



PROGRAMME MANUAL

REWARD

Rejuvenating Watersheds for Agricultural Resilience
through Innovative Development



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DIRECTORATE OF SOIL CONSERVATION & WATERSHED DEVELOPMENT
Department of Agriculture & Farmers' Empowerment
Government of Odisha

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ACRONYMS		
AAO	:	Assistant Agriculture Officer
ADA	:	Assistant Director of Agriculture
AET	:	Actual Evapotranspiration
AHO	:	Assistant Horticultural Officer
AWC	:	Available Water Capacity
AWS	:	Automatic Weather Station
CAG	:	Comptroller and Auditor General of India
CAO	:	Chief Accounts Officer
CB	:	Capacity Building
CBO	:	Community Based Organization
CEO	:	Chief Executive Officer
CGWB	:	Central Groundwater Board
DA	:	Designated Account
DL	:	Digital Library
DLC	:	District Level Committee
DLI	:	Disbursement Linked Indicator
DAFE	:	Department of Agriculture & Farmers Empowerment
DOFARD	:	Department of Fisheries & Animal Resources Development
DOH	:	Directorate of Horticulture
DOLR	:	Department of Land Resources
DPR	:	Detailed Project Report
DSCWD	:	Directorate of Soil Conservation & Watershed Development
DSS	:	Decision Support System
DWAC	:	District Watershed Advisory Committee
EC	:	Executive committee
E&S	:	Environmental and Social
ESMF	:	Environmental Social Management Framework
ESMP	:	Environmental and Social Management Plan
ESSA	:	Environmental and Social Assessment
ET	:	Evapotranspiration
FD	:	Finance Department
FMPC	:	Finance Management and Procurement Cell
FMTSC	:	Financial Management Technical Service Consultancy
FNGO	:	Field level Non-Government Organisation
FPC	:	Farmers Producer Company
FPO	:	Farmers Producers Organisation

FRC	:	Financial Review Consultancy
IDA	:	International Development Association
GIS	:	Geographic Information System
GoO	:	Government of Odisha
GOI	:	Government of India
GP	:	Gram Panchayat
GRS	:	Grievance Redressal Service
HO	:	Head Office
ICAR	:	Indian Council of Agricultural Research
IGA	:	Income Generating Activity
INM	:	Integrated Nutrient Management
IISWC	:	Indian Institute of Soil & Water Conservation
IIT	:	Indian Institute of Technology
IPM	:	Integrated Pest Management
IT	:	Information Technology
IIWM	:	Indian Institute of Water Management
IUFR	:	Interim Unaudited Financial Report
IVA	:	Independent Verification Agency
IWMP	:	Integrated Watershed Management Project
KVK	:	Krishi Vigyan Kendra
LCC	:	Land Capability Class
LEP	:	Livelihood Enhancement Plan
LR	:	Land Resource
LRI	:	Land Resources Inventory
LU	:	Land Use
M&E	:	Monitoring and Evaluation
MEL&D	:	Monitoring, Evaluation, Learning and Documentation
MIS	:	Management Information System
MOU	:	Memorandum of Understanding
MRP	:	Maximum Retail Price
MSP	:	Multi-Stakeholders Platform
MWS	:	Micro Watersheds
NBSS&LUP	:	National Bureau of Soil Survey and Land Use Planning
NGO	:	Non-Governmental Organization
NPK	:	Nitrogen, Phosphorous and Potash
O&M	:	Operations and Maintenance
OUAT	:	Odisha University of Agriculture & Technology
PDO	:	Project Development Objective
PET	:	Potential Evapo-transpiration

PFS	:	Project Financial Statement
P for R	:	Program for Results
PIA	:	Project Implementation Agency
P&K	:	Phosphorous and Potash
PMKSY	:	Pradhan Mantri Krishi Sinchayee Yojana
PMU	:	Project Management Unit
PPP-IAD	:	Private-Public-Participation for Integrated Agriculture Development
PRA	:	Participatory Rural Appraisal
PTC	:	Project Technical Cell
REWARD	:	Rejuvenating Watersheds for Agriculture Resilience through Innovative Development
RS	:	Remote Sensing
SAUs	:	State Agricultural Universities
SC	:	Scheduled Caste
SHG	:	Self Help Group
SLNA	:	State Level Nodal Agency
SLSC	:	State Level Sanctioning Committee
SRLM	:	State Rural Livelihood Mission
ST	:	Scheduled Tribe
SWD	:	State Watershed Department
SWS	:	Sub-Watershed
TOR	:	Terms of Reference
WMT	:	Watershed Management Team
UG	:	Users Group
VRG	:	Vulnerability Reduction Grant
WA	:	Watershed Association
WB	:	World Bank
WC	:	Watershed Committee
WDC	:	Watershed Development Component
WDD	:	Watershed Development Department

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1. Background

A. Context

1.1 State of Agriculture in Odisha

1.1.1 Odisha is largely a rural and an agrarian economy. Close to 83 per cent of its people live in rural areas and about 61.8 per cent of its 17.5 million workforce is employed in agriculture. The sector contributes about 18 per cent to the state's GDP. The state has a gross cropped area of about 8 million hectares, 46 per cent of which is double-cropped. Paddy is the main crop and covers about 3.89 million hectares (for the triennium ending 2017-18).

1.1.2 The rich natural resource endowment with prevalent diversified agro-climatic conditions of the State offers immense scope for agricultural growth. The climate is tropical, characterized by high temperature, high humidity, medium to high rainfall and mild winter. The normal annual rainfall is 1451.2 mm distributed over 69 rainy days. South-West monsoon contributes about 81.2% of annual rainfall in 53-57 days during the months of June to September. The average annual temperature of the State is 26.89°C with mean annual maximum of 32.56°C and mean annual minimum of 21.30° C. From the physiographic point of view, the State is divided into four Zones, viz. (i) the Northern Plateau (ii) the Eastern Ghat zone (iii) the Central Table lands and (iv) the Coastal zone. On the basis of climate, soil, rainfall, topography and cropping patterns, the State has been delineated into ten Agro-Climatic Zones.

1.1.3. Agriculture being the prime source of wealth in Odisha and the key to the reduction of rural poverty, all Government's policies and programmes have aimed at achieving rapid agricultural growth through optimum utilization of land, water, soil and plant resources. With a view to empower farmers of the State, the Agriculture Department has been renamed as Department of Agriculture and Farmers' Empowerment. Besides, the State has a separate Agriculture cabinet as a Committee of Cabinet to monitor and provide direction and focus to plans and policies related to agriculture & allied sectors.

1.1.4 Despite several hurdles like frequent occurrence of natural calamities with erratic monsoon and uneven distribution of rainfall, agricultural production has been increasing. The State could be able to produce higher food grains and was awarded with the prestigious "Krishi Karman Award" for consecutively for four times during 2010-11, 2012-13, 2013-14 and 2014-15. The biggest measurable success is the unprecedented growth of farmers' incomes in the state as observed in the recent past. Odisha farmer's incomes has grown more than seven times or at a compound annual growth rate (CAGR) of 16.5 per cent in nominal terms and 8.4 per cent in real terms during the period 2002-03 and 2015-16. Odisha's agricultural GDP has doubled in real terms in the last 16 years, clocking an average annual growth rate of about 4.5 per cent, higher than all India average of 3.1 per cent. These are encouraging signs. It is evident that the state is placed on a high growth path in agriculture.

