful, the approach will be scaled up across relevant basins and sub-basins in Odisha.

This document provides the Terms of Reference for an assignment to prepare a Catchment Development Plan for the Kharakeri sub-basin in the Rishikulya basin. The assignment will identify the current and future supply and demand of water resources in the Kharakeri sub-basin including the impact of climate change. On the basis of that hydrological assessment of present and future demand and supply, the consultant will provide technical assistance to the local authorities during the implementation of a participatory process to define water allocations among the competing users and help them to define a sub-basin development plan. The development plan will be shared with local authorities to inform broader regional development plans. The assignment will be implemented by a consultancy firm that has adequate in-house capacities to bring the assignment to satisfactory completion.

The project will hire a consultancy firm who have the required experience and expertise in local level planning, including agriculture and irrigation components for the preparation of management and development plan. The consultancy agency must have five years of experience in (1) development planning, (2) preparing plans in climate change adaptation / mitigation, (3) specific planning experience in agriculture and irrigation sector and (4) designing monitoring and evaluation framework for monitoring climatic change adaptation / mitigation interventions.

2.0 Terms of Reference

The assignment will prepare a sub-basin development plan of the Kharakeri sub-basin in the Rishikulya river basin. The assignment will include the following activities: (i) sub-basin characterization, (ii) stakeholder mobilization, (iii) hydrological analysis and (iv) sub-basin management and development plan.

The ayacut area in the sub-basin is named as lowland; the rest of the area is named as upland. The ayacut area may be further classified based on the issues faced by the crops e.g. areas having drainage issues, seepage from tanks, etc. In some cases, lowland may have to be further classified like upper, middle and lower ayacut depending upon the availability of irrigation and water/irrigation related issues.

1. Preliminary analysis of the sub-basin

- a. Delineation of the sub-basin, and identify coherent micro-catchments (or cascades) in the sub-basin.
- b. Describe the natural conditions (topography, geology, hydrogeology, meteorology, hydrology, environment, land-use, protected areas, etc.) mapping of protected areas, mapping of status and capacity of water infrastructure - including the ones planned - such as water resources, irrigation and hydraulic infrastructure.
- c. Identify current challenges, including droughts, floods, water quality and erosion and sedimentation, significant pressures on the qualitative and quantitative status of water bodies as well as on the ecosystems.
- d. Identify and describe the climate change scenarios for the sub-basin, including likely impact of climate change on rainfall amount and timing, temperature and ET, and radiation.
- e. Map existing monitoring and data networks, including monitoring stations and satellite databases, and collect relevant hydrological data from line departments, IMD and satellite (ISRO, NASA, ESA), and verify the quality of the data and identify any data gaps.

2. Social Mobilization

- a. Identify relevant stakeholder groups involved in the water sector, including their roles, responsibilities, expectations, etc. Identify key local authorities that are involved in water management.
- b. Raise awareness of stakeholders and local authorities on the importance of the proper identification and planning water resources investments.
- c. In consultation with stakeholders and local authorities, develop a stakeholder consultation process for discussing the sub-Basin Management Plan.

3. Hydrological analysis

- a. Determine all current and future water availability and all consumptive use by main water using sectors and develop a sub-basin water balance. Satellite data and toposheets may be used to identify all water withdrawals in the Kharakeri sub-basin as a basis for the analysis. Assess for each of the identified micro-catchments or cascades water requirements for non-consumptive uses, including potable water, hydropower, fisheries and tourism, navigation, biodiversity conservation as applicable. The assessed balances should account for changes in the water inputs to the sub-basin due to projected (possible) impacts of climate change.

- b. Determine the hydrological inter-dependence and connectivity of groundwater and surface water between upstream and downstream tanks under normal rainfall conditions to avoid “double counting”.

4. Sub-Basin Management and Development Plan

- a. In accordance with the stakeholder consultation process agreed under 2.c, the consultant will implement a sub-Basin Management Plan consultation process.
- b. Define for each of the identified micro-catchments or cascades, during public consultations with local authorities and stakeholders, the management and development objectives.
- c. Propose investments that would address the constraints identified under 1.c, and that would lead to win-win results across the sub-Basin and throughout the year.
- d. On the basis of the analysis above and the objectives that have been agreed with the stakeholders and local authorities, develop a draft sub-Basin Management and Development Plan (BMP).
- e. Present the draft BMP to the stakeholders in public consultation meetings (including public participation in the development of the draft and final basin management plans) to ensure broad acceptability of the plan.
- f. Present the draft BMP to the local authorities, the OIIPCRA Steering Committee and the competent Ministries, and integrate eventual comments from stakeholders, local authorities, SC and Ministries involved, and present the final BMP.

3.0 Deliverables

- Water bodies-at-risk report: describes the outcomes of component 1. Not more than 20 pages (excluding annexes).
- Hydrological Assessment Report: describes the outcomes of component 3. Not more than 20 pages (excluding annexes).
- Kharakeri sub-Basin Management Plan: describes the outcome of the entire assignment. Not more than 40 pages (excluding annexes).

4.0 Time Frame

	Tasks	I	II	III	IV	V	VI	VII
1	Preliminary analysis of the sub-basin							
2	Social Mobilization							
3	Hydrological analysis							
3	Sub-Basin Management Plan							

5.0 Data to be provided by OIIPCRA:

1. Location files in Kml file/s containing:
 - a. Catchment area
 - b. Command area
 - c. Boundary of the tanks in the sub-basin
2. Meteorological data (rainfall and potential evapotranspiration) data during 1988-2017
3. Groundwater level data during 1988-2017.

6.0 Required Human Resources:

Team	Qualification	Qualification and Experience
Team Leader	Ph. D in water resources/hydrology	Minimum experience of 10 years after Ph. D. Experience of working in agriculture, water resources projects and processing satellite data. International experience, including from outside South Asia.
Hydrogeologist	MSc in hydrology/groundwater	Minimum experience of 10 years. Experience in working in groundwater projects. International experience, including from outside South Asia.
Social Mobilization Expert	MSC in sociology or related field	Minimum experience of 10 years. Experience in working on social mobilization in water projects.
Agriculture Expert	Post Graduate in agriculture	Minimum 5 years of experience after PG in agriculture project.
Satellite Remote Sensing Expert	Post Graduate in satellite remote sensing	Minimum 5 years of experience after PG in processing satellite data. Experience should be in handling optical and active/passive microwave remote sensing.
GIS Expert	Post Graduate in GIS	Minimum 2 years of experience after PG in working on GIS.
Field staff to gather field information	Graduate in any discipline	Minimum 5 years of experience in collecting field data for water resources and agriculture project.

Annexure VI: Terms of Reference for Internal Audit

1. Background

Government of Odisha is presently engaged in preparing a project to be funded jointly by the GoI, IDA and IBRD, through Odisha Community Tanks Development & Management Society (OCTDMS), a newly set up society anchored within the Department of Water Resources. The estimated project cost is US\$235.4 million.

2. Objectives of the Project-

The Project Development Objective is to intensify and diversify agricultural production, enhance climate resilience in selected districts of Odisha.

3. Project Scope & Components

It is envisaged that the project will support the physical rehabilitation/modernization of about 538 tanks with an estimated CCA of about 60,000 hectares, spread across 15 districts of the state. The four board components of the project are;

Component and Sub- component code	Component and Sub-Component Description
1	Climate-Smart Intensification and Diversification of Production (US\$74.5 million)
1.1	Support to Improved Productivity and Climate Resilience (US\$32.1 million)
1.2	Support to Aquaculture Production (US\$5.6 million)
1.3	Support to Diversification and Produce Marketing (US\$36.9 million)
2	Improving Access to Irrigation and Water Productivity (US\$137.9 million)
2.1	Support to Water Sector Reforms (US\$6.0 million)
2.2	Support to Investments in Cascades (US\$132.0 million)
3	Institutional Capacity Strengthening (US\$9.7 million)
4	Project Management (US\$12.09 million)
5	Contingent Emergency Response (US\$0 million)

4. Implementation Arrangements

The overall responsibility for project implementation and coordination would rest with the Odisha Community Tank Development and Management Society (OCTDMS) which has been established to serve as a coordinating agency for tank rehabilitation in the state. The Governing Body of the OCTDMS is chaired by the Agricultural Production Commissioner and includes representatives of various line departments and civil society. Implementation support would be provided by the Departments of Water Resources, Agriculture, Horticulture, Fisheries and various support organizations and private service providers.

The OCTDMS would consist of a State Project Unit (SPMU) and about 15 District Project Units (ATMAs). The SPMU will be headed by a full-time Project Director of the rank of Additional/Special Secretary and would house a lean multi-disciplinary team dedicated to the project. The ATMAs would have corresponding smaller multi-disciplinary dedicated teams. Existing Water Resources Department (WRD) engineering staff (from the Minor Irrigation wing) would be deputed to the SPMU and ATMAs to work on the project. Activities related to agriculture, fisheries etc. would be implemented through the respective line departments with the coordination and integration function performed by agricultural livelihoods coordinators in the SPMU and ATMAs. The SPMU will be responsible for project planning and scheduling; coordination with other implementing partners; project-wise budget control and financial management; quality assurance and control; monitoring of the project input/output/ outcome/processes/Impacts; and providing timely and quality resources as well as technical assistance to ATMAs. The ATMAs will be responsible for implementation of district program; achievement of physical and financial milestones; quality assurance; and working closely with communities to achieve the project development objectives.

Funds will flow from the GoO Finance Department to the SPMU through a budgetary allocation for the project as a line item under the WRD budget. All project components and sub-components under other departments like Agriculture, Fisheries, Horticulture will be funded through the treasury directly.

A Project Steering Committee (PSC) chaired by the Chief Secretary will review project progress every six months and provide strategic directions, guidance on policy matters and resolve conflicts, if any, amongst the implementing agencies. At the district level, the project would be reviewed at least once every quarter by a District Level Steering Committee (DLSC), chaired by the District Collector and including representatives from non-government Support Organisations, Pani Panchayats (PPs), senior district level staff from the Departments of Water Resources, Agriculture, Horticulture, Fisheries, and the Zilla Parishad. The DLPMT will be the main forum for district level coordination of project activities, approval of annual action plans, monitoring of project progress, redressing of grievances, and resolution of conflicts, if any, amongst the implementing partners.

At the tank level, the focal point for organization and implementation will be the PP, constituted under the Odisha Pani Panchayat Act 2002, to which all command area farmers and other eligible tank users such as fisherman will belong. The PP will be expected to play an active role in the planning, implementation and supervision of subprojects, procurement of goods/works/services, operation and maintenance of tank systems, and self-monitoring of cost effectiveness and sustainability. Non-government SOs, recruited by the project, will facilitate community mobilization, participation, and institutional strengthening of the community-based institutions.

The project would be implemented according to norms, rules and procedure outlines in the Project Implementation Plan and the Operational Manual. These documents lay out roles and responsibilities of different stakeholders and provide details of project processes and project cycle. They incorporate experiences gained through implementation of other community projects in Odisha as well as the outcomes of various preparatory workshops, studies and analysis that were carried out as part of project preparation. The Project Implementation Plan and Operational Manual will be subject to periodic reviews conducted jointly by GoI, GoO and IBRD/IDA with stakeholder participation to address and constraints to the successful implementation of the project.

The project implementing entities will adopt a disclosure policy in compliance with their duties under the Right to Information Act both for on demand information and suo moto disclosure. This would include development of a project website, information management system, and a document

management system. To the extent possible all project related information will be electronically disseminated through the project website. The project would also develop an effective complaints handling system. At the district and Pani Panchayat levels, oversight would be developed through social audits and public display of information.

5. Objectives of the Audit:

The objective of the internal audit is to provide the project management timely fiduciary assurance that the financial management and procurement system and internal control procedures as applicable to the project are being adhered to by the various units, (ii) the financial reports being submitted to the PMU are in agreement with the books of account and can be relied upon to support the disbursements made by the Bank.

- 5.1 Coverage and Stands for the Audit:-** The Audit would cover the entire project i.e., covering the implementing units at the **Project level (SPMU/ATMA/ Department)** and at the Pani Panchayats on a sample basis. The audit would also cover all consultancies or other contracts that may be entered into by the implementing agencies. The internal audit should be carried out in accordance with the Auditing & Assurance Standards prescribed by the Institute of Chartered Accountants of India and will include such tests and controls, as the auditor considers necessary under the circumstances.

Specific areas of coverage of the audit will include the following:

5.1.1 Project level (SPMU/Department/ATMA):

- a) An assessment of the adequacy of the project financial management system, including internal controls. This would include aspects such as adequacy and effectiveness of accounting, financial and operational control; level of compliance with OIIPCRA Financial Rules and Regulations;
- b) Efficiency and timeliness of the funds flows to the SPMU, Department, ATMA and to the Pani Panchayats.
- c) Whether the accounts of the project are compiled in a timely manner and the expenditures consolidated on a monthly basis at the SPMU level.
- d) An assessment of compliance with provisions of financing agreement (Financing Agreement and Project Agreement), especially those relating to procurement, accounting and financial matters.
- e) Review the adequacy of financial and administrative delegation at the district level and examine whether and contracts are broken up due to lack of adequate delegation;
- f) Goods, works and services financed have been procured in accordance with the World Bank procurement guidelines, procurement manual of the project and financing agreements; while doing so, the checklist attached with TOR (Annex 1) will be followed by the internal auditor.
- g) Review the adequacy of financial and administrative delegation at the district level and examine whether and contracts are broken up due to lack of adequate delegation.
- h) All necessary supporting documents, records, and accounts have been kept in respect of all project activities and that clear linkages exist between accounting records, accounts books and the periodic financial reports (internal and external i.e. interim Financial Reports)
- i) Adequate records are maintained regarding the assets created and assets acquired by the project, including details of cost, identification and location of assets and ensuring that there is a system of physical verification of assets.
- j) With respect to civil works executed by irrigation and CAD and other related Works department, check to ensure that contract registers have been maintained and updated; running bills are properly approved and in agreement with Measurement Book; advances are properly adjusted and statutory deductions have been made;
- k) Inter unit fund transfers and bank reconciliations have been varied out on a monthly basis.
- l) With respect to fund releases to PPs, adequate records of Financing Agreements have been

maintained at each ATMA and that the ATMA s have maintained a record of monthly/quarterly financial statements and annual audit reports have been maintained;
The auditor is expected to obtain and satisfactorily document sufficient audit evidence to support audit conclusions.

5.1.2 Pani Panchayats Level

In case of audit of Pani Panchayats specific consideration will be given to the following –

- a) Pani Panchayats have maintained the books/records as per the Odisha Pani Panchayat Rules, 2003, to account for funds received from the project, water charges and other income and expenditures are correct and decisions taken by the General Body, Executive Committee and its constituent sub committees and appropriately reflected in the minute.
- b) The reports and other documents submitted by the Pani Panchayats to the district EE MI provide clear linkage with the books/records and reflected the correct position.
- c) The transactions are supported with necessary document/bills/vouchers and are approved by competent authority and forum.
- d) Goods, materials and services have been procured in accordance with the COM.
- e) Balance in Bank accounts, with third parties and the Project are duly reconciled.
- f) Social accountability, transparency/disclosure and social audit mechanisms, prescribed in the Manual, are being adhered to by the Pani Panchayat and there exists documentation evidencing compliance. (please document the nature of evidence obtained)

6. Period, Timing and Sample Coverage of Internal Audit

The Internal Audit will be for the period of two years and will be carried out on a quarterly basis. The selected firm(s) will submit in advance and agree with the SPMU a ‘schedule of audit’ in a manner that will allow each of ATMA s to be covered.

7. Reporting

7.1 **Quarterly Reporting:** The Auditors will provide a quarterly report for the units audited (a summary of the key findings, implications and recommendations by each District – including the Pani Panchayats covered, must be prepared and will be prepared and discussed with the District Project Manager to enable the Project manager to take timely action. The report should be discussed and agreed with the auditable units and should be structured in a manner giving the observations, the implications of the observations, the suggested recommendation and the management comments/ agreed actions. The audit observations should be supported by instances and quantified, as far as practicable.

The individual audit reports should be submitted within 45 days of the completion of the audit of a particular district. The reports will be directed as under –

- The Project Management Letter to the State Project Director.
- The individual audit reports to each of the auditable unit to the head of the unit.