1.1.5 Odisha's new agriculture policy – SAMRUDHI – which was approved at the State Cabinet on December, 2019 focuses on farmers' wellbeing and has been formulated to build on the inherent strengths of its agriculture and allied sectors. "My Government is dedicatedly working towards development of farmers and my aim is to hike farmers' income under the new agriculture policy," said the Chief Minister at inaugural function of a five-day agriculture expo, 'Krushi Odisha-2020' on 20, January, 2020. The aim of the new agricultural policy is to actualize the vast untapped potential of agriculture in Odisha and strengthen the economic and social well-being of its farmers, sharecroppers and landless agricultural households while ensuring the growth process is environmentally, economically and technologically inclusive, scalable and sustainable. The strategies to achieve these milestones include Leveraging Science & Technology, Resource use efficiency & productivity, Human resources upgrading and skilling, Strengthening Institutions and climate change adaptation.

1.2 Watershed Programme – A priority area

1.2.1 The strategy for doubling farmers' income has enlisted Participatory Watershed Development Program as a priority area, which is widely accepted as an integrated approach to conserve water, land and biodiversity resources as well as improvement of local livelihoods through enhanced and diversified production. In 2009, the Integrated Watershed Management Programme (IWMP) was launched, which marked the consolidation of various watershed development schemes and guidelines (such as National Watershed Development Project in Rainfed Areas, Integrated Wasteland Development Programme and Drought Prone Area Programme etc) under an integrated programme. In 2015-16, the IWMP became a component of the GoI's flagship program - the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

1.2.2 Odisha has a good institutional architecture to manage watershed programme. The state has successfully delivered programmes of Ministry of Agriculture, Ministry of Rural Development and Planning Commission etc., as well as externally aided projects such as Indo-Danish Comprehensive Watershed Project (IDCWDP) and Western Odisha Rural Livelihood Project (WORLP). The Details of the watershed programmes implemented in Odisha is appended in **Table-1**. The Directorate of Soil Conservation & Watershed Development under the administrative control of the Agriculture & Farmers' Empowerment Department is responsible for delivering watershed programs. Reliable services are on ground to increase people's participation in development through Community Based Organizations such as Watershed Associations, Self Help Groups, Farmer Interest Groups and User Groups. Instructions have been issued for effective convergence and wider participation of line department officers in the watershed programme.

Table-1: Details of the Watershed Programmes Implemented in Odisha

Sl. No	Scheme	Ministry / Funding Agency	No of Micro Watersheds treated	Status
1	River Valley Project (1962)	Agriculture	40	Completed
2	National Watershed Development Project in Rainfed Areas (1990)	Agriculture	876	Completed
3	Indo-Danish Comprehensive Watershed Project (1993)	Danish International Development Agency (DANIDA)	12	Completed
4	Employment Assurance Scheme (1994)	Rural Development	596	Completed
5	Drought Prone Area Programme (1994)	Rural Development	1319	Completed
6	Integrated Wasteland Development Programme (1994)	Rural Development	1046	Completed
7	Western Odisha Rural Livelihood Project (2000)	Department of International Development (DFID)	290	Completed
8	Additional Central Assistance (2001)	Planning Commission	314	Completed
9	Special Plan- KBK(2008)	Planning Commission	150	Completed
10	Integrated Watershed Management Programme (2009)	Rural Development	2885	Watershed Development Component of : PMKSY from 2015-16, will end in March, 2022

1.2.3 WORLP was a good practice of livelihoods integration with watersheds and has influenced national guidelines on Watershed Development. Independent Commission on Aid Impact (UK) has given the best rating of GREEN to WORLP. Findings from WORLP's Impact Evaluation Report reveal encouraging results;

- a. 29.2 percent of households below poverty line reported desired level of income to live above poverty line which is significantly higher than the control population (19.7%).
- b. Distress migration reduced from 47 % to 6 %.

- c. 71 % of the households were part of the inclusive groups such as SHGs, CIGs etc.
- d. Significant increase in natural, social and financial capital of the poor and very poor households (about 52 % to 65 %)

A review of the performance of the state's watershed projects has revealed their potential for drought-proofing, agricultural growth, environment protection and employment generation. Several impact studies by Odisha Space Application Centre (ORSAC), National Institute of Rural Development (NIRD), National Remote Sensing Centre (NRSC) etc. as well as third party agencies have reported positive changes in irrigation potential, crop intensity, crop canopy, production, productivity and household incomes resulting from watershed projects.

1.3. Need for Further Programme Improvements

1.3.1 Although substantial progress has been made in terms of approach, strategy and operational scale, there are still issues (such as non-availability of site-specific land resource information, weak community capacities and lack of incentives for post project sustainability etc) impeding 'scale up' the processes and successful management outcomes. There is a growing need to focus on the demand side of groundwater management in watersheds, crop selection based on land suitability assessment, rational fertilizer use informed by analysis of soil nutrient status, and greater value addition and market access for increased productivity and incomes. Improving impacts from watershed development program requires a more science-based and data-driven approach, stronger institutional capacities, and greater attention to specific farmers' needs.

1.3.2 Odisha has a total geographical area of about 15.57 million ha, which is divided into 20,079 micro-watersheds. Of these, 16,873 are treatable and 7,721 have been taken up so far under different schemes. A total of 9,152 micro-watersheds covering an area of about 8.6 million ha is yet to be treated. The WDC-PMKSY (erstwhile IWMP) has been the main source of funding for watershed development in the state, which is ending in March, 2022 and a new follow-up national programme is awaiting cabinet approval. The Draft Guidelines for New Generation Watershed Development Projects, 2020 has incorporated new approaches, many adopted from the Sujala III project, that address many of the above issues discussed in Para 3.1, but support is needed to help the states implement them effectively at scale, demonstrate successes, and learn lessons for further program improvements.

1.3.3 Hence, with this background, the REWARD has been conceived based on the experience of the World Bank assisted Sujala-III Project in Karnataka. The state of Karnataka has been identified to have an additional role as a 'lighthouse' state that will enable knowledge exchange and provide capacity building support to other states because of its experience in implementing science-based watershed planning and monitoring at a fairly large scale.

B. REWARD and Key Principles

1.4.1 The World Bank supported “PforR” (program for Results) Program-- REWARD will support the next phase of the Government of India’s (GOIs) watershed development program WDC-PMKSY-2.0. The duration of the program is five years starting April, 2021. While the WDC-PMKSY program is implemented across all states (except for the state of Goa), the REWARD Program will be initially supporting the national program in three selected states as well as the central level. At the central level, the REWARD Program scope covers management, monitoring, communication and knowledge sharing functions of the DoLR. At the state level, the REWARD Program will be contiguous in scope to the WDC-PMKSY, and support implementation of key science-based activities and demonstration sites in the WDC-PMKSY-2.0 projects , and in so doing, aim to influence the broader WDC-PMKSY in the three states.

1.4.2 **Qualifying& Readiness criteria:** States are selected into the program as they meet specific qualifying and readiness criteria. The criteria are;

- i. Extent of rainfed area
- ii. Socio-economic profile;
- iii. Financial readiness i.e. the State Government’s willingness to take an IBRD loan and provide counterpart financing of 30 percent of the cost of the Program;
- iv. Financial performance: the States have demonstrated utilization of more than 85 % percent of the funds released by the Department of Land Resources (DoLR) under the WDC-PMKSY in the past five years;
- iv. Institutional readiness: the States have established institutional arrangements at the State and district levels for watershed development and initiated partnerships with technical institutions;
- v. Demonstrated performance: the States have strong leadership in the SWD and demonstrated capacity to plan and implement watersheds at scale with evidence of results.

Three states - Karnataka, Odisha, and Andhra Pradesh have met the prescribed qualifying and readiness criteria. Each of these states (as well as the DoLR) will sign a separate program agreement with the Bank whereas a single loan agreement will be signed with the Ministry of Finance. The Central agency DoLR will also borrow a modest IBRD loan for coordination and knowledge activities. Each of the participating States will sign a separate program agreement with the Bank whereas a single loan agreement will be signed with the Ministry of Finance.

C. Purpose of the Program Manual

The purpose of the program manual is to define the framework, policies and procedures for effective implementation of the program. It serves as easy reference, guide for the planners, implementing agencies, decision makers and all other project partners of REWARD for the smooth implementation of the program. The activities and sub-activities along with allocated budget presented in the manual will act as guidance. As it is prepared before the project initiation stage, this would remain as a live document and there is always scope for updating the document from time to time. Executive instructions may be issued from time to time to operationalise the guidelines.

2. REWARD Programme Description and Components

A. Program Description

2.1 “P for R” (Programme for Results) Programme

The REWARD is a P for R (Programme for Results) programme. The disbursement of World Bank assistance will be subject to evidence of Programme achievements against mutually agreed Disbursement Linked Indicators (DLIs). The DLIs are being finalized in consultation with World Bank considering the need to signal critical actions in the achievement of the Project Development Objective (PDO) in the state’s contexts.

An Independent Verification Agency (IVA) will be engaged to verify the progress of Disbursement Linked Indicators [DLIs] and provide feedback on a periodical interval. Disbursement request applications will be submitted to the Bank for work completed and verified by the IVAs as per the agreed upon DLI. Once it is fully satisfied with the evidence of Program achievements, the Bank will authorize the disbursement of the appropriate amount of funding. There is no restriction for early achievement of the DLIs. Payment will be disbursed as and when targets are achieved and verified. Where targets for DLIs are not achieved in any particular year, the related disbursements will be rolled over into the next year.

B. Project Development Objective (PDO)

The Project Development Objective (PDO) of REWARD is to “Strengthen capacities of national and state institutions to implement science-based watershed development for improving farmers’ resilience and soil moisture outcomes in selected watersheds of participating states and to support mainstreaming across states.

2.2 Science based, Data driven Watershed Planning & Management

Having better quality and more precise site-level data will lead to more efficient watershed planning, investments and improved climate resiliency. The proposed Land resource inventory (LRI) - an assessment of the status and changing condition of soil, water and other related land resources at the field level will empower the farmers through informed decisions on crop selection, crop management, weather information, nutrient advice, crop water management, market information and conservation needs. Coupled with value-chain development through supporting investments in farmer producer organizations (FPOs) and market linkages, farmers would have a greater probability of generating higher yields, gross revenue, and net income.

Land Resource Inventory (LRI) data for an area of 5.26 lakh hectares will be made available in the Digital Library, out of which 17 green field sites involving 1.15 lakh hectares of land will be treated for scientific watershed development on saturation approach.

2.3 Programme Beneficiaries

The program seeks to put communities at the centre of watersheds, but with strong science-based tools available to them for decision making. The primary beneficiaries of the Program are the communities in rainfed areas that rely on sustainable land and water resources for livelihoods and ecosystem services. In particular, it will have positive impacts on women, small marginal farmers, and agricultural laborers. The efforts to ensure social inclusion in watershed planning and management will enhance the benefits that accrue to the most vulnerable.

There will be 1, 18,000 direct beneficiaries. 43,200 farmers will receive LRI and/or weather based agro-advisory information. 15 Farmer Producer Organisations / smaller Farmer Producer Collectives will be strengthened with forward and/or backward value chain linkages. It is expected that 10,000 poor / landless will diversify livelihood activities and 16,200 farmers will adopt a core set of resilient agriculture technologies and practices by the end of the project period.

C. State Specific Result Indicators

2.4 PDO Level Result Indicators

- Watershed Committees and Gram Panchayats demonstrate satisfactory watershed management
- Area (hectares) on which science- based watershed development has been implemented.
- Farmers adopt a core set of resilient agriculture technologies and practices (number, disaggregated by gender and social group).
- Targeted watershed area showing an increase in soil moisture (percentage).
- Direct project beneficiaries (number, disaggregated by gender and social group).

2.5 DLIs linked to PDO Indicators

S.No.	Indicator Name	Unit	DLI	Baseline	End Target
1	Watershed Committees and Gram Panchayats demonstrate satisfactory watershed management as measured through a performance rating system.	Percentage	DLI	0	30 ¹
1.1	Women headed Watershed Committees and Gram	Percentage		0	30 ²

¹ This percentage will be out of the 152 WCs and/or GPs that correspond to 152 saturation MWS (each MWS will have a WC; one GP may span more than one contiguous MWS).

² This percentage will be out of the women headed WCs and/or GPs that are a sub-set of the 152 saturation MWS.

	Panchayats which demonstrate satisfactory watershed management through a performance rating system.				
2	Land area treated with science-based watershed management technologies.	Hectares	DLI	0	100,000
3	Adoption of resilient agriculture technologies and practices by farmers.	Number of Farmers	DLI	NA	16,200
3.1	Of which, female farmers.	Number		NA	4860 ³
3.2	Of which, SC and ST farmers.	Number		NA	3240 ⁴
4	Farmer Producer Organizations with 25% increase in annual business turnover relative to baseline.	Number	DLI	NA	15 ⁵

D. Result Area and Sub Components

The Program focuses on two key result areas and their supporting activities which have been agreed with the Government and through which the Bank's support is likely to make a significant impact. These result areas are inter-linked and mutually reinforcing.