In addition, the internal auditor should provide an Executive Summary highlighting the critical Issues which require the attention of the Project Director, OIIPCRA and the status of actions on the previous recommendations.

7.2 **Format of the Management Letter:** The Management Letter will inter alia have the following sections-

- Objectives of the audit;
- Methodology of the audit;
- The status of implementation of the financial management system;
- The status of compliance of the previous audit reports, including major audit observations pending compliance;
- The key areas of weaknesses that need improvement; and
- Recommendations for improvements.

8. Qualification of the Auditing Firm(s)

The Audit firm applying for the assignment should possess the following qualifications.

- The firm should have a standing of at least fifteen years.
- The firm must have at least four partners exclusively engaged in the affairs of the firm, of whom at least two partners should be Fellow Chartered Accountants.
- The Firm should have at least one partner with continuous association with the firm of not less than ten years and one partner with continuous association of not less than 5 years and adequate qualified staff to be able to carry out the assignment.
- The firm should be empaneled with the Comptroller and Auditor General of India.
- Each audit team would be led by an Audit Partner with a minimum of 12 years of post-qualification experience as a practicing Chartered Accountant. The anticipated input of the team leader is about 180 working days each year. Day-to-day management of the audit should be the responsibility of an Audit Manager/Partner with at least 5 years of post-qualification experience. The audit firm should be able to deploy adequate number of audit staff comprising of qualified, semi – qualified and unqualified assistants.

9. General

The auditor would be given access to all documents, correspondence, and any other information relating to the Project and deemed necessary by the auditor. The auditor should become familiar with the Project, and with the relevant policies and guidelines of the World Bank (including those relating to disbursements, procurement and financial management and reporting). The auditor would be provided copies of the Project Implementation Plan, Project Appraisal Document (PAD) of the World Bank, Development Credit Agreement and Project Agreement with IDA (including agreed Minutes of negotiations), the Project implementation Plan, the Community Operations Manual, Financial Management Manuals, guidelines, policies and procedures issued by Project Management and the relevant World Bank policies and guidelines.

Checklist for Internal Audit Procurement

- a) The purpose of this checklist to guide the internal auditors in the procurement audit process so that all the aspects of the procurement process are looked into and the approach has consistency across the state.
- b) Before conducting the procurement audit, the auditors should familiarise themselves with the agreed procurement procedures for OIIPCRA as provided in the legal agreements for the project.
- c) Audit report should be submitted as part of the financial audit report but as a separate section not exceeding total 10 pages in length.
- d) The audit should cover both qualitative aspects (Checklist # 1) as well as transaction specific aspects (Checklist #2 & 3). These checklists are only to guide the auditors in taking up the procurement audit in systematic fashion and are not required to be submitted along with the audit report.

Checklist 1: Qualitative Aspects of Procurement

- e) Whether any manual on procurement procedure have been prepared and are available on site? If no, how the procurement procedure is guided?
- f) Whether the Bank's standard bidding documents are used for preparation tenders etc.? If no, how the tenders are prepared?
- g) Whether dedicated procurement staffs are in place? If no, who handles the procurement?
- h) Whether the staff handling the procurement have exposure or training related to the procurement?
- i) Whether complete list of contracts issued is available? Whether these data are computerised?
- j) Whether the procurement relating documents are available systematically?
- k) Whether internal approvals are taken for inviting quotations/placing orders?
- l) Whether financial negotiations are conducted frequently? If yes, under what circumstances and with whom (with all or lowest bidder)?
- m) Is there a procurement related compliant handling system in the agency? If yes, whether bidders are aware of the same?
- n) Whether the agency discloses the bid opportunity, put the tender documents and contract award information on its website?
- o) Whether a procurement plan is available? If yes, whether the actual progress is being monitored against the plan? If there are delays, what measures are being taken to cover the delays?
- p) Whether any procurement related irregularities were reported in the previous audit report? If yes, what actions have been taken in this regard?
- q) Whether there is separation of duties between various functions viz. Indenting/receiving, procurement and releasing funds?
- r) Feedback from procurement staff and other officials met on how to reduce delays and improved the process.

Checklist 2: Procurement of Works/Goods

- 1) Whether the method of procurement (based on the estimated value) adopted is in accordance with the Project Agreement? If no, list the deviations (major/minor)
- 2) Whether bidding document used for this work is according to the standard model cleared with the Bank? If no, list the deviations from standards (major/minor)
- 3) Whether price adjustment clause provided in the bid document? (Required when period of completion is more than 12 months)
- 4) Whether bill of quantities provides schedule of quantity for each slice separately and also one schedule for the combined work/goods?
- 5) Whether the guidelines have been followed in fixing the Bid Security? If not, why? (No exemption should be permitted to any bidder or any class of bidders)
- 6) Whether any preference on price or other conditions allowed in the bidding documents/award for any bidder or class of bidders? If yes, list the preferences.
(No preferential treatment should be given to any bidder or class of bidder either for price or for conditions unless specifically cleared with the Bank and stipulated in the Project Agreement)
- 7) Whether the Cost of bidding documents is reasonable?
- 8) Whether the Notice inviting tender (NIT) published in national newspapers?
- 9) Whether minimum 30 days provided for sale of bidding documents?
- 10) If pre-bid conference was held, whether the minutes were prepared and circulated to all the prospective bidders?
- 11) Whether the last date of receipt of bids and the date of opening of bids are different (Both should be the same)
- 12) Whether bids were evaluated as per the criteria given in the bidding document?
- 13) Has award been made to the lowest responsive bidder? (Award should be made to the lowest responsive bidder) if no, the reasons for ignoring lower offers?

- 14) Were any negotiations held with the bidders after opening of bids? If yes, whether Bank's clearance was obtained before holding negotiations and when? If Bank's clearance was not obtained why? (Bank doesn't favor any negotiations)
- 15) Whether the award was made within the original bid validity?
 - i) If no, what are the reasons for delay?
 - ii) If extension of bid validity was sought, was that from all bidders and not from the lowest alone?
 - iii) Was a period of extension exceeded 8 weeks?
 - iv) If affirmative, was Bank's clearance obtained?
- 16) Has the successful bidder furnished performance security in accordance with the conditions of contract?
- 17) Whether items received/work completed as per the schedule indicated in the contract document?
- 18) Whether payment released timely and as per the terms given in the contract?
- 19) Whether the assets procured and being utilised for the intended purpose?
- 20) Whether all the documents/records related to the contract were available?

Checklist 3: Selection of Consultants

- 1) Whether the method of selection adopted is in accordance with the Project Agreement.
- 2) Whether the terms of reference include the following?
 - i) Concise statement of objectives
 - ii) Outline of tasks to be carried out
 - iii) Schedule for completion of tasks
 - iv) Support/Inputs to be provided by the employer
 - v) Final outputs required from the consultant
 - vi) Review procedures
- 3) Whether the terms of reference have been reviewed and cleared with the Bank?
- 4) Whether the cost estimate has been prepared (Cost estimate, or budget, should be based on borrower's perception of the assignment requirements in terms of level and type of personnel, period to be spent in the field and in the home office, physical inputs and other items required for the services)
- 5) Whether a short list of the consultant's firms has been drawn? (The short list should have 6 consultants)
- 6) Whether the draft letter of invitation with draft or contract according to the Bank's standard document? If not/reasons thereof.
- 7) Whether at least 30 days given for submission of proposals.
- 8) Whether the proposals were evaluated as per criteria set out in the Letter of Invitation.
- 9) Whether the financial proposals opened in presence of technically qualified consultants?
- 10) Whether the financial negotiations were held with highest ranked firm (financial negotiations are not allowed if price is a factor for selection)
- 11) Whether proposals were evaluated as per the criteria given in the RFP document?
- 12) Has award been made to the highest ranked consultant? (Award should be made to the consultant scoring highest rank based on evaluation of technical and financial proposals)? If no, the reasons for ignoring the highest ranked proposal?
- 13) Whether the award was made within the original proposal validity? If no, what are the reasons for delay?
- 14) Whether the assignment completed as per the schedule indicated in the contract document?
- 15) Whether payment released timely and as per the terms given in the contract?
- 16) Whether all the documents/records related to the contract were available?

Annexure VII: Terms of Reference for External Audit

Background

1. Government of Odisha is presently engaged in preparing a project to be funded jointly by the GoI, IDA and IBRD, through Odisha Community Tanks Development & Management Society (OCTDMS), a newly set up society anchored within the Department of Water Resources. The estimated project cost is US\$ 235.4million.

Objectives of the Project-

2. The Project Development Objective is to intensify and diversify agricultural production, enhance climate resilience in selected districts of Odisha.

Project Scope & Components

It is envisaged that the project will support the physical rehabilitation/modernization of about 538 tanks with an estimated CCA of about 60000 hectares, spread across 15 districts of the state. The four broad components of the project are:

Component and Sub-component code	Component and Sub-Component Description
1	Climate-Smart Intensification and Diversification of Production (US\$74.5 million)
1.1	Support to Improved Productivity and Climate Resilience (US\$32.1 million)
1.2	Support to Aquaculture Production (US\$5.6 million)
1.3	Support to Diversification and Produce Marketing (US\$36.9 million)
2	Improving Access to Irrigation and Water Productivity (US\$137.9 million)
2.1	Support to Water Sector Reforms (US\$6.0 million)
2.2	Support to Investments in Cascades (US\$132.0 million)
3	Institutional Capacity Strengthening (US\$9.7 million)
4	Project Management (US\$12.09 million)
5	Contingent Emergency Response (US\$0 million)

Implementation Arrangements

4. The overall responsibility for project implementation and coordination would rest with the Odisha Community Tank Development and Management Society (OCTDMS) which has been established to serve as a coordinating agency for tank rehabilitation in the state. The Governing Body of the

OCTDMS is chaired by the Agricultural Production Commissioner and includes representatives of various line departments and civil society. Implementation support would be provided by the Departments of Water Resources, Agriculture, Horticulture, Fisheries, and various support organizations and private serviceproviders.

5. The OIIPCRA would consist of a State Project Unit (SPMU) and about 15 District Project Units (ATMAs). The SPMU will be headed by a full-time Project Director of the rank of Additional/Special Secretary and would house a lean multi-disciplinary team dedicated to the project. The ATMAs would have corresponding smaller multi-disciplinary dedicated teams. Existing Water Resources Department (WRD) engineering staff (from the Minor Irrigation wing) would be deputed to the SPMU and ATMAs to work on the project. Activities related to agriculture, fisheries etc. would be implemented through the respective line departments with the coordination and integration function performed in the SPMU and ATMAs. The SPMU will be responsible for project planning and scheduling; coordination with other implementing partners; project-wide budget control and financial management; quality assurance and control; monitoring of the project input/output/outcome/ processes/impacts; and providing timely and quality resources as well as technical assistance to ATMAs. The ATMAs will be responsible for the implementation of district programs; achievement of physical and financial milestones; quality assurance; and working closely with communities to achieve the project development objectives.
6. Funds will flow from the GoO Finance Department to the SPMU through a budgetary allocation for the project as a line item under the WRD budget. All project components and sub- components (including those which pertain to other departments like Agriculture, Horticulture, Fisheries etc.) will be funded through treasury directly and no funds will flow directly to the individual departments through their budget.
7. A Project Steering Committee (PSC) chaired by the Chief Secretary will review project progress every six months and provide strategic directions, guidance on policy matters and resolve conflicts, if any, amongst the implementing agencies. At the district level, the project would be reviewed at least once every quarter by a District Level Project Management Team (DLPMT), chaired by the District Collector and including representatives from non-government Support Organizations, WUAs, senior district level staff from the Departments of Water Resources, Agriculture, Horticulture, Fisheries, and the Zilla Parishad. The DLPMT will be the main forum for district level coordination of project activities with other ongoing government programs (particularly watershed development in tank catchment areas), approval of annual action plans, monitoring of project progress, redressing of grievances, and resolution of conflicts, if any, amongst the implementing partners.
8. At the tank level, the focal point for organization and implementation will be the WUA, constituted under the Odisha Pani Panchayat Act 2002, to which all command area farmers and other eligible tank users such as fishermen will belong. The WUA will be expected to play an active role in the planning, implementation and supervision of subprojects, procurement of goods/works/services, operation and maintenance of tank systems, and self-monitoring of cost effectiveness and sustainability. Non-government SOs, recruited by the project, will facilitate community mobilization, participation, and institutional strengthening of the community-based institutions.
9. In each tank a SO will work with the villagers to familiarize them with the project objectives, expected outputs/outcomes and the processes of implementation. In those tanks where WUAs do not already exist, the SO will assist with formation and election of a WUA. The SO will also facilitate the induction of new members (e.g., fishermen) into the WUAs. It will engage with the village communities within the tank system to objectively assess their willingness and preparedness to participate in the project, following which the SO, with technical support from line department and ATMA staff, will work with the WUAs to prepare a plan which, through a participatory process, will identify and prioritize desirable interventions as well as prepare cost estimates and implementation plans for them.
10. The project would be implemented according to norms, rules and procedures outlined in the Project

Implementation Plan and the Operational Manual. These documents lay out roles and responsibilities of different stakeholders and provide detail of project processes and project cycle. They incorporate experiences gained through implementation of other community projects in Odisha as well as the outcomes of various preparatory workshops, studies and analyses that were carried out as part of project preparation. The Project Implementation Plan and Operational Manual will be subject to periodic reviews conducted jointly by GoI, GoO and IBRD/IDA with stakeholder participation to address any constraints to the successful implementation of the project.

11. The project implementing entities will adopt a disclosure policy in compliance with their duties under the Right to Information Act both for on demand information and suo moto disclosure. This would include development of a project website, information management system, and a document management system. To the extent possible all project related information will be electronically disseminated through the project website. The project would also develop an effective complaints handling system. At the district and village levels, oversight would be developed through social audits and public display of information.

Objectives of the Audit:

12. The essence of the World Bank audit policy is to ensure that the Bank receives adequate independent, professional audit assurance that the proceeds of World Bank loans were used for the purposes intended, that the annual project financial statements are free from material misstatement, and that the terms of the loan agreement were complied with in all material respects.
13. The objective of the audit of the Project Financial Statement (PFS) is to enable the auditor to express a professional opinion as to whether (1) the PFS give a true and fair view of the sources and applications of project funds for the period under audit examination; (2) the funds were utilized for the purposes for which they were provided, and (3) expenditures shown in the PFS are eligible for financing under the relevant loan or credit agreement. In addition, where applicable, the auditor will express a professional opinion as to whether the Financial Management Reports submitted by project management may be relied upon to support any applications for withdrawal from the IDA Credit/Loan.
14. The books of account that provide the basis for preparation of the PFS are established to reflect the financial transactions of the project and are maintained by OCTDMS and its constituent state and district level units.

Audit Standards

15. The audit will be carried out in accordance with the Auditing Standards promulgated by the Institute of Chartered Accountants of India. The auditor should accordingly consider materiality when planning and performing the audit to reduce audit risk to an acceptable level that is consistent with the objective of the audit. Although the responsibility for preventing irregularity, fraud, or the use of loan proceeds for purposes other than as defined in the legal agreement remains with the borrower, the audit should be planned so as to have a reasonable expectation of detecting material misstatements in the project financial statements.

Audit Scope

16. In conducting the audit, special attention should be paid to the following:
 - (a) All external funds have been used in accordance with the conditions of the relevant legal agreements and only for the purposes for which the financing was provided. Relevant legal agreements include the Financing Agreement, the Project Agreement, and the Minutes of Negotiations;

- (b) Effective project financial management systems, including internal controls, were in operation throughout the period under audit examination. This would include aspects such as adequacy and effectiveness of accounting, financial and operational controls, and any needs for revision; level of compliance with established policies, plans and procedures; reliability of accounting systems, data and financial reports; methods of remedying weak controls or creating them where there are none; verification of assets and liabilities; and integrity, controls, security and effectiveness of the operation of the computerized system; and Counterpart funds have been provided and used in accordance with the relevant legal agreements and only for the purposes for which they were provided;
- (c) All necessary supporting documents, records, and accounts have been kept in respect of all project transactions including expenditures reported via Interim unaudited Financial Reports (IUFs) where applicable. Clear linkages should exist between the books of account and reports presented to the Bank;
- (d) The project accounts have been prepared in accordance with the accounting principles defined in the Project Financial Manual and give a true and fair view of the financial position of the project at the year end and of resources and expenditures for the year ended on that date; and
- (e) Goods and services financed have been procured in accordance with the World Bank procurement guidelines and financing agreements.

Project Financial Statements

17. The Project Financial Statements should include-
- (a) Receipts & Payments Account, Income & Expenditure Accounts and Balance Sheet- Annex VI(A)
 - (b) Reconciliation of Claims to Total Applications of Funds - Annex 16.12
 - (c) Other Statements or Schedules which may include:
 - An annexure separately listing cumulative project expenditures by Project Component/Sub-components with approved budget; -Annex V (IUF 2)
 - A detailed list of assets created or purchased from project funds. Schedule of Fixed Assets- Annex 16.13
 - (d) Management Assertion- Management should sign the project financial statements and provide a written acknowledgement of its responsibility for the preparation and fair presentation of the financial statements and an assertion that project funds have been expended in accordance with the intended purposes as reflected in the financial statements. An example of a Management Assertion Letter is shown at Annexure 16.3.

Statements of Expenditures and Financial Management Reports

18. In addition to the audit of the PFS, the auditor is required to audit all Interim Financial Reports (IFRs) for withdrawal applications made during the period under audit examination. The auditor should apply such tests as the auditor considers necessary under the circumstances to satisfy the audit objective. In particular, these expenditures should be carefully examined for project eligibility by reference to the relevant financing agreements. Where ineligible expenditures are identified as having been included in withdrawal applications and reimbursed against, these should be separately noted by the auditor.

Audit Report

19. An audit report on the project financial statements should be prepared in accordance with the

Auditing Standards promulgated by the Institute of Chartered Accountants of India. Those standards require an audit opinion to be rendered related to the financial statements taken as a whole, indicating unambiguously whether it is unqualified or qualified and, if the latter, whether it is qualified in certain respects or is adverse or a disclaimer of opinion. In addition, the audit opinion paragraph will specify whether, in the auditor's opinion, (1) the funds were utilized for the purposes for which they were provided, (2) expenditures shown in the PFS are eligible for financing under the relevant loan or credit agreement and, where applicable, (3) the IUFs submitted during the period are supported by adequate detailed documentation maintained in the project accounting offices.

20. The project financial statements and the audit report should be received by the Bank not later than 6 months after the end of the fiscal year. The auditor should also submit the two copies of the audited accounts and audit report to the Implementing Agency.

Management Letter

21. In addition to the audit report on the project financial statements, the auditor may prepare a management letter (See Annex 16.5) containing recommendations for improvements in internal control and other matters coming to the attention of the auditor during the audit examination, possibly including matters such as the following:
 - observations on the accounting records, systems, and controls that were examined during the course of the audit
 - deficiencies or weakness in systems and controls, together with specific recommendations for improvement
 - compliance with financial covenants in the financing agreements
 - matters that might have a significant impact on the implementation of the project
 - the status of recommendations from previous management letters, including any issues which remain to be addressed and any issues which recurred
 - any other matters that the auditor considers pertinent.
22. The auditor should supply the Bank with a copy of the management letter together with the audit report on the project financial statements. In the event that no management letter is issued, the auditor should supply a written advice to that effect together with the audit report on the project financial statements. A sample covering letter that could be used to transmit a management letter is shown at Annexure 16.5.

General

23. The auditor should be given access to any information relevant for the purposes of conducting the audit. This would normally include all legal documents, correspondence, and any other information associated with the project and deemed necessary by the auditor. The information made available to the auditor should include, but not be limited to, copies of the Bank's Project Appraisal Document, the relevant Legal Agreements, a copy of these Guidelines, and a copy of the Bank's Financial Management Assessment of the project entity. It is highly desirable that the auditor become familiar with other Bank policy documents, such as OP/BP 10.02, the Bank's internal guidelines on Financial Management that include financial reporting and auditing requirements for projects financed by the World Bank. The auditor should also be familiar with the Bank's Disbursement Manual. Both documents will be provided by the Project staff to the auditor.

Annexure VIII:

Potential Investment Plan Financing Activities:

Note: These listed activities having the potential to enhance agribusiness and market linkage. However, there will be field level assessment to identify the actual requirements in different project districts and investment plan will be finalised accordingly. The “potential investment areas” discussed here is suggestive only.

1.0 Establishment of Pack House

For post-harvest management and value addition, emphasis shall be given for establishment of pack house with aggregation, grading, sorting and packaging facility in the selected project area. Pack houses will be established after spatial planning and inflow / outflow assessment of the commodities in identified clusters. Farmer Producer Organizations and suitable agri-entrepreneurs shall be encouraged for establishment of pack houses (9mX6m) with mentioned facilities. The project will support in establishing 30 Nos. of pack houses in suitable locations, based on the feasibility assessment.

Key Guiding Principles

1. Feasibility assessment before establishing pack houses, covering (a) production details of different horticultural/agricultural commodities, (b) assessment of marketable surplus of major commodities, (c) in-flow / out-flow of major commodities, (d) market potential assessment, (e) feasible location for establishment of pack house etc.;
2. Association of agri-entrepreneur / FPO / PP in the operation and management of the pack houses based on their capacity assessment;
3. Preparation of DPR (including structural layout) with business plan for each pack house;
4. Adherence to Government guidelines and technical specification for pack houses;
5. Capacity building of Agri-entrepreneur / FPO / PP on operation and management of the pack house;
6. Preparation of a detail operational guidelines for the operation and maintenance of the pack house and its sustainability;
7. Project shall support only for establishment of pack house without land cost. Land shall be provided by the concerned agri-entrepreneur through FPO / PP;
8. There would not be acquisition of land for establishing pack house. Available government land / GP land / land available with agri-entrepreneur / FPO / PP will be utilised for the purpose;
9. Land proposed for pack house construction would be litigation free and land record would be verified by appropriate authority;
10. Each pack house unit will be a resource generating unit (revenue-based cost centre)

Expected Output and Indicators; Pack House

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Feasibility assessment for establishing pack house	PD-ATMA/DDH	SO/ABSO	Feasibility for Pack house assessed	No. of feasibility assessment studies for Pack house conducted
Preparation of DPR / Business Plan	PD-ATMA/DDH	SO/ABSO	DPR for Pack house prepared	No. of DPRs prepared
Identification and finalization of location for Packhouse	PD-ATMA/DDH	SO/ABSO	Suitable location for Packhouse finalized	No. of locations finalized for Pack house
Establishment of Pack house in suitable location	PD-ATMA/DDH	DOH	Complete Packhouse established	No. of Packhouses established
Preparation and orientation of detail operational guidelines for the operation and maintenance of pack house	PD-ATMA/DDH	SO/ABSO	Detail operational guidelines prepared and imparted to the Agri-entrepreneurs/FPCs/PPs	No. of Agri-entrepreneurs /FPCs/PPs oriented/trained on detail operational guidelines

2.0 Development of Rural Marketing Infrastructure

Traditional marketing system of agricultural commodities is unfavourable for farmers as major share of consumer price goes to the traders and middlemen. The farmers used to get low price for their produce whereas the consumers pay higher price for poor quality products available in the markets. With a view to give boost to the marginal and small farmers by providing direct access to the consumers, minimising the middlemen role in the chain, project will support for development of rural marketing infrastructure in the feasible locations in the production clusters. The project will provide basic infrastructure facilities like market yard, market sheds, selling platform, power supply, lighting, drinking water facility, approach road, etc.

Key Guiding Principles

1. A detailed survey of current production system, quantum of production of different agricultural and horticultural commodities, market mechanism and opinion of farmers / producers in the cluster to assess the need of marketing infrastructure;
2. Encroachment / litigation free land / market yard should be identified, after examining the feasibility and suitability of the place for development of rural marketing infrastructure;
3. The project will provide basic infrastructure facilities like market sheds, selling platform, power supply, lighting, drinking water facility, approach road, etc. based on need of the sellers and the buyers;
4. The investment should generate revenue for operation, maintenance and self-sustenance of the market. A committee can be constituted (if not existing), involving sellers, for operation and maintenance. The committee will collect user fee from the sellers, to be fixed by the committee in consultation with the sellers, based on the volume of sale;
5. The market committee should have an operational guideline, covering transaction management, collection of fees, days of operation (daily / weekly), operation and maintenance of the market place etc.

6. The market committee should maintain detail record and deposit the collected amount in a local branch of any nationalised bank;
7. The committee may register itself under suitable act of the Government;
8. Expenditure incurred by the executive committee should be shared with the general committee members on annual basis during a formal meeting;
9. Proper utilization of the facilities shall be regularly monitored.

Expected Output and Indicators; Rural Market Infrastructure

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Need and Feasibility assessment for marketing infrastructure	PD-ATMA / DDH	ABS0/SO	Feasibility and need for marketing infrastructure assessed for each district	No. of feasibility and need assessment for marketing infrastructure conducted
Identification of suitable market yard/existing haat for development of infrastructures based on needs	PD-ATMA / DDH	ABS0/SO	Suitable market yard/existing haat identified for development of infrastructures	No. of market yard/existing haat identified for development of infrastructures
Preparation of DPR / Business Plan				
Development of Rural Marketing Infrastructure based on need	PD-ATMA / DDH	DA&FP/DOH/OSAMB	Rural Marketing Infrastructures based on the need developed	No. of rural markets developed infrastructures for marketing

3.0 Solar Power Cold Storage

Cold Storages are essential for extending the shelf life, period of marketing, avoiding glut, reduce post-harvest losses, minimizing transportation bottlenecks during peak period of production and maintenance of quality of produce. The development of cold storages has an important role in reducing the wastages of the perishable commodities and providing remunerative prices to the growers and to make available farm products to the consumers at competitive and affordable prices. In the overall process of cool chain establishment for fruits and vegetables, the project will establish 60 Nos. of solar powered cold storage/rooms, each of 5 MT capacity in suitable locations based on feasibility.

Key Guiding Principles

1. Feasibility assessment before establishing solar powered cold storage unit, covering production details of different horticultural commodities;
2. Preparation of DPR with detail business plan for each solar powered cold storage unit;
3. Designing the storage structure scientifically, based on available technological options;
4. Association of suitable Agri-entrepreneur / FPOs /PPs in the operation and management of the cold storage units;
5. Capacity building of Agri-entrepreneur / FPOs /PPs on solar powered cold storage system operation and maintenance;
6. Preparation of a detail operational guidelines for the operation and maintenance of the solar powered cold storage system and its sustainability;
7. Existing Government guidelines for solar powered cold storage system should be abided

8. Project shall support only for establishment of solar powered cold storage unit without land cost. Land shall be provided by the concerned Agri-entrepreneur through FPO / PP;
9. There would not be acquisition of land for establishing cold storage. Available government land / GP land / land available with agri-entrepreneur / FPO / PP will be utilised for the purpose;
10. Land proposed for cold storage construction would be litigation free and land record would be verified by appropriate authority;
11. Each cold storage will be a resource generating unit (revenue-based cost centre)

Expected Output and Indicators; Cold Storage

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Feasibility assessment for Solar Powered Cold Storage	PD-ATMA / DDH	SO / ABSO	Feasibility for Solar Powered Cold Storage assessed	No. of feasibility assessment studies conducted for Solar Powered Cold Storage
Preparation of DPR / Business Plan	PD-ATMA / DDH	SO / ABSO	DPRs prepared for Solar Powered Cold Storage	No. of DPRs prepared for Solar Powered Cold Storage
Identification and finalization of location for Solar Powered Cold Storage	PD-ATMA / DDH	SO / ABSO	Suitable location finalized for Solar Powered Cold Storage	No. of locations finalized for Solar Powered Cold Storage
Establishment of Solar Powered Cold Storage	PD-ATMA / DDH	DOH	Completed Solar Powered Cold Storages established	No. of Solar Powered Cold Storage established
Preparation and orientation of detail operational guidelines for the operation and maintenance of Solar Powered Cold Storage	PD-ATMA / DDH	SO / ABSO	Detail operational guidelines for Solar Powered Cold Storage prepared and imparted to the Agri-entrepreneur /FPCs/PPs	No. of Agri-entrepreneur /FPCs/PPs oriented/trained on detail operational guidelines for Solar Powered Cold Storage

4.0 Transit Point Storage / Procurement Shed

Small and marginal farmers do not have the economic strength to retain their farm produce with them till the market prices become favourable. Scientific storage facility can help the farmers to minimise the wastage and enable them to sell their produce at favourable market price. Transit point storage facilities will enable small farmers to enhance their holding capacity in order to sell their produce at fair prices and avoid distress sales. The project will support in establishment of transit point storage godowns (30-50MT capacity) with procurement shade as well as sorting, grading, weighing and packaging facilities at suitable locations in the project blocks. The project will also facilitate market linkage of agricultural commodities linking these transit point storage godowns with other market instruments.

Key Guiding Principles

1. The project will support establishment of transit point storage godowns with procurement shade as well as sorting, grading, weighing and packaging facilities at suitable locations in the project blocks based on feasibility;
2. Preparation of DPR with business plan for each transit point storage godown;

3. Association of suitable Agri-entrepreneur / FPO / PP in the operation and management of the transit point storage godowns;
4. Capacity building of Agri-entrepreneur / FPOs / PPs on transit point storage godown operation and maintenance;
5. Preparation of a detail operational guidelines for the operation and maintenance of the transit point storage facility and its sustainability;
6. Project shall support only for establishment of transit point storage godown unit without land cost. Land shall be provided by the concerned Agri-entrepreneur through FPO / PP;
7. Each transit point storage godown will be a resource generating unit (revenue-based cost centre)

Expected Output and Indicators; Transit Storage

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Feasibility assessment for Transit Point Storage godown	PD-ATMA	SO/ABSO	Feasibility for Transit Point Storage godown assessed	No. of feasibility assessment studies conducted for Transit Point Storage godown
Preparation of DPR / Business Plan	PD-ATMA	SO/ABSO	DPRs prepared for Transit Point Storage godown	No. of DPRs prepared for Transit Point Storage godown
Identification and finalization of location for Transit Point Storage godown	PD-ATMA	SO/ABSO	Suitable location finalized for Transit Point Storage godown	No. of locations finalized for Transit Point Storage godown
Establishment of Transit Point Storage godown	PD-ATMA	DOA	Transit Point Storage godown established	No. of Transit Point Storage godown established
Preparation and orientation of detail operational guidelines for the operation and maintenance of Transit Point Storage facilities	PD-ATMA	SO/ABSO	Detail operational guidelines for Transit Point Storage facilities prepared and imparted to the Agri-entrepreneur /FPCs/PPs	No. of Agri-entrepreneur /FPCs/PPs oriented/trained on detail operational guidelines for Transit Point Storage facilities

5.0 Value Addition (Establishment of Processing Unit/s)

Mini Processing units for pulses, oilseeds, millets, lemon grass, fruits and vegetables (Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units) will be established in suitable locations based on the feasibility within the project districts for value addition of the farm produce. Such processing facilities will help farmers for fetching better price, long shelf life and better marketability of their farm output. The FPOs / PPs / agri-entrepreneurs shall be encouraged for establishing primary processing units with project support. The project will support in establishing such processing units for agricultural / horticultural produce based on the feasibility.

Project shall support in establishing 30 Nos. of Dal mills (35 Kg capacity/hour), 30 Nos. of Oil expellers (6 Ltr. capacity/hour), 30 Nos. of Millet processing units (200 Kg capacity/hour) and 30 Nos. of Lemon grass oil extraction plants (5MT capacity/day) at suitable locations in the project districts. For production of pickles, jam, jelly, sauce, 30 Nos. of primary processing units (6mX9m) shall be established at strategic locations based on feasibility assessment.

Key Guiding Principles

1. A detail feasibility assessment would be conducted before establishing the processing unit/s, covering production details of different horticultural/agricultural commodities, marketable surplus, potential for processing and value addition etc.;

2. Association of suitable agri-entrepreneur / FPOs / PPs in establishment, operation and management of the processing units;
3. Preparation of DPR with detail business plan for each processing unit to make it a viable enterprise;
4. The units will be established in project villages / clusters at strategic locations;
5. Capacity building of FPOs/PPs/ agri-entrepreneurs on its operation and maintenance, if they are associated in the process;
6. Preparation of a detail operational guidelines for the operation and maintenance of the processing unit and its sustainability;
7. Project shall support only for establishment of processing unit without land cost. Land shall be provided by the concerned agri-entrepreneur through FPO / PP.
8. There would not be acquisition of land for establishing processing unit/s. Available government land / GP land / land available with agri-entrepreneur / FPO / PP will be utilised for the purpose;
9. Land proposed for processing unit construction would be litigation free and land record would be verified by appropriate authority;
10. Each processing unit will be a resource generating unit (revenue-based cost centre); and
11. The instruments, to be installed, should be ISI certified.