Result Area	Envisaged Supporting Activities
Result Area 1: Strengthening the institutional capacity and policy environment for science-based, participatory watershed development in the participating states.	a. Strengthened community institutions and local government bodies engaged in watershed management b. Enhanced institutional capacity for watershed management c. National Center of Excellence on Watershed Management in Karnataka. d. Incentivize the development and dissemination of supportive policies at the national and state levels. e. Strengthened monitoring and evaluation systems at national and state levels: ○ The REWARD Program will support a transition to a state-of-the-art monitoring, evaluation, learning and knowledge sharing system in two ways. First, by strengthening MIS on watershed management through the development and deployment of a GIS-enabled MIS platform. ○ The Program will establish a scientific assessment and evaluation system, including a rigorous impact evaluation that encompasses the application of remote sensing and GIS technologies; process monitoring, and thematic studies for assessing change in specific parameters (such

³30% of farmers

⁴20% of farmers

⁵15 FPOs in Odisha

	as groundwater level, and sediment load, soil organic carbon) to evaluate the effectiveness of watershed investments.
Result Area 2: Scientific Watershed Development and Enhanced Livelihoods.	a. Development and dissemination of scientific information for watershed planning; b. Planning and implementation of watershed development interventions in select sub-watersheds in a saturation mode. c. The Program will support different elements of Climate Smart Agriculture including such as soil management (soil moisture management, erosion control, integrated soil fertility management, etc.); water management (ridge area treatment, drainage line treatment, rain water harvesting, efficient irrigation, etc.) provision of weather-based and LRI-based agro-advisories to farmers; appropriate crop selection (including horticulture and agro-forestry); and, value-chain interventions that can reduce post-harvest losses and enhance incomes through better access to markets etc. d. Implementation of value-chain development interventions with focus on production enhancement, post harvest management, infrastructure development, and forward and backward linkages of producers to markets for longer term COVID-19 recovery; and e. Livelihood protection and enhancement support for poor and land-less households for medium term COVID-19 recovery

2.6 Intermediate Result Indicators

S.No.	Indicator Name	Unit	DLI	Baseline	End Target
Results area 1: Strengthened Institutions and Supportive Policy for Watershed Development					
1	Adoption of strengthened watershed O&M policy by states.	Number of States		0	1
2	Results from pilots on science-based fertilizer application captured and disseminated.	Number of Pilots		0	1
Results area 2: Science-based Watershed Development and Enhanced Livelihoods					
3	Land area for which watershed plans are available and approved.	Hectares		0	3,00,000
4	Farmers accessing agro-advisory information.	Number		0	43,200
4.1	Of which, female farmers.	Number		0	12,960 ⁶

⁶30 percent

4.2	Of which, SC and ST farmers.	Number		0	8640 ⁷
5	Increase in farmers adopting value chain services of targeted Farmer Producer Organizations.	Percentage		0	25
6	Increase in climate –adjusted soil moisture in targeted watershed areas	Percentage		0	20 ⁸

E. The proposed PforR will support the next phase of the WDC-PMKSY program: As per PAD, the new five-year WDC-PMKSY program is implemented across all states (except for the state of Goa) and the REWARD Program is a sub-set of the same. The estimated total allocation to the REWARD Program for Karnataka, Odisha and the DoLR comes to USD 243.24 million. The proposed International Bank for Reconstruction and Development (IBRD) financing of the REWARD Program is USD 115 million—USD 60 million for Karnataka, USD 49 million for Odisha and USD 6 million for DoLR. In addition, the two states and the DoLR are committing an additional amount of USD 52.71 million, as per DEA norms for IBRD supported projects. At the central level, the REWARD Program scope covers management, monitoring, communication and knowledge sharing functions of the DoLR. At the state level, the REWARD Program will support implementation of key evidence-based watershed activities and value addition initiatives, and in so doing, aim to influence the WDC-PMKSY in the two states.

REWARD: Program Budget (USD million)						
	Projected government share (under WDC-PMKSY)	Additional government share (DEA requirement)	Total government share (A+B)	IBRD share	Total program budget (C+D)	IBRD percent contribution to total program budget
DoLR	5.41	6.00	11.41	6	17.41	34%
Karnataka	148.65	25.71	174.36	60	234.36	26%
Odisha	89.19	21.00	110.19	49	159.19	31%
TOTAL	243.24	52.71	295.96	115	410.96	28%

F. Program Scope and Boundaries

REWARD is planned to develop 17 Green field sites to establish model watersheds on saturation. For this purpose, 152 micro watersheds have been identified in five pilot districts for taking up intended interventions, covering a total geographical area of 1.15 lakh ha. Land Resources Inventory (LRI) activities will also be taken up in 5.26 lakh ha in seven districts (including five pilot districts) to provide comprehensive site- specific cadastral level information useful for appropriate Natural Resources Management (NRM) planning at farm level and integrated development of the area.

It is expected that, the State will establish and maintain partnerships between DSC&WD and scientific and technical institutions through formal arrangements such as contracts and

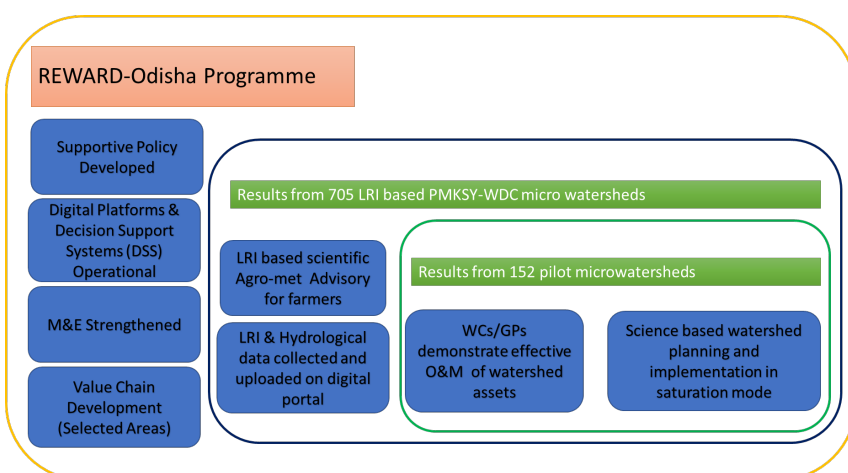
⁷20 percent

⁸ 20 percent increase in soil moisture in sampled sites out of the 1,00,000 hectares under science based watershed management

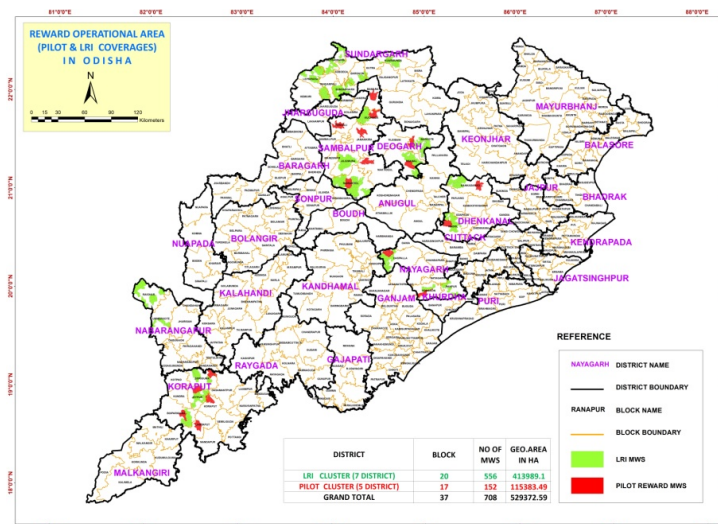
memoranda of understanding (MoUs) throughout the project period on the following, at a minimum: remote sensing, soil studies, hydrology, and agriculture. These partnerships will help the states to do LRI data collection in a wider area of 5.26 lakh hectares in support of long-term institutional capacity building and data-oriented watershed planning for which cabinet clearances are in place.