Expected Output and Indicators; Processing Units

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Feasibility assessment for Dal Mill / Oil expellers / Millets processing units / Lemon grass oil extraction plants / vegetable and fruit processing units	PD-ATMA / DDH	SO / ABSO	Feasibility for Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units assessed	No. of feasibility studies conducted for Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units
Preparation of DPR / Business Plan	PD-ATMA / DDH	SO / ABSO	DPRs prepared for Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units	No. of DPRs / Business Plans prepared
Identification and finalization of location for the processing units	PD-ATMA / DDH	SO / ABSO	Suitable location finalized for Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units	No. of locations finalized for Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units
Establishment of Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units	PD-ATMA / DDH	DA&FP / DOH	Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units established	No. of Dal Mill/Oil expellers/Millets processing units/Lemon grass oil extraction plants/vegetable and fruit processing units established

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Preparation and orientation of detail operational guidelines for the operation and maintenance of the processing unit and its sustainability	PD-ATMA / DDH	SO / ABSO	Detail operational guidelines prepared and imparted to the Agri-entrepreneurs /FPCs/PPs	No. of Agri-entrepreneurs /FPCs/PPs oriented/trained on detail operational guidelines of the processing units

6.0 Transportation / Logistic Support (Refrigerated Transport Vehicles-Solar)

The cold chain is used primarily to derive benefit from the temporary enhancement of life cycle of the horticultural commodities. In order to preserve the products quality and enhance life cycle of the produce, the project will support in procuring 22 Nos. of solar powered refrigerated transport vehicles/perforated vans with capacity to transport 250 - 400kg of fresh fruits and vegetables. This will be helpful in establishing a cold chain system for horticultural crops in the project districts and facilitating transportation of commodities to demand locations. A refrigerated van must comply with all relevant rules and regulations of State / Central Government in its manufacture and operations.

Key Guiding Principles

1. Feasibility assessment covering production details of different horticultural commodities;
2. Preparation of DPR with business plan for each refrigerated transport vehicle;
3. Association of suitable Agri-entrepreneur / FPO / PP in the operation and management of the refrigerated transport vehicles;
4. Preparation of a detail operational guidelines for the operation and maintenance of the refrigerated transport vehicles;
5. Adherence to the existing Government guidelines with technical specifications for refrigerated transport vehicles;
6. Each refrigerated transport vehicle will be a resource generating unit.

Expected Output and Indicators; Refrigerated Transport Vehicle

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Feasibility assessment for Refrigerated Transport Vehicles	PD-ATMA / DDH	SO/ABSO	Feasibility for Refrigerated Transport Vehicles assessed	No. of feasibility studies conducted for Refrigerated Transport Vehicles
Preparation of DPR / Business Plan	PD-ATMA / DDH	SO/ABSO	DPRs prepared for Refrigerated Transport Vehicles	No. of DPRs prepared for Refrigerated Transport Vehicles
Procurement of Refrigerated Transport Vehicles	PD-ATMA / DDH	DOH	Completed Refrigerated Transport Vehicles procured	No. of Refrigerated Transport Vehicles procured
Preparation and orientation of detail operational guidelines for the operation and maintenance of	PD-ATMA / DDH	SO/ABSO	Detail operational guidelines and maintenance of Refrigerated Transport	No. of Agri-entrepreneur /FPCs/PPs oriented/trained on detail operational

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Refrigerated Transport Vehicles			Vehicles prepared and imparted to the Agri-entrepreneur /FPCs/PPs	guidelines and maintenance of Refrigerated Transport Vehicles

7.0 Buyer and Seller Interface

For strengthening farmer Consumer market linkage, effective buyer-seller meets shall be organized every year in the project area, especially after the harvesting of crops. In order to have effective market linkage, interface of farmers/FPOs/FPCs with the potential buyers like wholesaler/processor/industrial buyer/corporate buyer/institutional buyer/hostels/hotels, etc. shall be organised. The buyer-seller meet is a unique concept of prefixed meetings, presentations and one-to-one sessions. The buyer-seller meet is for providing a customized floor for organizations to meet, discuss, consult and transact business. Project shall support to organise Buyer-seller interface programs twice in each year at district level and once in each year at state level.

Key Guiding Principles

1. Assessing the volume and type of agri commodities to be available for sale in different months in the production clusters of the project district;
2. Identifying potential buyers, the potential buyer may be wholesaler/processor/industrial buyer/corporate buyer/institutional buyer/hostels/hotels, etc.;
3. Appraising the potential buyers on the availability status of agri commodities in the project area and assessing their requirements regarding the type and volume of agri commodities;
4. Organising buyer-seller meet in a in a place and time suitable for both the parties with prior intimation ensuring full attendance;
5. Facilitating inspection of material and facilities for satisfaction of the potential buyers, if required;
6. Facilitating negotiation of both the parties;
7. Completing the contract/agreement process.

Expected Output and Indicators; Buyer-Seller Interface for Market Linkage

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Assessment of volume and type of agri commodities to be available for sale	PD-ATMA / DDH	ABSO/SO	Volume and type of agri commodities assessed	No. of districts conducted assessment of volume and type of agri commodities to be available for sale
Identification of potential buyers	PD-ATMA / DDH	ABSO/SO	Potential buyers identified	No. of Potential buyers identified
Organizing of buyer-seller meet	PD-ATMA / DDH	ABSO/SO	Buyer-seller meets organized successfully	No. of Buyer-seller meets organized
Execution of business agreement among buyer and seller	PD-ATMA / DDH	ABSO/SO	Business agreement among buyer and seller executed	No. of business agreements among buyer and seller executed

8.0 Linking Agriculture Markets with e-NAM

The Government of India has developed an electronic trading portal, called National Agriculture Marketing (NAM). It is a pan-India electronic trading portal which seeks to network the existing APMC and other market yards to create a unified national market for agricultural commodities. Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing eNAM under the aegis of Ministry of Agriculture and Farmers’ Welfare, Government of India. NAM is a “virtual” market but it has a physical market (mandi) at the back end. It is a device to create a national network of physical mandis which can be accessed online. It seeks to leverage the physical infrastructure of the mandis through an online trading portal, enabling buyers situated even outside the State to participate in trading at the local level.

The project will facilitate to “plug-in” to selected market yards existing in the project districts (regulated or private) with the NAM. Linking with NAM will help to increase the choice of the farmer when s/he brings his produce to the mandi for sale. Local traders can bid for the produce, as also traders of other states / locations on the electronic platform. The farmer will have the choice to accept either the local offer or the online offer, based on the price consideration. The local markets / mandis will also not loose out and in either case, the transaction will be on the books of the local mandi and they will continue to earn the transaction fee. When, the volume of business will significantly increase and there will be greater competition for specific produce, it will help the mandis to collect higher transaction fees.

The electronic platform NAM helps the farmers with more options for sale of his/her produces in different mandis. NAM offers the opportunity for the local traders in the mandi to access a larger national market for secondary trading. Bulk buyers, processors, exporters etc. benefit from being able to participate directly in trading through the NAM platform, thereby reducing their intermediation costs. With access to national markets, farmers can get significant benefits through higher returns, lower transaction costs to buyers and stable prices and availability to consumers.

Key Guiding Principles

1. Consultation / discussion with existing regulated and unregulated markets;
2. Registration of farmers/FPOs (via eNAM portal, mobile application, e-NAM mandi);
3. Capacity building of farmers, FPOs, registered traders and other associated stakeholders;
4. Initial hand holding support to farmers / FPOs/traders;
5. Monitoring, supervision and tracking of transactions.

Expected Output and Indicators; Market Linkage with E-NAM

Sub-Activities	Responsibility		Expected Output	Indicators
	Primary	Secondary		
Consultation / discussion with existing regulated and unregulated markets	PD-ATMA / DDH	ABSO/SO	Farmers/FPOs registered for online trading	No. of Farmers / FPOs registered for online trading
Registration of farmers / FPOs / Commodities	PD-ATMA / DDH	ABSO/SO		No. of commodities registered with E-NAM
Monitoring, supervision and tracking of transactions	PD-ATMA / DDH	ABSO/SO		

Expected Interventions and Outputs

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
A	Interventions in Agriculture		
A.1	Post-Harvest Management and Agribusiness	Transit Point Storage / and Procurement Shed	<ol style="list-style-type: none"> 1. No. of Transit Point Storage godown established by project location / district; 2. Total storage capacity of the structures created; 3. Utilisation of transit storage structures and farmers accessibility; 4. Revenue generation and sustainability of the storage structures; 5. No. of Agri-entrepreneur / FPO / PPs associated in the management of the storage structures.
		Development of Rural Marketing Infrastructure	<ol style="list-style-type: none"> 1. No. of market yard (existing / new) supported with different marketing infrastructures; 2. Types of marketing infrastructures created as per the identified needs; 3. Enhancement in seller's turnout and sell of commodities due to development of marketing infrastructures.
		Post-Harvest Management Facility	<ol style="list-style-type: none"> 1. No. of dal mill / oil expellers / millet processing units established; 2. Quantum of processed products produced per year; 3. No. of farmers (by sex, social group and holding category) accessed the facility; 4. No. of Agri-entrepreneurs / FPOs / PPs associated in the management of the facility / processing unit; 5. Financial gain of farmers / agri-entrepreneurs / FPO / PP from selling of processed products.
		Buyer-Seller Interface	<ol style="list-style-type: none"> 1. No. of Buyer-seller meets organized; 2. No. of state level and national level buyers participated; 3. No. of business agreements among buyer and seller executed; 4. Quantum of produced sold by commodity type by farmers / FPO / PP; 5. Financial return / profit to farmers / FPO / PP / agri entrepreneurs.
		Linking Agriculture Markets with e-NAM	<ol style="list-style-type: none"> 1. No. of markets / commodities registered 2. Volume of business done through E-NAM /

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
			bed portal; 3. Income of producers / FPO / PP through web-based marketing.
		Engagement of Agribusiness Support Organization (ABSO)	1. No. of Agribusiness Support Organizations (ABSO) associated; 2. No. of model investment plans developed and taken up under the project; 3. No. of FPO / PP / private entities engaged in agribusiness activities.
B Interventions in Horticulture			
B.1	Storage Structures	Pack House	1. No. of pack houses established; 2. Quantum of commodities packed and dispatched for marketing; 3. Income enhancement of farmers / FPO / PP / Agri entrepreneur due to package of produces; 4. No. of farmers accessed the facility and availed the benefit; 5. Revenue generation and financial sustenance of the pack house.
		Cold Room-Solar for 5 MTs	1. No. of solar cold rooms established; 2. Storage capacity of the cold rooms and quantum of commodities stored; 3. Income enhancement of farmers / FPO / PP / Agri entrepreneur due to storage / improved shelf life of produces; 4. No. of farmers accessed the facility and availed the benefit; 5. Revenue generation and financial sustenance of the solar cold room.
B.2	Post-harvest management – value addition	Primary processing unit (vegetables & fruits)	1. No. of units for primary processing of vegetables / fruits established; 2. Average processing capacity of the installed unit/s per day; 3. Quantum of vegetables / fruits processed per day / season; 4. No. of farmers (by sex, social group and holding category) accessed the processing facility; 5. Average income of Agri entrepreneur / FPO / PP / women SHG from primary process; 6. Profitability of the processing unit.
		Processing unit-Lemon grass	1. No. of Lemon grass processing units established; 2. Average processing capacity of the installed unit/s per day;

SN	Focused Area	Proposed Interventions	Expected Output / Outcome Indicators
			<ol style="list-style-type: none"> 3. Quantum of Lemon grass processed per day / season; 4. No. of farmers (by sex, social group and holding category) accessed the processing facility and availed the benefit; 5. Average income of farmers / Agri entrepreneur / FPO / PP / women SHG from primary process; 6. Profitability of the processing unit.
		Perforated van / Refrigerator vehicle (solar)	<ol style="list-style-type: none"> 1. No. of Refrigerated Transport Vehicles procured and remain under regular operation; 2. Quantum of commodities transported in a year 3. Enhancement in market price due to improved shelf life of commodities and price realization by the farmers / FPO;

Annexure IX:

Guidelines for Sanction and Disbursement of Capital Investment Subsidy Under Agriculture Policy-2013

The Government have announced an Agriculture Policy which has come into effect from 1st APRIL, 2013. The said policy provides for payment of Capital Investment Subsidy as follows.

Scheme	Pattern of Assistance
Capital Investment Subsidy for Commercial Agri-Enterprises (CAE)	40% of the fixed capital (excluding the cost of the land) subject to a limit of 50.00 lakh (50% limited to 50.00 lakh for SC/ST/Women/Graduates of Agriculture and Allied Disciplines)

Capital Investment Subsidy will be provided to the Agro- entrepreneurs for setting up Agri-Enterprises enlisted below:

SN	Name of the Projects	Minimum Requirement
1.	Commercial Floriculture	Protected condition-0.5 acre Open condition-4.00 acre
2.	Commercial Meat, Egg & Fish Production	Broiler (meat)-4000 birds, Layer (egg)-10000 birds Fish Production-2Ha water area Sheep/Goat/Pig- 100 nos.
3.	Plantation crops like tea, coffee, rubber, cocoa, cashew and oil palm	Plantation area-4.00 ha.
4.	Commercial calf rearing centre	CB female calf – 20 nos.
5.	Commercial goat/sheep/pig rearing centre	Goat/Sheep-100 nos, Pig-50 nos.
6.	Export oriented agriculture & horticulture	
7.	Freshwater pearl culture	
8.	Agro Service Centre	Min. requirement of machines
9.	Agri- clinic and Agri- business Centre	
10.	Veterinary Clinic	
11.	Refrigerated Van	
12.	Agro-eco Tourism	
13.	Bio fertilizer Production and Marketing	50 MT per annum
14.	Soil Testing Laboratory	10000 samples/annum
15.	Fingerling production	
16.	Commercial Fruit cultivation	Plantation area-4.00 ha.(long term fruit bearing plants)
17.	Bagasse based Unit	
18.	Cashew processing and other cashew nut based industry	
19.	Coir based industry	
20.	Jute based industry	

SN	Name of the Projects	Minimum Requirement
21.	Seed Processing Plant	
22.	Oil extraction Mill	
23.	Cattle & Poultry / Fish Feed Plant	30 MT/day
24.	Apiary (Bee keeping)	100 boxes
25.	Coconut based products	
26.	Dairy farming and milk processing	Dairy farming- 20 CB cows/ 20 graded buffaloes; Milk processing- 10,000 LPD
27.	Squash, Jam, Jelly, pickle, etc of different fruits	
28.	Fruit Pulp	
29.	Vegetables & spices based industry	
30.	Dehydration and canning of vegetables	
31.	Frozen fruits and vegetables	
32.	Cultivation and processing of mushroom	
33.	Mushroom spawn production unit	25000 bottles/sitting
34.	Meat processing unit	
35.	Food Products Based on Soya bean	
36.	Maize Processing Plant	
37.	Product out of crop residue	
38.	Tissue culture laboratory	
39.	Vermiculture	
40.	Bio pesticides/Bio control agent producing unit	
41.	Green House, Poly House, Glass House	1000 sqm.
42.	Extraction of essence / oil from flowers, roots,leaves and branches	
43.	Cold Storage	1000 MT
44.	Processing of fruits for commercial purpose	
45.	Integrated Farming	
46.	Honey Processing Units	
47.	Pulse processing and derivatives industries.	
48.	Enzymes and vitamins out of agri, horti, fish and animal products	
49.	Poultry Hatchery and Breeders Farm	Poultry Hatchery-20000 eggs/week Breeders farm-1000 birds
50.	Fish / Prawn processing units	
51.	Mechanised sorting, grading and packing of agricultural / horticultural products	
52.	Technology Upgradation / modernization / expansion of existing agro based industries and food processing industries	
53.	Bakery & Confectionary	
54.	Groundnut Processing/ Marketing (use of decorticator)	
55.	Ragi, small millets, coarse cereal processing(project size <`2.00 crores)	
56.	Tree borne oilseeds processing	
57.	Commercial Duck Farming	Minimum unit size-4000 nos.
58.	Establishment of Aquashop	
59.	Duck farming as a part of integrated farming. (Minimum Unit size – 400 nos.)	Minimum unit size-400 nos.
60.	Integrated Rice Mill having minimum investment of 1 Crore in machineries. The relevant machines will be approved by the SLTC.	
61.	Gobar gas (Bio-gas) plant for harnessing energy. (OREDA	

SN	Name of the Projects	Minimum Requirement
	& Agriculture Department should provide Rs. 8000/- each and it should be executed preferably through Co-operative / Farmers'Societies)	
62.	Food processing industries under the purview of the Union Ministry of Food Processing will be eligible for top-up subsidy of 10%	
63.	Warehouses for agricultural input and output will be eligible for 10% top-up subsidy.	

N.B.: 1) The above-mentioned list of enterprises can be amended/modified by the Government from time to time in the changing circumstances.

The entrepreneur should get net income of 10% of the project cost minimum to Rs.2.00 lakh per annum from all the above-mentioned projects.

The CAE projects against which no minimum prerequisite is there, the viable project report should be prepared so that entrepreneur should get net income of 10% of the project cost minimum to Rs.2.00 lakh per annum from the project.

Annexure X:

Schemes in Fishery Sector

A. CENTRAL PLAN SCHEMES (100% Central Assistance)

1. Strengthening of Data base and information net working for Fisheries sector
2. Introduction of Intermediate crafts of improved design
3. Safety of Fishermen at Sea
4. Development of post-harvest Infrastructure
5. Enforcement of Marine Fisheries Regulation Act
6. Promoting of Fuel-efficient Environment friendly Fishing Practice Promotion of CNG/LPG driven Engine

B. CENTRALLY SPONSORED PLAN SCHEMES

Development of Marine fisheries infrastructure & post-harvest operation (State share: Central share)

1. Fishermen Development Rebate on HSD Oil(25:75)
2. Safety of Marine Fishermen at sea(25:75)
3. Development of Shore Base Facilities(25:75)
4. Establishment of Fishing Harbour & fish landing centre(30:70)
5. Up-Gradation & Modernisation of Fishing Harbour & Fish Landing Centre(25:75)
6. Motorisation of Traditional Craft(50:50)

National scheme for Welfare for Fishermen (State share: Central share)

1. Group Accident Insurance for Fishermen(50:50)
2. Saving-cum-Relief fund(50:50)
3. National welfare fund for Construction of low-cost house(50:50)
4. Fisheries Training and Extension(20:80)

Development of Inland Fisheries & Aquaculture (State share: Central share)

1. Devt. of water logged Areas through FFDA(25:75)
2. Integrated Development of Inland capture resources (Reservoir/Rivers)(25:75)
3. Devt. of fresh water aquaculture through FFDA(25:75)
4. Devt. of Brackish water Aquaculture through FFDA(25:75)
5. Innovative Initiative capacity Building & Training(25:75)

STATE PLAN SCHEMES (100% State assistance)

7. Infrastructure improvement

8. Mastyajibi UnnayanYojana
9. Contribution towards NFDBAssistance
10. Contribution towards RIDFAssistance
11. Organisation of skill up-gradation training & awarenessmeet
12. Survey & Investigation of Fishing Harbour & Fish LandingCenter
13. Reactivation of FisheriesCo-operatives
14. Interest Subvention on Short Term credit to fish farmers- Crop loan for fishfarmers
15. Interest Subvention on Long Term Credit Support to fishfarmers
16. Integrated Management & Pro poor Support Project for Marine Fishermen inOrissa
17. Empowering Fishermen through Mobile Advisory Services & Establishment of Toll Free Call Centre for Fisheries ExtensionService
18. Promotion of Intensive Aquaculture & Fish seedHatchery
19. Matsyajibi BasagrahaYojana
20. Infrastructure for cage culture
21. Investment of Share capital in Fisheries Co- operativeSocieties

Central Assistance from outsideBudget

22. Intensive Coastal Zone Management Project(ICZMP)
23. Orissa Community Tank Management Project(OCTMP)
24. National Fisheries Development Board(NFDB)
25. Excavation fo Multi-purpose Farm pond for pisciculture underMGNREGS

RKVY (100% CentralAssistance)

- i) Enhancing inland fish production throughNMPS
 - a) Intensive Aquaculture in tanks &ponds
 - b) Reservoir fisheries development through Cageculture
- ii) Aquaculture development through integrated approach in Rayagada district underNMPS
- iii) Assistance to fishermen for livelihood development for marine & Chilikafishermen
- iv) Replacement of breeders & management of fish seedfarm
- v) Development of Approach road to Chanadrabha prawn hatchery at Konark in Puridistrict
- vi) Establishment of fish net machine at OPDC Net Manufacturingunit

RIDF (20% state share: 80%NABARD)

- a) Construction of fish landing center at Markandi, Kanisi Block in Ganjamdistrict
- b) Establishment of Fishing jetties with landing auction platform & other associated facilities at Gopalpur in Ganjamdistrict
- c) Construction of CC road for Gudupahi shrimp cluster from Nuanai Ghant bridge Chhack to Bhimpurpahi Chhack in Balasore district (Reach - I, II &III)

MUY (Mastyajibi UnnayanYojana)

- i. Assistance for net & Boat for inland fishermen underRKVY
- ii. Assistance for fish marketing infrastructure for fishermen (Ice box with Cycle, Ice box with Motor Cycle and Ice box with Auto Rickshaw) underRKVY
- iii. Replacement of wooden country craft with FRP boat for marine fishermen underRKVY
- iv. Motorization of country craft for marinefishermen
- v. Demonstration of cage culture in reservoirs underRKVY

- vi. Sea weed culture as an alternative livelihood for marine fishermen under RKVY
- vii. Award to meritorious children of fishermen community (100% State Plan)
- viii. Group Accident Insurance scheme for fishermen
- ix. NETRAJYOTI scheme for fishermen (State scheme)
- x. Financial assistance for fatal diseases for fishermen (State scheme)
- xi. Financial assistance to fisher women SHGs (100% State Plan)
- xii. MO KUDIA scheme for fishermen (State scheme)
- xiii. Basundhara for fishermen (State scheme)
- xiv. Special PDS for marine fishermen affected during fishing ban (State scheme)

Annexure XI:

Fishery Schemes and Pattern of Assistance

I. Development of Inland Fisheries & Aquaculture

SN.	Objective	Salient features	Modalities
1	Construction of New Pond/tank	1. Increase water area under Freshwater pisciculture 2. Unit cost Rs.3.0lakhs	Subsidy 20% for all & 25% for SC/ST
2	Renovation of pond/tank	1. Increase water area under pisciculture 2. Unit cost Rs.75000/-Ha	Subsidy 20% for all & 25% for SC/ST
3	Cost of inputs	1. Increase water area under pisciculture 2. Unit cost Rs.50,000/ha	Subsidy 20% for all & 25% for SC/ST Freshwater Prawn culture Rs.1.80 lakhs/Ha
4	Fresh water fish seed hatchery	1. Increase fish seed production 2. Unit cost Rs.12 lakh (10 Million capacity)	Subsidy 10% to entrepreneur
5	Fish feed unit	1. Supply fish feed to fish farmers 2. Small unit cost Rs.7.50 lakhs (1.2 Qtl per day)	Subsidy 20% for all
6	Establishment of freshwater prawn seed hatchery	1. Supply of FW prawn seed to farmers 2. Unit cost Rs.12 lakh (5-10 Million PL/Yr)	Subsidy 10% to entrepreneur
7	Provision of soil & water testing kits to each FFDA	1. Estimation of water quality of pond water 2. Unit cost Rs.40000/-	Sanctioned once to each FFDA
8	Setting up of Integrated units, including hatcheries for ornamental fishes	1. Produce ornamental fish seed to market 2. Unit cost Rs.15 lakh (5-10 Million fry)	Subsidy 10%
9	Brood banks for ornamental fishes	1. Conservation of ornamental fish species 2. Unit cost Rs.25 lakh per unit including farm & transport arrangement	
10	Ornamental/ fish seed certification	1. Certification of authentic fish seed producer Unit cost Rs.25 lakh per unit	
11	Transportation of fish/prawn seed		
12	Purchase of vehicle		50% of cost of vehicle & 50% cost for replaced vehicle

Eligibility

1. All category offarmer
2. Pond development subsidy (Excavation/renovation with first year input) is admissible up to 5.00ha
3. Subsidy is admissible with or without institutional finance

II. Development of Brackish water Aquaculture

Sl.	Objective	Salient features	Modalities
1	Renovation of pond/tank	1. Increase brackish water aquaculture 2. Unit cost Rs.2.4lakhs/Ha	Subsidy 25% of cost for all subject to maximum of Rs.60000/- to small farmers less than 2 ha
2	Establishment of Demonstration-cum-training center	Onetime GOI share of grants amounting Rs.5.0 lakhs	
3	Network of Diagnostic Laboratories for Aquatic Animal health	100% expenditure to be incurred by center	

III. Development of Waterlogged area

Sl.	Objective	Salient features	Modalities
1	Development of Waterlogged area	1. Develop waterlogged area in fresh/brackish water area 2. Unit cost Rs.2.0lakhs/ha	Subsidy 20% to the beneficiary with ceiling of Rs.40000/-per Ha.
2	Inputs (fish/prawn)	1. seed, feed, manure, fertilizers, preventive measures for disease, transportation charges etc 2. Unit cost Rs.75000/ha	Subsidy 20% to the beneficiary with ceiling of Rs.15000/-per Ha

IV. Inland Capture Fisheries

Sl.	Objective	Salient features	Modalities
1	Fish Seed Rearing Units Cages/Pen with inputs	1. Cage size: One cage (3 x 2 x 2m) 2. Unit cost Rs.3.0 lakhs/ha for rearing unit / Unit cost Rs.25000/ ha for cage/pen	Subsidy 20% to the beneficiary with ceiling of Rs.60000/-per Ha Subsidy 20% to the beneficiary with ceiling of Rs.5000/-per unit of cage
2	Inputs cost	1. Input includes seed, feed, manure, fertilizers, preventive measures for disease, transportation charges etc	Subsidy 20% to the beneficiary with ceiling of Rs.6000/-per Ha

3	Craft & Gear	2. Unit cost Rs.30000/ha 1. Supply of Net, boats 2. Unit cost Rs.15000/unit	Subsidy 20% to the beneficiary with ceiling of Rs.3000/-per unit
4	Construction of Fish landing center	Unit cost Rs.100000/-unit	
5	Riverine Fisheries Conservation and Awareness Programme	Rs.2.00 lakhs per year to State Govt.	

V. Innovative Initiative

Sl.	Objective	Salient features	Modalities
1	(Need based proposal)	As per actual	

VI. Organisation of skill up-gradation training & awarenessmeets

Sl.	Objective	Salient features	Modalities
1	Training programme and awareness meet on different aquaculture practices, processing and extension activities to farmers / master trainers/government officers at induction level.	Awareness meet per district Rs.50000/-	i.30 participants per batch ii. Period of training 30 days/ training. iii. TA Rs.500/- per day iv. Rs.150/- per day v. Horarium to resource person Rs.1000/-

VII. Fisheries scheme implemented under National Fisheries Development Board(NFDB)

SN	Scheme/ Objective	Salient Features	Modalities
1	Intensive Aquaculture in ponds		
a	Construction of new fish/prawn ponds and tanks	3.00lakhs/ha for plain area	1.20% subsidy with a ceiling of ₹ 0.60 lakhs/ha. 2) 25%subsidy to SC&STs with a ceiling of ₹ 75lakhs / ha. No upper area limitation is there to avail subsidy
	New species Pangasius sutchi	3.00 lakhs/ ha.	20% of the unit cost for all farmers. 25%subsidy to SC& STs.
b	Renovation of exiting fish/prawn ponds& Tanks Entrepreneurs/farmers	0.75 lakhs/ha.	20%subsidy for all farmers/entrepreneurs with a ceiling of ₹0.15lakhs/ha. 25%subsidy to SC& STs with a ceiling of ₹0.1875 lakhs/ha.
	For New species Pangasius sutchi	0.75 lakh/ha.	-do-
C	Cost of inputs for prawn farming Entrepreneurs / farmers	1.80 lakhs/ha.	20% subsidy with a ceiling Of ₹0.36 lakhs/ha.
	For fish/prawn farming in paddy fields	0.50 lakhs/ha.	20% subsidy for all farmers/entrepreneurs.

SN	Scheme/ Objective	Salient Features	Modalities
	Entrepreneurs/farmers For New species Pangasius sutchi	5.00 lakh/ha	40% of subsidy of the unit cost for initial period of 2yrs and thereafter 20% for all farmers @ 25% for SC/ST farmers.
d	Establishment of freshwater prawn seed hatchery		
	ii) Capacity :5-8 million PL/year Entrepreneurs/farmers	₹ 12 lakhs/unit	20% subsidy with a ceiling of Rs 2.40lakhs to entrepreneurs/farmers.
e	Establishment of fish seed hatchery		
	Establishment of fish seed hatcheries with / without / nurseries 7-8 million (fry) Capacity / year.	₹ 12.00lakhs/unit for plainareas.	20% back ended bank linked subsidy to entrepreneurs/ farmers with a ceiling of ₹ 2.4lakhs.
f	Renovation of fish Seed Farms		
	Construction of fish seed rearing units for rearing fry to large fingerling of 80-100mm size new fish/prawn ponds and tanks	3.00 lakhs/ha for plain area	20% subsidy for all farmers, 25%subsidy to SC&STs / government organizations
g	Feed mill (extruded floating pelleted feed for 5 tons/hour production capacity entrepreneurs	₹ 1000.00lakhs/ unit	40% equity on machinery and equipment in respect of listed companies or 40% soft loan(with 5% interest) administered through commercial banks for entrepreneurs/profit making fisheries federation/Fisheries Corporation
	Feed mills of 2 tons/day	₹ 25.00lakhs/unit	40% soft loan on capital cost (excluding land cost) @5% interest rate through nationalized bank
	Feed mills of 1.2 quintals/day	₹ 7.5 lakhs/unit	20% subsidy with a ceiling of Rs.1.5 lakh/unit for farmers and entrepreneurs
h	Ornamental Fisheries		
i)	Backyard hatchery	₹ 1.50lakh	50% of unit cost subsidy to women SHGs 25% of unit cost subsidy to individual household
ii)	Medium scale ornamental unit	₹ 4.00lakhs	25% of unit cost subsidy to entrepreneurs
iii)	Integrated ornamental units	₹ 15.00lakhs	90% grants to State Fisheries and Govt. organization 25% of unit cost subsidy to entrepreneurs
iv)	Aquarium fabrication unit	₹ 1.00 lakhs	50% of unit cost subsidy to women SHGs and fisherwomen co-operative entrepreneurs 25% of unit cost subsidy to any