However, farmer outreach will primarily be done in a subset (3.0 lakh hectares) of this larger area but could be extended beyond these geographies as mentioned in para-38 of the Project Appraisal Document (PAD) version 14th October 2021 shared by the World Bank.

The REWARD-Programme scope is depicted below.



The districts selected for developing Green Field Sites and LRI activities are given at table-2 and table-3 below.



The districts have been selected considering several criteria such as situational contexts (Agro-climatic Zones, Aspirational districts, communication & accessibility, Non DMF / OMBADC operational areas), Socio-Economic Contexts (KBK region), watershed contexts (prioritisation of watersheds by Odisha Remote Application Centre, Left over untreated watersheds, drought

vulnerability) and institutional contexts (capacity of the district watershed implementation team, performance of the ongoing watershed projects). The blocks within the districts are selected considering extent of rain fed areas, drought vulnerability, value chain opportunities, extent of ground water exploited etc.

Table-2: District Wise Proposed Clusters of Micro Watersheds for Green Field Sites (Pilot)

Sl.No	Name of District	Name of Block	Number of Micro Watersheds	Geographic Area (Hectares)
1	SAMBALPUR	BAMRA	9	7210.84
		KUCHINDA	9	7670.87
		JAMANKIRA	9	7139.76
		RAIROKHOL	11	7611.42
		RENGALI	10	7186.03
		NAKTIDEUL	11	7234.92
		SUB TOTAL	59	44053.84
2	DHENKANAL	KANKADAHADA	13	6836.85
		HINDOL	10	6470.85
		SUB TOTAL	23	13307.7
3	NAYAGADA	ODAGAON	7	5847.79
		DASPALLA	10	7029.3
		SUB TOTAL	17	12877.09
4	DEOGARH	BARKOTE	8	6111.94
		REAMAL	8	6626.91
		SUB TOTAL	16	12738.85
5	KORAPUT	BORIGUMA	8	6680.54
		JAYPORE	6	6798.38
		KORAPUT	9	6439.21
		LAMTAPUT	8	6884.66
		BOIPARIGUDA	6	5603.22
		SUB TOTAL	37	32406.01
TOTAL			152	115383.49

Table-3: District Wise Proposed Clusters of Micro Watersheds for additional Land Resource Inventory

Sl.No	Name of District	Name of Block	Number of Micro Watersheds	Geographic Area (Hectares)
1	SAMBALPUR	KUCHINDA	29	19516.87
		RAIROKHOL	67	49621.06
		JUJUMURA	25	22604.38
		SUB TOTAL	121	91742.31
2	DHENKANAL	KANKADAHADA	37	21912.4
		HINDOL	30	19653.08
		SUB TOTAL	67	41565.48
3	NAYAGADA	RANAPUR	18	11147.5
		ODAGAON	9	5431.42
		DASPALLA	28	19656.98
		SUB TOTAL	55	36235.9
4	DEOGARH	BARKOTE	28	19276.54
		REAMAL	38	27873.12
		SUB TOTAL	66	47149.66
5	KORAPUT	BORIGUMA	19	14401.85
		JAEPOR	24	18572.94

		BOIPARIGUDA	17	15137.83
		SUB TOTAL	60	48112.62
6	NABARANGPUR	RAIGHAR	29	30151.82
		UMARKOTE	10	8884.49
		SUB TOTAL	39	39036.31
7	SUNDERGARH	LEFRIPADA	46	35490.86
		SUNDERGARH	28	22194.25
		BALISANKARA	30	24191.41
		BARGAON	18	11634.85
		KUANARMUNDA	23	13958.21
		SUB TOTAL	145	107469.58
TOTAL			553	411311.86

G. REWARD- Odisha Programme Cost

The REWARD programme is a subset of centrally sponsored scheme WDC-PMKSY. The REWARD- Odisha Programme targets to implement science based watershed development in saturation mode in 1.15 lakh hectares by leveraging funds from WDC-PMKSY as well as from convergence of schemes such as MGNREGS etc. Further, the programme targets to conduct LRI activities in 5.26 lakh hectares. Thus, the total outlay of the programme is Rs 800.00 Crores (REWARD programme Cost is Rs 500.00 Crore, WDC-PMKSY Project Cost is Rs 250.00 Crores, Convergence through MGNREGS is Rs 50.00 Crores).

The World Bank Support will be IBRD loan to the State and the State has the obligation to repay 100% of the loan. 49 million USD from the World Bank and USD 21 million from the State on a 70:30 World Bank: State cost sharing will be utilized over a period of **five** years. The state will also adopt Public Financial Management System (PFMS) and appropriate audit arrangements.

Expected Disbursement schedule of World Bank fund (Unit: USD million)

FY 1 (2022)	FY 2 (2023)	FY 3 (2024)	FY 4 (2025)	FY 5 (2026)	Total
6.0	10.90	9.30	9.50	13.30	49.0

The cost of major components under REWARD for Odisha State is summarised below in **Table-4**.

Table-4: Component wise Financial Budget under REWARD Programme**(Rupees in Crore)**

SL No.	Component	Activity	Year					Total	Remarks
			2022	2023	2024	2025	2026		
1	WC demonstrate satisfactory watershed management	Performance Incentives for WC	0.00	0.125	0.175	0.00	0.25	0.55	REWARD FUND
2		Training for 152 WC on critical aspects of project management	0.00	0.75	0.75	0.75	0.75	3.00	REWARD FUND
3	Land area treated with science-based watershed management technologies	Taking up LRI in 5 lakh Ha. in Rainfed watershed areas in 7 districts	22.02	11.34	6.74	2.91	0.62	43.63	REWARD FUND
4		Hydrological studies in sample MWs	22.80	5.19	5.11	4.97	4.88	42.95	REWARD FUND
5		Preparation of DPR for 152 MWs	0.00	1.25	1.25	0.00	0.00	2.50	PMKSY FUND
6		Training to each WC on preparation of DPR utilizing LRI outputs	0.00	0.30	0.30	0.00	0.00	0.60	REWARD FUND
7		Saturation of 152 MWs in 5 Districts (NRM activities)	0.00	50.00	90.00	150.00	110.00	400.00	PMKSY-Rs 150 Crore REWARD FUND- Rs 200 Crore & Convergence-Rs 50 Crore
8		Activities to increase climate-adjusted soil moisture in targeted watershed areas (20,000 Ha.)	0.00	2.50	5.00	5.00	7.50	20.00	REWARD FUND
9	Adoption of resilient agriculture technologies and practices by farmers	Demonstration of core set of resilient agriculture technologies and practices (10,000 Ha.)	0.00	1.00	3.00	4.00	4.00	12.00	REWARD FUND
10		Policy Innovation pilot	0.00	2.00	4.00	5.00	5.00	16.00	REWARD FUND
11		Agro Advisory (Dissemination of LRI cards through Village based training, train and equip farmers to adopt climate resilient agriculture practices, and link them to value chains)	0.00	1.00	3.00	4.00	4.00	12.00	REWARD FUND