SN	Scheme/ Objective	Salient Features	Modalities
			individual
v)	Training to beneficiaries on ornamental Fisheries	Training up-to 5days women SHGs/ fisherwomen cooperative society and any individual setting up of ornamental units.	DA@150 per day. TA 100per day. Honorarium to resource person ₹ 500 per day, TA@ ₹ 1000 per programme implementing agencies@ ₹ 75/day/member per batch 30 members
2	Reservoir Fisheries Development (RFD)		
i)	Fingerling Stocking in reservoirs @ 2000/ha in small reservoirs, @1000/ha for medium and @500 for large reservoirs.	Rs.1/ per fingerling of 80 -100 mm IMC and other species indicated in the guidelines. This cost would include rearing of seed in-situ/ex-situand transportation.	100% grant will be provided for stocking of fingerlings. Implementing agency shall have to pay 25% lease/license amount to the NFDB.
ii)	Continuous stocking for medium and large reservoirs for 4 consecutive years.(1+3)	Rs. 1/ per fingerling of 80-100mm size.	Finance assistance will be extended for stocking of fingerlings in medium and large reservoirs at 50%of numbers stocked in the first year.
iii)	Training to fishermen on reservoir management		Training upto for five days to the fishermen depending on the reservoirs. DAtofishermen ₹ 150/Day. TA to fishermen ₹ 100 per day. Honorarium to the resourse persons ₹ 500/per day. TA @ 1000/per programme.Implementing Agency@ ₹ 75/ day/member.
3.	Coastal Aquaculture		
i)	Construction of ponds for brackish water fin fish culture	₹ 2.40 lakhs/ha	25% unit cost subject to a maximum of 0.60lakhs/ ha as subsidy.
ii)	Additional infrastructure for brackish finfish culture for modification of existing farms.	₹ 2.00lakhs/ha.	25% unit cost subject to maximum of 0.50lakhs/ha as subsidy.
iii)	Cage culture of brackish water fin fish in ponds and open waters.	₹ 10.00lakhs/ha	25% unit cost subject to a maximum of 2.50lakhs/ha as subsidy.
iv)	Input assistance for brackish water fin fish culture.	₹ 3.00 lakhs /ha (subject to the approval of CIBA based on the Productionlevels)	1.One time back ended subsidy of 25% to all farmers to a maximum of 0.75 lakhs/ ha and 2. 30% subsidy in case of SC/ STs to a maximum of 0.90 lakhs/ha.
v)	Input assistance for cage culture of	7.00lakhs/ha (subject to the approval of	1. Back-ended subsidy of 25% on the working capital for first crop with a

SN	Scheme/ Objective	Salient Features	Modalities
	brackish water fin fish.	CIBA/ RGCA based on production levels)	ceiling of Rs. 1.75lakhs/ ha. 2.Backended subsidy of 30% on the working capital for first crop to SCS/STS with a ceiling of Rs2.10lakhs/ha.
4)	Need Based Financial Assistance for development and demonstration of innovative/new technologies.		
	1.For increasing fish production / productivity as brood stock development.	Unit cost to be recommended by Central Fisheries Institute concerned.	One time 100% grant to the Central/State Government organizations/Federation.
	2. Newspecies 3. Low cost feed with high nutritive value. 4. New farming practices (cage/ pen culture) etc.	Unit cost to be recommended by Central Fisheries Institute concerned.	40% of the project cost as promotional incentive as back-ended subsidy to the entrepreneurs.
	5.Development of Diagnostic kits (including biotechnological kits)	Unit cost has to be approved by Central Fish Institute concerned.	40% soft loan on capital Investment through commercial banks to the entrepreneurs.
	Need based financial assistance for infrastructure development in coastal aquaculture(Aquatic Quarantine etc)	Approval of Government of India is mandatory.	90% grant to Government Departments/ Agencies.
	Need based financial assistance for Specific Pathogen Free Shrimp naupli production centers.	₹ 25.00 lakhs for at least 200 million nauplii production capacity/year.	100% grant to government Agencies. 25% of the unit cost as subsidy to entrepreneurs.
	Additional infrastructure for SPF shrimp seed hatcheries.	₹ 20.00 lakhs for 30 million PL 20 capacity/ year.	90% to the central/ State Government Departments /Institutions 25% of the unit cost as subsidy to entrepreneurs.
	Assistance to Specific Pathogen Free shrimp culture farms for additional infrastructure for semi intensive/ intensive farming.	Rs.15.00 lakhs for 5ha.w.s.a.and above.	1. back ended subsidy of 25% on the capitalcost. 2.Back ended subsidy of 30% on the capital cost toSCs/STs.
5.	Mariculture		
a.	Setting up of cage mariculture projects for	₹ 2.00 crores per unit.	Full financial support for demonstration projects undertaken by

SN	Scheme/ Objective	Salient Features	Modalities
	demonstration purpose at least 20 different locations.		Government institutions.
b.	Setting up of open sea cage culture by companies.	₹ 2.00crores per unit.	20% equity participation on investment.
c.	Promotion of diversification by shrimp hatcheries to take up seed production of finfish species of commercial importance.	₹ 70lakhs.	20% subsidy on the unit cost not exceeding 14.0 lakhs/ unit.
d.	Assistance for setting up of Open Sea cage culture units by fishermen groups.	₹ 1.25 lakhs capitalcost. ₹ 2.45 lakhs workingcapital.	40% back ended subsidy on capital cost.
e.	Assistance for setting up of Open Sea cage culture units by entrepreneurs.	₹ 6.00lakhs unit cost.	40% back ended subsidy on capital cost.
f.	Marine ornamental fish demonstration hatchery	₹ 83.2lakh/unit.	100% financial assistance to Govt. and institutes having expertise as per the guidelines of NFDB.
g.	Training on marine ornamental fish culture	100% grant	100% financial assistance to Govt. institutions as per the guidelines of NFDB.
h.	Assistance to Mussel/Oyster/Clam culture/other commercial shellfishes.	1. Mussel culture(rack culture:30m x20m rack of 1200 ropesof1m): ₹ 1.90lakhs (₹ 1.41lakhs on capital and ₹ 0.49 lakhs as recurring costs) 2. Mussel culture (raft culture: 12 units of 5m x5m rafts of 300sq. m(600 ropesof4m): ₹ 4.32lakhs (₹ 2.81 lakhs on capital and ₹ 1.51 lakhs as recurring costs). 3. Edible Oyster and clam culture (rack culture of 300 sq.m area): ₹ 1.27lakhs (₹ 0.38lakhs on capital and ₹ 0.89 lakhs as recurring costs).	1.25% back ended subsidy to Women SHGs,entrepreneurs on capital & recurring cost to all farmers and2.30% subsidy in case of SC/ STs.
6.	Development of Domestic Fish Marketing		
a	Modernization of wholesale fish	₹ 250.00 Lakhs/50 stalls;	90% of capital cost as grant to Government Fisheries Departments,

SN	Scheme/ Objective	Salient Features	Modalities
	markets.	approximate area of 3.0 acres.	Quasi Government Organisations, Local Civic Bodies, and Research Institutes.
b	Development/ construction of new retail markets, complexes and retail outlets.	₹ 50.00 lakhsto 100.00 lakhs.	90% of capital cost as grant to Government Fisheries Departments, Quasi Government Organizations, Local Civic Bodies, Research Institutes, 25% of capital cost as subsidy to pvt. entrepreneurs and 30% to SC/ST, Women and NE beneficiaries.
c	Establishment of modern fish retail outlet by NFDB.	To be decided and appraised on case to case basis and on the local conditions. Normally, it may cost up to 10 lakhs excluding the buildingcost.	NFDB will establish the retail outlets and will be leased/ rented to eligible entrepreneurs/ self-help groups/ ex-servicemen to manage the unit under P PP mode.
d	Setting up of retail fish Outlets.	Upto ₹ 10.00lakhs.	Subsidy @25% of approved Project cost to entrepreneurs (30% subsidy for SCs/STs/NE regions)
e	Retailing by fisherwomen	Upto ₹ 10.00lakhs	40% on the project cost to Fisherwomen who are involved in fish marketing and fisherwomen who are from fishermen community and members of local fishermen or fisherwomen co-operativesocieties.
f	Cold chain development and processing of value added products.	Unit cost has to be decided and appraised on case to case basis.	90% of capital cost as grant to Government Fisheries Departments, Quasi Government Organizations, Local Civil Bodies, Research Institutes, 25% of capital cost as subsidy to Pvt. Entrepreneurs and 30% SC/ST, women and NE beneficiaries.
g	Campaign for promotion of fish products and consumption.	Each proposal will be examined and appraised on case to case basis.	100% grants to Government Departments, Research institutions, and Quasi government Organizations.
h	Organization of fish festival / fish mela	Upto ₹ 50.00 lakhs.	50% of the expenditure to Govt. departments/ Quasi Government organizations.
i	Model Fish Dressing Centre	Upto ₹ 150.00lakhs.	90% grant to the Govt. Departments/ Quasi Govt. Organizations/ Research Institutes.
j	Setting up of Solar drying of fish units	Unit cost up to ₹ 6.0 lakhs for 100Kg. Case to case basis for 500 g and above.	a) 90% grant to the Govt. Departments/Quasi Govt. Organizations /Research Institutes. b) 25% subsidy (30% for SC/ST & NE regions) to fishermen/ fisherwomen/ SHGs/ entrepreneurs.
k	Platform for Sun drying of fish	Unit costlimitedto ₹ 35,000/	a) 90% grant to the Govt . Departments/ Quasi Govt. Organizations/ ResearchInstitutes. b) 25% subsidy (30% for SC/ST & NE

SN	Scheme/ Objective	Salient Features	Modalities
			Regions) to fishermen/fisherwomen / SHGs/entrepreneurs.
1	Training and demonstration to fisherwomen on hygienic handling of fish and processing /value addition.	Daily allowance of ₹ 150/day/trainee to and fro travel. Subject to a maximum of ₹ 500 per trainee. Honorarium of ₹ 500/day and actual to and fro travel, subject to a maximum of 1000. 75/trainee/day to the Implementing Agency.	100% Financial assistance as per the guidelines of NFDB.
7	Infrastructure: Fishing Harbours and Landing Centers		
	Modernisation/ Up-gradation of fishing harbours and fish landing centers.	Based on the approved cost of CICFE, Bangalore.	i. 100% financial assistance as per the guidelines of NFDB. ii. Constitution of a Management committee involving Fisheries Dept./stake holders/ Boat owners/ exporters/processors is pre-requirements
8	Deep sea fishing and Tuna processing		
a	Development of indigenous tuna fishing fleet	NFDB support boats Rs.75 lakh including gear component.	i. 25-33% of the total cost of construction as equity participation and beneficiaries could raise the balance through loan. ii. OAL of boat should be 18-20 meter. iii. After one year of moratorium, the beneficiaries should start repaying the equity in equal instalments.
b	Human resource development	i. DA ₹ 150/day/trainee ii. To & fro travel Max. ₹ 500/actual. iii. Honorarium 500 and actual to & fro expenses Max. 1000/ iv. Institutional expenses ₹ 75/trainee/day.	100% financial assistance as per guide lines of NFDB.
c	Up-gradation of processing unit	To be decided and processing units on case to case basis	20-30% equity participation appraised by MPEDA for ICAR/ Government institutions.
9	Human resource development programme: Training		
	Training programme on different aquaculture practices, processing and	To be decided on case to case basis.	i. 20 participants per batch ii. Period of training 10 days/ training.

SN	Scheme/ Objective	Salient Features	Modalities
	extension activities to farmers / master trainers/government officers at induction level.		iii. TA will be provided on request from the organizing institutes after submission of travel documents. iv.No DA is eligible to the participants since boarding and lodging facilities are being provided by the concerned training institutes with the funding support of NFDB. v. Funding support will be provided to the training organising institutes towards course fee, honorarium and TA to the resource personnel. Publication, local visit and misc. expenditure, where justified. 100% financial assistance to Government as per the guidelines of NFDB.s

Enhancing Inland Fish Production (Development of Intensive aquaculture in tanks and ponds & reservoir fisheries development programme through cage culture under NMPS)

Sl.	Objective	Salient features	Modalities
1	Excavation of pond and pisciculture	Unit Cost-Rs. 4.00 lakh per ha for tank devt., production target of 5 MT/ha.	40% subsidy for all categories in tank devt.
2	Enhancing fish production in reservoirs through Cage culture	Rs. 334.00 lakh per reservoir (two battery of cage, 24 in each battery, cage size 6 mX4 m X4 m size production target of 5 MT/cage	Pilot project (Cage culture)

Aquaculture Development through Integrated Approach in Rayagada District under NMPS

Sl.	Objective	Salient features	Modalities
	Excavation of new tank, rearing tank, Construction of hatchery, feed mill plant, rearing tank for pisciculture in cluster approach	Unit Cost-Rs 250.00 lakh per Cluster	40% subsidy for construction of ponds, nursery, rearing, and input cost for one cluster (one cluster is 40 ha.)

Replacement of Breeders and Management of Fish seed farms under RKVY

Sl.	Objective	Salient features	Modalities
	i)To enhance fish seed production from the present trend of 4200 lakh fry to 6300 lakh per annum from the exiting 29 fish seed farms ii)To ensure timely supply of quality fry/fingerlings/yearlings to	Unit Cost-Rs. 6.00lakh /deep bore well ,Rs30.00 per kg feed, Rs.50/- for replacement	100% assistance

Sl.	Objective	Salient features	Modalities
	farmers iii)To modernize infrastructure facilities to withstand adverse weather for breeding operation	of 1 Kg breeder	

Development of approach road to Chandrabhaga Prawn Hatchery at Konark, Dist- Puri under RKVY

Sl.	Objective	Salient features	Modalities
	To improve the road for lifting of post larvae during rainy season by the brackish water farmers of the State as it is disconnected from the main road.	Unit Cost-Rs.196.00 lakh	100% assistance

Establishment of Fish net machine (of - size MSB7- 60) including bobbing winding machine B/2 with all accessories under RKVY

Sl.	Objective	Salient features	Modalities
	i)Production and availability of quality netting material for fisher community ii)High speed net machines would reduce overhead expenses thereby limiting production cost and selling at cheaper price iii) Supply variety of fishing net as per demand of fisher community and best quality iv) Help the fishers to protectcheating against under quality fishing net of Chinamake	Unit Cost-Rs. 90.00 lakh for One machine	100% assistance

Replacement of wooden country craft with FRP boat for Marine fishermen under RKVY

Sl.	Objective	Salient features	Modalities
	i)To save the life and fishing accessories of poor marinefishermen. ii) To provide livelihood support to the poor fish farmers by increasing fish catch per uniteffort. Iii) To ensure long life of fishing craft.	Unit Cost-Rs.1.0442 lakh per boat	Back ended subsidy of 50% of the project cost limited to Rs 50,000.00

Assistance for fish marketing infrastructure for both marine, inland and Chilika fishermen(MUY of RKVY)

Sl.	Objective	Salient features	Modalities
	i) To ensure supply of fresh &hygienic fish to theconsumer ii)To fetch better price of the catch through proper post-harvestcare. iii) To reduce the transit period from landing centre to the consumer market iv) To reduce the spoilage of fish during transit	Unit Cost- Rs.5000/-for Bi-Cycle with ice box, Rs.35,000/- for Moped with ice box and Rs. 2,35,000/- for Auto with ice box	Subsidy: 50% of the cost limited to Rs2000/- for Bi-cycle with ice box, 25% of the cost limited to Rs7500/- for Moped with ice box and 25% of the cost limited to Rs 35,000/- for Auto with ice box for all categories of fishermen

Assistance for net and boat for inland fishermen under MUY of RKVY

Sl.	Objective	Salient features	Modalities
	To increase fishing efficiency of the active fishermen earning livelihood from reservoir/riverine fisheries ii)To increase fish Catch Per Unit Effort and income of fishermen involved in reservoirfisheries iii)To increase the fish production from reservoirs/ rivers	Unit Cost- Rs.25,000/- (Boat-Rs.15,000/- and Net-Rs 10,000/-)	Subsidy:Rs.12,500/- (50% fromRKVY)

Sea weed culture as an alternate livelihood for marine fishermen under MUY of RKVY

Sl.	Objective	Salient features	Modalities
	To create sustainable livelihood for coastal fishermen affected due to fishing ban and other conservation measures.	Unit Cost-Rs. 650/-per raft	Pilot project

Demonstration of cage culture in reservoirs for inland fishermen under MUY of RKVY

Sl.	Objective	Salient features	Modalities
	i) To exploit the unexploited areato the maximum possible extent for increasing fishproduction ii)To introduce cage culture a diversified culture method to attend optimum level of fish production in reservoirs. Iii) To provide livelihood support to the poor fish farmers by increasing CPUE and create employment opportunity in rural	Unit Cost-Rs.1.40 lakh per cage of size 5mx3mx3m	Pilot Project

sector.