12	Farmer Producer Collectives(FPCs)	Formation of 15 FPCs & value chain development	2.69	8.60	6.93	1.85	0.95	21.00	REWARD FUND
13	Capacity Building	CBSA,CB & IEC Materials	4.30	2.80	1.60	1.50	1.50	11.70	PMKSY FUND
14	On Farm & Off Farm activities	Livelihoods & PSME	0.00	5.00	15.00	20.00	20.00	60.00	PMKSY FUND
			0.00	5.00	5.00	5.00	5.00	20.00	REWARD FUND
15	M & E	Development of MIS , Process Monitoring & Evaluation of projects	1.00	2.50	2.50	3.00	3.00	12.00	REWARD FUND
16	IVA		1.00	1.25	1.25	1.25	1.25	6.00	REWARD FUND
17	Internal & External Audit		0.18	0.18	0.18	0.18	0.18	0.90	REWARD FUND
18	Installation and post project sustainability of Digital Library	Maintenance of Digital Library	0.00	5.00	5.00	5.00	5.00	20.00	REWARD FUND
19	Project Management	HR	7.75	7.75	7.75	7.75	7.75	38.75	REWARD FUND
		Admn.	5.00	5.00	5.00	5.00	5.00	25.00	PMKSY FUND
		Consultancy services	2.00	2.00	2.00	2.00	2.00	10.00	REWARD FUND
20	Contingency including Seminars, Workshops etc.		2.50	4.00	5.00	5.00	5.00	21.50	REWARD FUND
G.TOTAL			71.24	124.53	176.54	234.16	193.63	800.08	

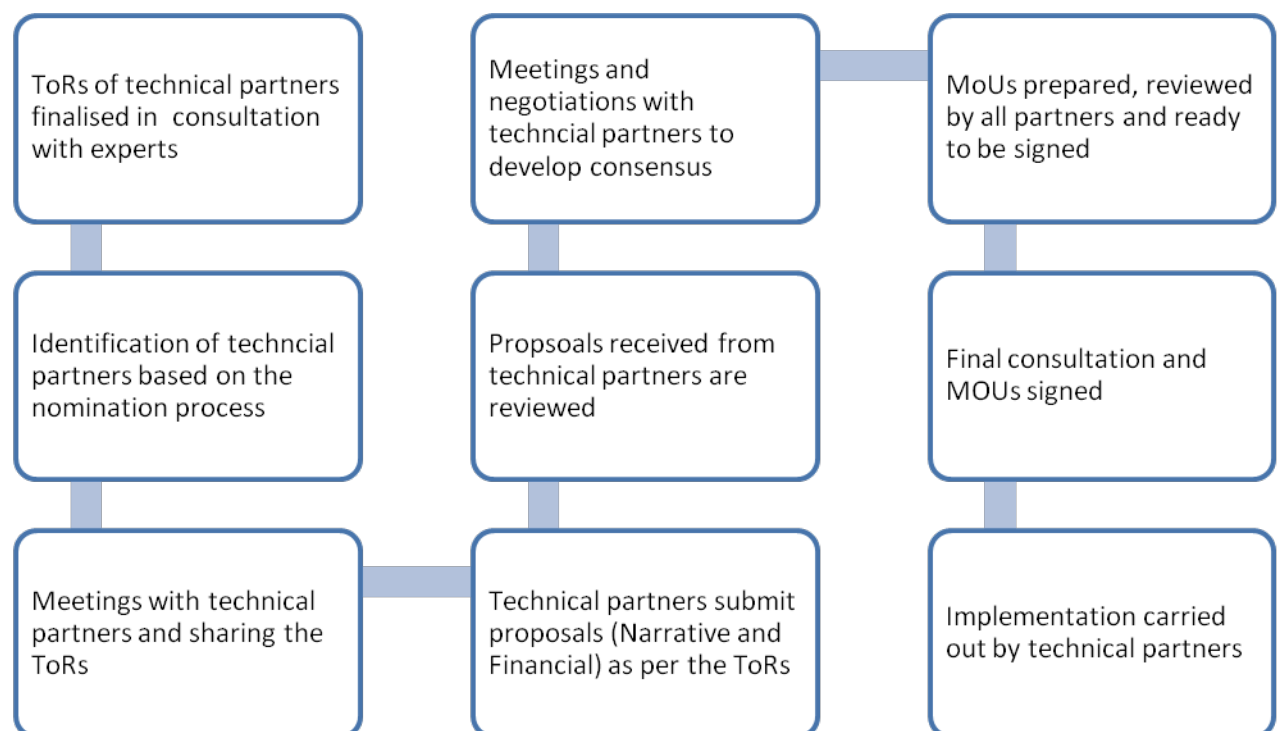
Note: The budget estimated may be subject to change in actual based on the proposed funds availability and need based activities.

3. Partnerships

3.1 The REWARD programme has envisaged partnerships with scientific and technical institutions to leverage technical and scientific knowledge on adoption of science-based and LRI data driven approaches for planning, preparation of Detailed Project Reports (DPR)s using LRI data, Hydrology data, DSS and impact evaluations, develop technical standards for adopting science based approaches, build capacity of primary and secondary stakeholders and providing appropriate trainings and advisory services to farmers through ICT platforms and also extension activities for climate resiliency. Further, it also emphasizes on strengthening MIS systems with GIS and ICT platforms for tracking real time data on various sub-project cycles and analysing the same for timely decision making.

Accordingly, institutions with required domain expertise have been identified as partner organisations for REWARD in Odisha. Odisha University of Agriculture & Technology (OUAT), the State Agriculture University has been seen as the major partner as it has the foot print in all districts through its network of KVKs and constituent colleges in western and southern Odisha.

In the beginning of the program, the Directorate of Soil Conservation & watershed Development i.e. the State Watershed Development Department will be signing an Memorandum of Understanding (MoU) with all the relevant technical agencies as program partners and the REWARD will be implemented in a consortium mode. The MoUs will clearly define the tasks to be performed by each of the technical partners, area of operation, specific deliverables and budget etc. The broad selection process of the technical partners is presented in the **flow diagram**.



3.2 Technical Partners on Hydrology: There are four lead partners in hydrological assessment group namely, IIT Bhubaneswar (IIT BBS), Odisha University of Agriculture and Technology (OUAT), Bhubaneswar, ICAR-IIWM, Bhubaneswar, and ICAR- IISWC, Sunabeda. IIT, Bhubaneswar will be responsible for developing science-based technologies for the MWS in Dhenkanal district and similarly, IIWM for the MWS in Nayagarh district, OUAT for the MWS in Deogarh, Sambalpur and Sundargarh districts and IISWC, Sunabeda for the MWS in Koraput and Nawarangpur districts. Thus, each team will share the responsibility of conducting survey, extending technical support for field instrumentation, collection of data, and preparation of DPR in the selected pilot, monitoring and LRI watersheds of the assigned district(s). The technical partners organisation shall have responsibilities of developing protocols, manuals, imparting training and handholding support to the partner institutions, staff of DSCWD at State, district and Cluster level; ToTs to the CRPs and organising stakeholder workshop in coordination with the DSCWD as per their envisaged lead and supporting roles in hydrology, LRI, RS&GIS and ICT. However, the expertise and experience available with the partner institutes have been considered to entrust upon them the following specific tasks as outlined in the table below.

Technical Partners on Hydrology		
Partner Organisation	Activities	Responsibilities
Odisha University of Agriculture & Technology (OUAT)	Geo-morphological characterization and water balance modelling of MWS. DSS for estimation of water balance components at LMU scale	<u>OUAT is the lead partner with respect to geo-morphological characterization, calibration and validation of water balance models</u> for all the selected MWS in the REWARD districts. Primary and secondary data along with spatial maps of respective MWS collected by the other partner institutes will be provided to OUAT for hydrological modelling and simulation of water balance components. Finally, one DSS will be developed to downscale the hydrological information to LMU level.
ICAR- Indian Institute of Soil & Water Conservation(IISWC)	Development of DSS for identification of potential sites for SWC structures. Hydrologic and hydraulic design of soil and water conservation structures	IISWC, Sunabeda is the <u>lead partner to calibrate and validate the surface runoff models</u> and further, assigned to formulate the protocol for DSS on siting and volume estimation <u>of soil and water conservation structures</u> along with their designs for the all the MWS in the REWARD districts. Hydrological, geomorphology and existing structural data relevant to identification of potential sites for SWC structures in MWS are to be shared with IISWC by all the partners.
Indian Institute of Technology (IIT), Bhubaneswar	Groundwater modelling and estimation of groundwater recharge, extraction, storage and	IIT Bhubaneswar is the lead technical partner for the overall supervision of project activity by partner institutes. <u>As a leader in groundwater modelling</u> , it will develop, calibrate, and validate the models for estimation of groundwater

	mapping of groundwater potential and recharge zones. Development of DSS for siting of groundwater recharge and extraction structures along with their design.	storage, draft and recharge for the ONE pilot MWS in Dhenkanal district. In line with the details listed in section 2.1, IIT Bhubaneswar will calibrate/Validate Visual MODFLOW Flex 5.0, Visual HELP and Hydrus-1D for generating prediction on groundwater level, recharge, surface-groundwater interaction, evapotranspiration, groundwater contribution to evapotranspiration and storage anomaly. Moreover, different machine learning tools will be coupled with these physical based models to enhance the prediction accuracy with minimum data sets. Subsequently, <u>IIT Bhubaneswar will develop a DSS for siting of groundwater extraction and recharge structures</u> and will also develop the detailed training material and protocols for both the activities and provide to the project partners. IIT Bhubaneswar will then impart hands-on training to the personnel at partner institutes on groundwater modeling through relevant software packages and extend its support to the concerned persons at partner institutes as and when required during the project duration.
ICAR-Indian Institute of Water Management (IIWM)	Estimation of sector-wise water demands, MWS characterization based on water demand and availability. Development of DSS for water allocation, crop planning and agro-advisory services.	As the lead partner, <u>IIWM is assigned to calibrate and validate water budgeting models and crop growth simulation models</u>. The lead partner is also responsible for preparing protocols on development of DSS for estimating the Crop water requirement and Water budgeting for all the MWS in the REWARD districts. All the partner institutes are required to provide relevant data pertaining to crops, their growing season, dates of sowing, existing soil and hydrologic information of the MWS in their districts to IIWM.
Odisha Space Application Centre (ORSAC)	Integrated DSS Development	All the DSS modules will be combined in a single platform and hosted in server placed at ORSAC, Bhubaneswar. A web portal and user-friendly mobile app will be developed by ORSAC for the end users to derive required solutions.
LRI Partners	Preparation MWS resource maps and watershed planning Atlas	This will be done by the concerned LRI partner.

3.3 Technical Partners on LRI:

National Bureau of Soil Survey and Land use planning (NBSSLUP), Kolkata will be the lead agency in LRI activities and Odisha University of Agriculture and Technology will be the major technical partners in developing LRI in REWARD project. Odisha Space application centre (ORSAC) will have the major roles on RS, GIS and ICT support services. OUAT along with other LRI partners is to facilitate the preparation of Detailed Project Report (DPR) by watershed and other line departments by providing the required LRI outputs and training, participate in the DPR validation exercise and update the DPR based on the inputs and suggestions received. The updated DPR will be used for taking up interventions by the departments concerned in the project districts.

The broad roles and responsibilities of these technical partners are given in the table below.

Partner Organisation	Responsibilities
National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), Kolkata	• Overall technical guidance to the Technical Partners in LRI. Provide inputs for updation of Digital Library and Decision Support System. • Co-ordinate with WDD in organizing stakeholder workshops and Training project staff, project partners, NGOs and other project States on LRI • Extension support services to project districts, partners and other project States • Advise WDD and other partner institutions more specifically SAUs on the requirement of various RS inputs / imageries, theme maps as the project progresses; • Develop standard protocols, Proformas and Manuals for field survey and laboratory analysis for soil & water samples; • Train the SAUs / community in RS, GIS and Natural Resources Survey / Characterization; • Undertake characterization of correlated soil series from the project districts; • Assist WDD in Developing additional Decision Support Systems (DSS) in collaboration with WDD and project partners; • Assist WDD in developing guidelines to draw treatment plans. • Provide the generic, functional specifications for the major equipment to be procured by WDD through International/National Competitive Bidding; • Prepare LRI, Hydrological Atlases and Reports • Preparation of DPR in the selected pilot • Validation of DPRs • To conduct State and district level workshops every year for capacity building the project partners • To conduct symposium/technical workshops