Financial Assistance to Fisherwomen SHGs under State Plan Scheme of MUY

Sl.	Objective	Salient features	Modalities
	To encourage the business of WSHGs involved in fish marketing/pisciculture face difficulties in procurement of fish and other requisites for paucity of funds and opt to lend it from pvt. Sources.	All WSHG doing the fisheries related activities are eligible for assistance	Revolving fund of Rs.5,000/- per WSHG

Reactivation of Fisheries Co-operatives:

Sl.	Objective	Salient features	Modalities
	Reactivation of PFCSs, training & skill up-gradation of cooperative officials, members & office bearers of PFCSs		Financial assistance will be given to PFCSs for reactivation for Working capital purpose in the form revolving fund. Training & skill up-gradation of fisheries cooperative officials will be taken-up by Directorate of fisheries, Odisha Training & skillupgradation of members of PFCS /Secretary/President of PFCSs will be taken-up by FISHFED in consultation with Directorate of fisheries, Odisha

Strengthening of Data base and information net working for Fisheries sector

Sl.	Objective	Salient features	Modalities
	The objective of the scheme is to develop uniform concepts, definitions and terminology for various inland as well as marine fishery resources and to evolve a suitable and standardized uniform scientific methodology for collection and estimation of fishery resources and catch in the country in collaboration with the states.	Both inland and marine fisheries resource and catch survey is to be conducted.	Contractual part-time enumerators @Rs.8500/- per month will be engaged for the survey work

Source: <http://www.fardodisha.gov.in>

Annexure XII: Schemes in Agriculture-Horticulture and Pattern of Assistance

Mission for Integrated Development of Horticulture (MIDH) is a Centrally Sponsored Scheme for the holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. Under MIDH, Government of India (GOI) contributes 60%, of total outlay for developmental programmes in all the states except states in North East and Himalayas, 40% share is contributed by State Governments. In the case of North Eastern States and Himalayan States, GOI contributes 90%.

S N	Item	Cost Norms*	Pattern of Assistance
A.	RESEARCH	Rs. 100.00 lakh/ Project	Central Government Institutes under ICAR, CSIR, SAUs, National level Govt. agencies and others location specific Institutes will take up (i) need based applied research & development works in the areas of Seed & Planting material including import of planting material, (ii) Technology standardization and (iii)Technology acquisition and(iv) Imparting training and FLD, on project mode, with 100% assistance.
B.	PLANTATION INFRASTRUCTURE DEVELOPMENT		
B. 1	Production of planting material		
	i)Hi-tech nursery (4 ha)	Rs. 25.00 lakh/ha.	100% to public sector limited to Rs 100 lakh/unit and in case of private sector, credit linked back-ended subsidy @ 40% of cost, subject to a maximum of Rs. 40 lakh/unit, for a maximum of 4 ha. As project-based activity on prorata basis. Each nursery will produce a minimum of 50,000 numbers per hectare of mandated Perennial fruit crops/ tree spices/ aromatic trees/plantation crops per year, duly certified for its quality.
	ii)Small Nursery (1 ha)	Rs. 15.00 lakh/ha	100% to public sector and in case of private sector, credit linked back-ended subsidy of cost, subject to a maximum of Rs. 7.50 lakh/unit, as project-based activity. Each nursery will produce a minimum of 25,000 numbers of mandated perennial vegetatively propagated fruit plants/tree spices/plantation crops per year, aromatic plants, duly certified for its quality.
	iii) Upgrading nursery infrastructure to meet accreditation norms	Up to Rs. 10.00 lakh/ nursery of 4 Ha	100% to public sector and 50% of cost to private sector subject to a maximum of Rs. 5.00 lakh/nursery. The infrastructure facilities will include establishment of hot bed sterilization of media, working shed, Virus indexing facility (for citrus & apple), Hardening chamber/net house, Mist chamber, Establishment of Mother Block, Irrigation and fertigation facility/unit.
	iv) Strengthening of existing Tissue Culture (TC) units	Rs. 20.00 lakh /unit	100% of cost to public sector and in case of private sector, credit linked back ended subsidy @ 50% of cost
	v) Setting up of	Rs 250 lakh/per unit	100% of total cost to public sector and in case of

	new TC Units.		private sector, creditlinkedbackendedsubsidy@40%ofcost. Each TC unit will produce a minimum of 25 lakh Plants / year of mandated crops, duly hardened, for which protocols are available for commercial use.
vi) Seed production for vegetables and spices			

	a) Open pollinated crops	Rs. 35,000/ha	For public sector 100%, for private sector 35% in general areas and 50% in NE & Himalayan States, Tribal Sub Plans (TSP) areas, Andaman & Nicobar & Lakshadweep Islands, limited to 5 ha. Output target of seed for each crop will be fixed by the individual state
	b) Hybrid seeds	Rs. 1.50 lakh/ha	For public sector 100%, for private sector 35% in general areas and 50% in NE & Himalayan States, TSP areas, Andaman & Nicobar & Lakshadweep Islands, limited to 5 ha. Output target of seed for each crop will be fixed by the individual state for each beneficiary, before releasing funds.
	vii) Import of planting material	Rs. 100.00 lakh	100% of cost for State Govt. / PSUs, as project-based activity.
	viii) Seed infrastructure (for handling, processing, packing, storage etc. of seeds meant for use as seed material for cultivation of horticulture crops)	Rs. 200.00 lakh	100% of cost to public sector and in case of private sector, credit linked back subsidy @ 50% of cost of project.
B 2.	Establishment of new gardens (Area expansion-for a maximum area of 4ha per beneficiary)		
	I. Fruits		
	(a) Cost intensive crops		
	i) Fruit crops like Grape, Kiwi, Passion fruit etc.		
	a) Integrated package with drip irrigation and trellis.	Rs 4.00 lakh/ha	Maximum of Rs. 1.60 lakh/- per ha. (40% of cost) for meeting the expenditure on planting material and cost of material for drip irrigation, trellies and INM/IPM, in 3 instalments of 60:20:20 subject to survival rate of 75% in 2nd year and 90% in 3rd year).
	b) Without integration	Rs. 1.25 lakh/ha	Maximum of Rs. 0.50 lakh/ha (40% of cost) for meeting the expenditure on planting material and cost of INM/IPM in three instalments of 60:20:20 subject to survival rate of 75% in 2nd year and 90% in 3rd year. For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost.
	ii) Strawberry		
	a) Integrated package with drip irrigation	Rs.2.80 lakh/ha	Maximum of Rs. 1.12 lakh/ per ha. (40% of cost) for meeting the expenditure on planting material and cost of material for drip irrigation, mulching and INM/IPM, in one instalment.

	b) Without integration iii) Banana (sucker)	Rs. 1.25 lakh/ha	Maximum of Rs.0.50lakh/ha (40%ofcost) for meeting the expenditure on planting material and cost of INM/IPM one instalment. For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost.
	a) Integrated package with drip irrigation.	Rs. 2.00 lakh/ha	MaximumofRs.0.80lakh/ ha (40% of the cost) for meeting expenditure on planting material, drip irrigation and cost of material for INM/IPM, in 2 instalments (75:25).

	b) Without integration	Rs.87,500/ha	Maximum of Rs. 0.35 lakh/ha (40% of cost) for meeting the expenditure on planting material and cost of INM/IPM in 2 instalments (75:25). For(a) and (b) above, in the case of NE and Himalayan States, TSP areas, And a man & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 2installments.
	iv) Pineapple (sucker)		
	a) Integrated package with drip irrigation.	Rs. 3.00 lakh/ha	MaximumofRs.1.20lakh/ha(40%ofthecost)for meeting expenditure on planting material, drip irrigation and cost of material for INM/IPM, in 2installments.
	b) Without integration	Rs.87,500/ha	Maximum of Rs. 0.35 lakh/ha (40% of cost) for meeting the expenditure on planting material and cost of INM/IPM in 2 instalments (75:25). For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 2 instalments (75:25).
	v) Banana (TC)		
	a) Integrated package with drip irrigation.	Rs. 3.00 lakh/ha	Maximum of Rs. 1.20 lakh/ha (40 % of cost) for meeting the expenditure on planting material and cost of material for drip system, INM/IPM etc., in 2 instalments (75:25).
	b) Without integration	Rs. 1.25 lakh/ha.	Max. of Rs. 0.50 lakh per ha, (40% of cost) for meeting the expenditure on planting material and cost of INM/IPM in 2 instalments (75:25). For(a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 2 instalments (75:25).
	vi) Pineapple (TC)		
	a) Integrated package with drip irrigation.	Rs. 5.50 lakh /ha.	Maximum of Rs. 2.20 lakh/ha (40 % of cost) for meeting the expenditure on planting material and cost of material for drip system, INM/IPM etc., in 2 instalments (75:25).
	b) Without integration	Rs. 1.25 lakh/ha.	Max. of Rs. 0.50 lakh per ha, (40% of cost) for meeting the expenditure on planting material and cost of INM/IPM in 2 instalments (75:25). For(a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 2 instalments (75:25).
	vii) Papaya		
	a) Integrated package with	Rs. 2.00	MaximumofRs.0.80lakh/ha(40%ofthecost)

drip irrigation.	lakh/ha.	for meeting expenditure on planting material, drip irrigation and cost of material for INM/IPM, in 2 instalments (75:25).
b) Without integration	Rs. 60,000/ha	Maximum of Rs. 0.30 lakh/ha (50 % of cost) for meeting the expenditure on planting material and cost of INM/IPM in 2 instalments (75:25). For(a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 2 instalments(75:25).
viii) Ultra high density (Meadow orchard)		
a) Integrated package with drip irrigation	Rs 2.00 lakh/ha	Maximum of Rs. 0.80 lakh/ ha. (40% of cost) for meeting the expenditure on planting material and cost of material for drip system, INM/IPM, and canopy management in 3 installments of 60:20:20 subject to survival rate of 75% in 2nd year and 90% in 3rd year).
b) Without integration	Rs. 1.25 lakh/ha	MaximumofRs.0.50lakh/ha.,(40%ofcost)for meeting the expenditure on planting material and cost of INM/IPM in 3 instalments. For(a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 3installments.
ix) High density planting (mango, guava, litchi, pomegranate, apple, citrus etc).		
a) Integrated package withdripirrigation	Rs 1.50 lakh/ha	Maximum of Rs. 0.60 lakh per ha. (40% of cost) for meeting the expenditure on planting material, cost of drip system, INM/IPM, canopy management etc., in 3 installments of 60:20:20 subject to survival rate of 75% in 2nd year and 90% in 3rd year).
b) Without Integration.	Rs. 1.00 lakh/ha.	Maximum of Rs. 0.40 lakh/ha (40% of the cost) for meeting the expenditure on planting material and cost of INM/IPM in 3 instalments (60:20:20). For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 3 instalments of 60:20:20 subject to survival rate of 75% in 2 nd year and 90% in 3 rd year)
(b) Fruit crops other than cost intensive		
i) Fruit crops other than cost intensive crops using normal spacing		
a) Integrated package with drip irrigation	Rs 1.00 lakh/ha	Maximum of Rs. 0.40 lakh/ ha. (40% of cost) for meeting the expenditure on planting material, cost of drip system, INM/IPM, canopy management etc in 3 instalments of 60:20:20 subject to survival rate of 75% in 2nd year & 90% in 3rd year for perennial crops and for non perennial crops in 2 instalments of 75:25.

b) Without Integration	Rs. 60,000/ha	Maximum of Rs. 0.30 lakh/ha (50 % of cost) for meeting the expenditure on planting material and cost of INM/IPM in 3 instalments, in all States. For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost in 3installments.
II. Vegetable (For maximum area of 2 ha per beneficiary)		
i) Hybrid	Rs.50,000/ ha	40% of cost in general areas and in the case of NE and Himalayan States, TSP areas, Andaman & Nicobarand Lakshadweep Islands, assistance will be @ 50% of cost.
III. Mushrooms		
i) Production unit	20 lakh /unit	100% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back ended subsidy.
ii) Spawn making unit	Rs. 15 lakh/unit	100% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back ended subsidy.
	iii) Compost making unit	Rs.20.00lakh/unit 1 00% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back endedsubsidy.
IV. Flowers (For a maximum of 2 ha per beneficiary)		
	i) Cut flowers	Rs. 1.00lakh/ha 40 % of the cost for S&M farmers and 25% of cost to other categoryfarmersingener alareas,50%ofcostinNE &HS,TSP areas, A&N and Lakshadweep Islands.
	iii) bulbous flowers Lakh / ha	Rs.1.50 40 % of the cost for S&M farmers and 25% of cost to other Category farmers in general areas, 50% of cost in NE & HS, TSP areas, A&N and Laks had weep Islands.
	iii) Loose Flowers	Rs.40,000/ha 40 % of the cost for S&M farmers and 25% of cost to other category farmers

		in general reaps, 50% of cost in NE&HS, TSP areas, A&N and Lakshadweep Islands.
V. Spices (For a maximum area of 4 ha per beneficiary)		
	vii) Seed spice and Rhizomatic spices	Rs.30,000/ha Maximum of Rs.12,000/-perha. (40% of cost) for meeting the expenditure on planting material and cost of material for INM/ IPM etc).
	viii) Perennia spices (black pepper, Meeting the cinnamon, clove and nutmeg)	Rs.50,000/ha Maximum of Rs.20,000/-perha (@ 40% of cost) for expenditure on planting material and cost of material for IPM/INM For (i) and (ii) above, in the case of NE and Himalayan States, TSP areas, Andaman and Lakshadweep Islands, Assistance will be @ 50% of cost.
VI. Aromatic Plants (For a maximum area of 4 ha per beneficiary)		
	i) Cost intensive aromatic plants	Rs.1,00,000/ha 40% of cost, subject to a maximum of Rs.40,000/- per ha, for (patchouli, geranium, rosemary, etc.) meeting the expenditure on planting material and cost for INM/IPM etc.
	ii) Other aromatic plants	Rs.40,000/ha 40% of cost, subject to a maximum of Rs.16,000/-per ha, meeting the expenditure on planting material and cost of material for INM/IPM etc.
	For (i) and (ii) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nico barand Lakshadweep Islands, assistance will be @ 50% of cost.	
VII. Plantation crops (For a maximum area of 4 ha per beneficiary)		
	i) Cashew and Cocoa	
	a) Integrated package with drip irrigation	Rs.1.00lakh/ ha Rs.0.40 lakh per ha (40% of cost) for meeting the expenditure on planting material and cost of material for drip system, INM/IPM etc) in 3 instalments of 60:20:20 subject to survival rate of 50% in second year and 90% in third year.
b) Without integration meeting the expenditure	Rs.50,000/ha	Rs.0.20 lakh per ha (40% of cost) for on planting material and cost of material for INM/IPM in 3 instalments of 60:20:20 subject to survival rate of 75% in second year and 90% in third year for a maximum area of 4 ha per beneficiary. For (a) and (b) above, in the case of NE and Himalayan States, TSP areas, Andaman & Nicobar and Lakshadweep Islands assistance will be @ 50% of cost

B.3.	Rejuvenation/ replacement of senile maximum of Rs. 20 K plantation, canopy management	Rs.40,000/ha	in 3instalments. 50% of the total cost subject to a limited to two ha per beneficiary.
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B.5	Protected cultivation		
	1. Green House structure		
	(a) Fan & Pad system	Rs. 1650/Sq.m (up to beneficiary. area 500 Sq. m) Rs. 1465/Sq. m (>500 Sq.m up to 1008 Sqm) Rs. 1420/Sq. m (>1008 Sq. m up to 2080 Sq.m) Rs. 1400/Sq. m (>2080 Sq. m upto 4000 Sq.m) Above rates will be 15% higher for hilly areas.	50% of cost for a maximum area of 4000 sq. m per
	(b) Naturally ventilated system		
	i) Tubular structure	Rs.1060/Sq.m (up to area 500 Sq. m) Rs. 935/Sq.m (>500 Sq. m up to 1008 Sq. m) Rs. 890/Sq. m (>1008 Sqm up to 2080 Sq. m) Rs. 844/Sq. m (>2080 Sq. m up to 4000 Sq. m) Above rate will be 15% higher for hilly areas.	50% of cost limited 4000 sq. m. per beneficiary.
	ii) Wooden structure	Rs. 540/Sq. m and Rs. 621/Sq. m for hilly areas	50% of the cost limited to 20 units per beneficiary (each unit not to exceed 200 sq.m).
	iii) Bamboo structure	Rs. 450/Sq. m and Rs. 518/Sq. m for hilly areas	50% of the cost limited to 20 units per beneficiary (each unit should not exceed 200 sq.m).
	2. Shade Net House		

(a) Tubular structure beneficiary. Rs. 816/Sqm for hilly areas	Rs.710/Sqm and	50% of cost limited to 4000 sq.m. per
(b)Wooden structure	Rs.492/Sqmand	50% of cost limited to 20 units

		per beneficiary (566/Sqm for hilly areas < 200 sq.m).
(c)Bamboo structure	Rs.360/Sqm and	50% of cost limited to 20 units per beneficiary (Rs.414/Sqm for hilly areas < 200sq.m).
3.PlasticTunnels beneficiary. Rs.75/Sqm for hilly areas.	Rs.60/Sqmand	50% of cost limited 1000 sq.m. per
4. Walk in tunnels beneficiary (< 800	Rs.600/sqm	50% of the cost limited to 5 units per
5. Anti Bird/Anti Hail Nets rbeneficiary.	Rs.35/Sqm	50% of cost limited to 5000 sq.m. pe
6. Cost of planting material& cultivation of high value vegetables grown inpoly house 4000 sq m per	Rs.140/Sq.m	50%ofcostlimitedto
7. Cost of planting material& Cultivation of Orchid & Anthurium under polyhouse/ 50%ofcostlimitedto 4000 sq m shade net house.	Rs.700/Sqm	
8. Cost of planting material& Cultivation of Carnation & Gerbera under poly house/ 50%ofcostlimitedto 4000 sq m shade net house.	Rs.610/Sqm	
9. Cost of planting material& Cultivation of Rose and lilum under polyhouse/ 50%ofcostlimitedto 4000 sq m shade net house	Rs.426/Sqm	
10.PlasticMulching per beneficiary. Rs. 36,800/ha for hilly areas	Rs.32,000/haand	50% of the total cost limited to 2 ha
B. 6	Precision Farming development and extension through Precision Farming Development Centers (PFDCs)	Project based 100% of cost to PFDCs
B. 7		
Promotion of Integrated Nutrient Management(INM) Integrated Pest Management (IPM)		
i) Promotion of IPM/INM	Rs. 4000/ha	30% of cost subject to a maximum of Rs 1200/ha limited to 4.00 ha/ beneficiary.
ix) Disease forecasting unit (PSUs)	Rs.6.00lakh/unit	100 % of costs.
iii) Bio control lab	Rs.90.00lakh/unit	100% to Public sector and 50% to private sector.
iv) Plant Health Clinics	Rs.25.00lakhs/unit	100% to Public sector and 50% to private sector.
v)Leaf/T issue analysis labs	Rs.25.00lakh/unit	100% to Public sector and 50% to private sector.
B.8	Organic Farming	
i) Adoption of organic farming.	Rs.20,000/ha 50%ofcostlimitedtoRs.10000/haforamaximumareaof4	ha. per beneficiary, spread over a period of 3 years involving an assistanceofRs.4000/-

			infirstyearandRs.3000/-each in second & third year. The programme to be linked with certification.
ii) Organic Certification include Rs.1.50lakhin	Project based		Rs.5lakh for a cluster of 50 ha which will Firstyear,Rs.1.50 lakh in second year and Rs.2.00 lakhinthird year.
iii) Vermi compost Units/ organic input administered on pro-rata	Rs.100,000/unit for permanent structure andRs.16,000/unit cost conforming to the size of Vermibed. to be administered		50% of cost conforming to the size of dimension of permanent structure to be basis.ForHDPEVermibed,50% of size of for HDPE 96cft (12’x4’x2’) and IS15907:2010 Pro rata rata basis.
B.9 Certification for Good Agricultural Practice s (GAP), Including infrastr ucture	Rs.10,000/ha		50% of the cost for maximum of 4ha/ beneficiary.
B.10 Centre of Excellence for Horticulture established	Rs.1000.00lakh/ centre		100% of cost to public sector. This can be bi-lateral co-operation also.
B.11 Pollination support through bee keeping			
i) Production of nucleus stock (Public	Rs.20.00lakh		100% of the cost. sector)
ii) Production of bee colonies by bee of 2000 colonies/ year breeder	Rs.10.00lakh		40% of cost for producing in.
iii) Honey bee colony	Rs.2000/colonyof8		40% of cost limited to 50 colonies /beneficiary. frames
iv)Bee Hives /beneficiary.	Rs 2000/perhive.		40% of cost limited to 50 colonies
v) Equipment including honey extractor (4 one set per beneficiary. frame), food grade container (30 kg),net, including complete set of Bee keeping equipment.	Rs.20,000/set		40% of the cost limited to
B.12 Horticulture Mechanization			
i)Tractor (up to 20 PTOHP)	3.00lakh/unit		25%ofcost,subjecttoamaximumofRs.0.75lakh/unit for general category farmers, and in the case if SC, ST, Small & Marginal famers, women farmers and beneficiaries in NE states, 35% of cost, subject to a maximum of Rs. 1.00 lakh per unit.
ii) Power Tiller			
a) Powertiller (below8BHP) unit for general category	1.00 lakh per unit		Subject to a maximum of Rs.0.40 lakh/ farmers, and in the case if SC, ST, Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.50 lakh/unit.
b)Powertiller (8BHP&above) unit for general category	1.50 lakh per unit		Subject to a maximum of Rs.0.60 lakh/ farmers, and in the case if SC, ST,

		Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.75 lakh/unit.
iii) Tractor/Power tiller (below 20 BHP) driven equipments		
a) Land Development, till age and seed preparation equipments	0.30 lakh per unit for general category SC, ST, Small & Marginal farmers,	Subject to a maximum of Rs.0.121 lakh per unit for general category farmers, and in the case if women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.15 lakh/unit.
b) Sowing, planting reaping and digging equipments	0.30 lakh per unit for general category SC, ST, Small & Marginal farmers,	Subject to a maximum of Rs. 0.15 lakh/unit. women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.15 lakh/unit.
c) Plastic mulchlaying machine unit for general category	0.70 lakh per unit	Subject to a maximum of Rs.0.28 lakh/ farmers, and in the case if SC, ST, Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.35 lakh/unit.
iv) Self-propelled Horticulture Machinery of Rs.1.00 lakh/ unit for general category		2.50 lakh per unit Subject to a maximum farmers, and in the case if SC, ST, Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 1.25 lakh/unit.
v) Plant Protection equipments		
(a) Manual sprayer: unit for general	Rs.0.012lakh/unit	Subject to a maximum of Rs.0.005 lakh/ farmers, and in the case if SC, ST, Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.006lakh/unit.
(i) Knapsack/foot operated sprayer.		
(b)Powered Knapsack sprayer/Power Operated Taiwans prayer (capacity8-12 Small & Marginal Its): states, subject of a	Rs.0.062lakh/unit	Subject to a maximum of Rs.0.025 farmers, and in the case if SC,ST, women farmers and beneficiaries in NE maximum of Rs. 0.031 lakh/unit
(c)Powered Knapsack sprayer/Power Operated Taiwan sprayer (capacity above 12-16Its):	Rs.0.076lakh/unit	Subject to a maximum of Rs.0.03 farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.038lakh/unit
(d)Powered Knapsack sprayer/Power Operated Taiwan sprayer	Rs.0.20lakh/unit	Subject to a maximum of Rs.0.08

(capacity above Small & Marginal , 16/lts)		farmers, and in the case if SC,ST, women farmers and beneficiaries in NE states, subject to a maximum of Rs. 0.10lakh/unit
(e) Tractor mounted/ Operated Sprayer Rs.0.20lakh/unit lakh/ unit for general category (below 20BHP): Small & Marginal farmers,		Subject to a maximum of Rs.0.08 lakh/unit farmers, and in the case if SC,ST, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.10 lakh/unit
(g) Eco Friendly Light Trap for general	Rs.0.028lakh/unit	Subject to a maximum of Rs.0.012lakh/unit farmers, and in the case if SC, ST, Small & Marginal farmers, women farmers and beneficiaries in NE states, subject of a maximum of Rs. 0.014 lakh/unit
vi) Import of new machines & tools for horticulture for demonstration purpose (Public sector)	Rs. 50.00lakhper 100% of total cost . unit	
B.13 Technology Dissemination cost in farms belonging through demonstration /frontline demonstration	Rs.25.00lakh	75 % of cost in farmers field and 100% of to Public Sector, SAUs etc.
B.14 Human Resource Development(HRD) i) HRD for Supervisors &Entrepreneurs	Rs.20.00lakh/unit	100% of the cost in first year. In subsequent years, cost of Infrastructure not to be claimed.
ii) HRD for Gardeners	Rs.15.00lakh/unit	100% of the cost.
iii) Training of farmers		
a) Within the State	Rs.1000/dayper transport	100% cost farmer including
b) Outside the State	Project based as per	100% cost. actual.
iv) Exposure visit of farmers		
a) Outside the State	Project based as per	100% cost. actual.
b) Outside India	Rs. 4.00lakh/ Course fee cost to be participant	Project Based.100% of air/ rail travel. under Mission Management.
v) Training/ study tour of technical staff/ field functionaries		
a) Within the State	Rs.300/day per DA, as admissible	100% cost. participant plus TA/
b) Study tour to progressive States/units 5participants) TA/DA, as admissible	Rs.800/day per participant plus	100% cost. (group of minimum
c) Outside India	Rs. 6.00lakhper participants	100% of air/ rail travel cost Mission Management.

C. INTEGRATED POST HARVEST MANAGEMENT			
C. 1	Packhouse 9Mx6M	Rs.4.00lakh/unit 50% of the capital. with size of	
C. 4	Cold room (staging) @35% of the project cost	Rs. 15.00lakh/unit of 30MTcapacity	Credit linked back-ended subsidy general areas and 50% of cost in case Hilly & Scheduled areas, per beneficiary.
C. 5	Mobile pre-cooling unit of the cost of	Rs.25.00lakh	Credit linkedback-ended subsidy@35% Project in General areas and 50% of cost in case Hilly & Scheduled areas, per beneficiary.
C.6 Cold Storage (Construction, Expansion and Modernisation)			
	i) Cold storage units Type 1 - basic mezzanine structure with large chamber (of >250 MT) type with single temperature zone	Rs. 8,000/MT, (max 5,000 MT capacity)	Credit linked back-ended subsidy @ 35% of the cost of project in general areas and 50% of cost in case Hilly & Scheduled areas, per beneficiary.
C. 8	Refrigerated Transport vehicles	Rs. 26.00 lakh for 9 MT (NHM & HMNEH),and prorata basis for lesser capacity, but not below 4 MT.	Credit linked back-ended subsidy @35% of the cost of project in general areas and 50% of cost in case of Hilly & Scheduled areas, per beneficiary.
C. 9	Primary / Mobile/ Minimal processing unit	Rs 25.00 lakh/unit	Credit linked back-ended subsidy @40% of the capital cost of project in general areas and 55% in case of Hilly & Scheduled areas.
C. 10	Ripening chamber	Rs. 1.00 lakh/MT	Credit linked back-ended subsidy @35% of the capital cost of project in general areas and 50% in case of Hilly & Scheduled areas for a maximum of 300 MT per beneficiary.
C. 11	Evaporative/low energy cool chamber (8MT)	Rs. 5.00 lakh/unit	50% of the total cost.
C. 12	Preservation unit (low cost)	Rs.2.00 lakh/unit for new unit and Rs.1.00lakh/unit for up-gradation	50% of the total cost.
C.13	Low cost onion storage structure(25MT)	Rs. 1.75 lakh/per unit	50% of the total cost.
C.14	Pusa Zero energy cool chamber(100kg)	Rs. 4000perunit	50% of the totalcost.
C. 15	ESTABLISHMENTOFMARKETINGINFRASTRUCTUREFORHORTICULTURALPRODUCEING		
D.	OVT./PRIVATE/COOPERATIVE SECTOR		
D. 1	Terminal markets	Rs.150.00crore/ crore) as Public- project through competitive bidding, in	25% to 40% (limited to Rs.50.00 Partnership mode operational guidelines issued separately.

D. 2	Wholesale markets	Rs.100.00crore/ project	Credit linked back-ended subsidy @ 25% of the capital cost of projecting general areas and 33.33% in case of Hilly & Scheduled areas, per beneficiary.
D. 3	Rural Markets/Apni mandies/Direct markets	Rs. 25.00 lakh	Credit linked back-ended subsidy @40% of the capital cost of project in general are as and 55% incase of Hilly & Scheduled areas, per beneficiary.
D. 4	Retail Markets/outlets	Rs. 15.00 lakh	Creditlinkedback-endedsubsidy@35% of the capital cost of project in general areas and 50% encase of Hilly & Scheduled areas, per beneficiary.
D. 5	Static/Mobile Vending cart/platform withcool chamber.	Rs. 30,000/	50% of total cost.
D. 6	Functional Infrastructure for:		
	i) Collection, sorting/grading, packing units etc.	Rs.15.00 lakh	Creditlinkedback-ended subsidy @40% of the capital cost of projectin general areas and 55% in case of Hilly & Scheduled areas, per beneficiary.
	ii) Quality control/analysis lab	Rs. 200.00 lakh	100% of the total cost to public sector and 50% of cost to private sector as credit linked back ended subsidy.
D. 7	Gravity operated rope way in hilly areas	Rs. 15.00 lakh/km	Credit linked back-ended subsidy @ 50% of capital costs in Hilly areas.
E. FOODPROCESSING			
E. 1	Food processing units	Rs. 800 lakh/unit	Credit linked back ended capital investment assistance of 50% of cost in the States of J&K, Himachal and Uttarakhand
F. SPECIAL INTERVENTIONS			
F. 1	Innovative interventions not covered under any GOI schemes	10% of outlay	50% of cost, based on project proposal.
F. 2	Tackling of emergent /unforeseen requirements of SHMs	Rs.20.00 lakh	50% of cost, based on project proposal.
G. MISSIONMANAGEMENT			
	Institutional Strengthening, hire/purchase Project based of vehicles, hardware/software		100% assistance.
	Seminars conferences, workshops, exhibitions, Kisan Mela, horticulture shows, honey festivals etc.		
	a) International level	Rs. 7.50 lakh per event.	100% of cost per event of 4 days, on pro rata basis.
	b) National level	Rs. 5.00 lakh per event.	100% of cost per event of two days.
	c) State level	Rs. 3.00 lakh /event	100% assistance subject to a maximum of Rs.3.00 lakh per event of two days.

	d) District level	Rs. 2.00 lakh /event	100% assistance subject to a maximum of Rs.2.00 lakh per event of two days.
	Information dissemination through publicity, printed literature etc and local advertisements	Rs. 0.40 lakh/ block	100% of cost.

G. 5	Development of technology packages in electronic form to be shared through IT network	Rs. 1.00 lakh/ district	100% of Cost
G. 6	Technical Support Group (TSG) at State Level for hiring experts/staff, studies, monitoring & concurrent evaluation/ evaluation, mass media, publicity, video conferences.	Project based, subject to a ceiling of Rs.50.00lakhper annum/state	100% of cost
G. 7	7. Promotion of Farmer Producers Organization/ FPO/FIG Farmer Interest Groups of 15-20 farmers/20ha, Growers Associations and tie up with Financial Institution and Aggregators.	As per norms issued by SFAC.	As per norms issued by SFAC from time to time.
G. 8	Baseline survey and Strengthening horticultural statistical data base	Rs. 100.00 lakh for large states, Rs.50.00 lakh for small states and Rs. 25.00 lakh for very small states/ UTs.	100% of cost as one time grant on survey related activities.
I.	National Level		
G. 9	Technical Support Group (TSG) at National Level for hiring experts/staff, studies, Seminar/ Workshops, training, contingencies, monitoring & evaluation, mass media, publicity, video conference etc as per G.3.	Rs. 5.00 crore per annum	100% of cost.
G.10	2. Technical Collaboration with On International agencies like FAO, World Bank, ADB, Bilateral cooperation, International exposure visits/ training of officials etc.	Project based. 100% of cost.	
<p><i>* Cost norms means upper limit of cost for calculation of subsidy.</i></p> <p>#Note: There lease of back ended subsidy need not be credit linked for the institutions like Public Sector Units, Panchayats, Cooperatives, Registered Societies / Trusts and Public limited Companies, provided they can meet the remaining share of the project cost, out of their own resources. Hilly Areas include those areas covered under Hill Area Development Programme and Western Ghat Development Programme of Planning Commission. Scheduled Areas include those areas notified by Planning Commission and State Governments. TSP Areas include those areas notified by Ministry of Tribal Affairs. NE & Himalayan States refer to States in North East & Himalayan region covered under HMNEH scheme.</p>			

Source: MIDH