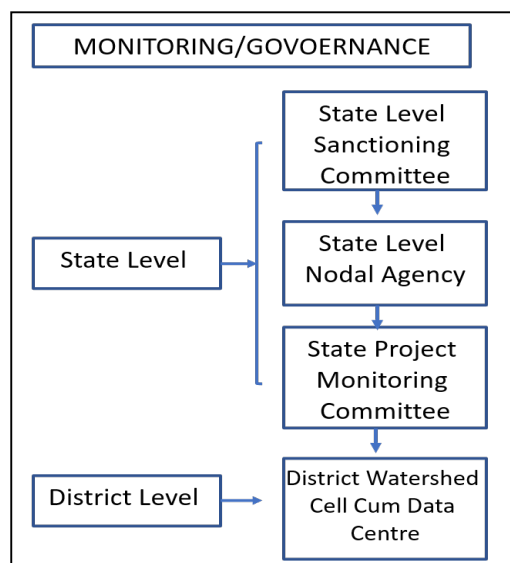
	• To participate district, block and cluster level LRI dissemination workshops
Odisha University of Agriculture & Technology (OUAT)	• Major technical partners in LRI • Providing Technical Inputs for planning and, Participatory Research based on Land Resources Inventory and Hydrological research. • To be associated with IIT(BBS), ICAR-IIWM and ICAR-IISWC on hydrology and NBSS&LUP for LRI • To carry out Land resource inventory in their respective areas of operation • Prepare LRI and Hydrological Atlases and Reports • Preparation of DPR in the selected pilot • Validation of DPRs • Agro-Meteorology department, OUAT to associate with IMD, OSDMA, NIC and DA&FP in analysing climate data and providing weather based Agro-advisory services to farmers • Training and Extension support • To conduct annual symposium/technical workshops by partners on a rotation basis • To participate district, Block and cluster level LRI dissemination workshops • Operate GIS Laboratory and Field survey units • Provide inputs for new DSS • Developing contingency plans to overcome weather aberrations • Integrated farming, Income generation activity and Participatory Research work. • Conduct Demonstrations on fodder, feed, livestock, fisheries etc. • Conduct Trainings on Livestock and Fisheries related activities
Odisha Space Application Centre (ORSAC)	• Geo referenced Seamless Cadastral Maps at District/Block/Cluster level for the State • Geo referenced satellite imageries for the project areas • Base Maps for all the Micro watersheds (Administrative Boundary, Drainage, Water Bodies and Transport Network) • Land use / Land cover maps at the Micro watershed level • Data standards as per ORSAC/ National GIS (NGIS) Norms • UIDs initially at Cadastral level and later at Land parcel level with inputs from project partners • DEM for all the micro watersheds • Watershed Management Portal with a centralized Land Resource Inventory (LRI), Digital Library, LRI Portal, Decision Support System(s) and mobile applications as part of the Portal development in association with other Project Partners • Webhosting of Watershed management portal and DSS

	• Development of web-mobile interface (Mobile app) app for the watershed management portal/DSS and farmers advisories • Training Modules & Manuals related to RS & GIS • Capacity building and handholding support to partners and DSCWD staff
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3.4 Successful watershed outcomes can emerge from collaborations with scientific & research organizations and the private sector as demonstrated in Sujala-III projects in Karnataka and requires coordinated efforts across key line departments, such as Agriculture, Horticulture, Animal Resources and Forest, Environment & Climate Change departments. REWARD envisages provision of technical support and capacity building for public private partnerships (PPP) projects in value chain development. Further, NGOs may also be engaged as Project Implementing Agency (PIA) if required. The State watershed department will follow due procurement procedures for hiring services of public and private organisations/resources agency and NGOs and adhere to the guidelines in force for implementation of watershed projects in the State. Since REWARD promotes innovations and development; it is dynamic and evolving. Hence, more technical partners may be identified during project implementation and can be taken on board for specific project requirements. The Terms of References of Technical Partners is at **Annexure-I (A, B, C)**

4. Institutional Arrangements

4.1 Institutions play a key role in planning, implementation, monitoring and sustaining the watershed activities for better results. DSC&WD will be partnering with many State and Central organizations and agencies involved in research, development and management of natural resources in the State for implementation of REWARD project. In addition to the external institutional arrangements, the proposed project will also have internal formal institutional arrangements for periodical review, overseeing the project progress against a set of deliverables, timely guidance, approvals and taking appropriate policy level decisions. The following institutional arrangements will be established from state to village level for implementation of REWARD project in the state.



A. Monitoring / Governance Institutions

4.2 State level Sanctioning Committee (SLSC) under the Chairmanship of Chief Secretary, GoO is the Apex body for PMKSY, which will also oversee the REWARD project in the State. Agriculture Production Commissioner will be the Vice-Chairman of the committee. Secretary- Finance, P&C, Fishery & ARD, F&E, PR & DW, Water resources, Cooperation and Rural Development along with Vice Chancellor, OUAT, Directors of line departments, representatives from NITI Ayog, Ministry of RD, A&FW, Water Resources will be the members in the Committee. Secretary A&FE, GoO will be member Secretary. The SLSC shall be responsible for the overall strategy, approach and supervision of the watershed development projects in the state.

4.3 State level Nodal Agency (SLNA) under the chairmanship of Agriculture Production Commissioner, Govt. of Odisha will monitor project implementation from time to time. Secretary- A &FE, PR&DW, WR, Finance, F&ARD, F&E along with VC, OUAT, representatives of NRAA, DoLR,GoI, Director- A&FP, Director-Horticulture, Director- ICAR-IIWM, CGM- NABARD, Regional Director- CGWB, Representative of VO and Director, DSC&WD will be the CEO-SLNA and Member Secretary.

4.4 State Project Monitoring Committee (SPMC) under the chairmanship of Secretary, Agriculture & FE, Govt. of Odisha will monitor project implementation from time to time along with approval of action plan, HR policy and procurement policy, project partners and consultants. It will also coordinate among various departments for effective convergence. Directors of all the line departments, Director- Special Project (PR&DW department), State heads of ORMAS, OLM & Mission Shakti along with VC, OUAT will be the members. Director, DSC&WD will be the member secretary.

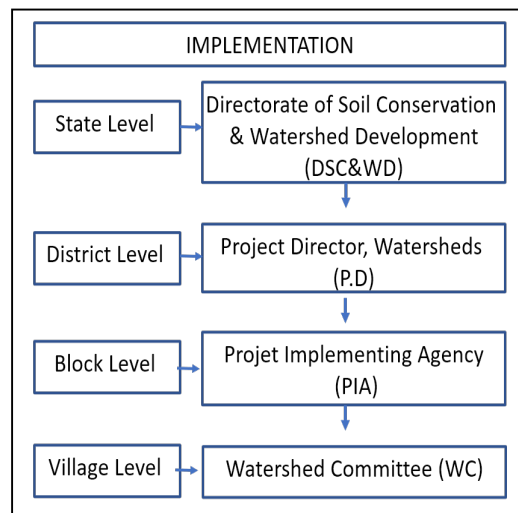
4.5 Watershed Cell Cum Data Centre (WCDC) headed by District Collector and Chairman- WCDC will monitor project implementation in the district. It will also coordinate among various departments for effective convergence. P.D, DRDA and Co-Chairman- WCDC , district heads of all line

departments along with district head of ORMAS, OLM , Mission Shakti and representative from KVK &FPO will be the members.

B. Implementing Institutions

4.6 State Project Implementing Agency (SPIA) /

Directorate of Soil Conservation & Watershed Development (DSC&WD) headed by Director, SC&WD will implement the project in the state. A team of senior officers from the cadre of Soil Conservation & Watershed Directorate including Joint Director, Administrative officer, Finance officer, Deputy Director, Assistant Director, Assistant Soil Conservation Officers and a team of senior technical officers drawn from areas related to agriculture, agriculture engineering, horticulture, animal husbandry on deputation/deployment from their respective Directorates/ cadres will assist in implementation and monitoring of the project with the support of a team of experts at Directorate level.



4.7 State Project Management Unit (SPMU) will be established at Directorate level with a team of experts from areas of Procurement, Hydrology, M&E, LRI, IT, MIS, GIS, Capacity Building, Social Development, FPO & Value chain. They will be outsourced from open market and support the SPIA in coordinating with agencies and universities on technical matters, reporting on the project progress and outcome, Preparing action plan and Handholding support to the districts and PIA in particular for preparation of DPR and project implementation.

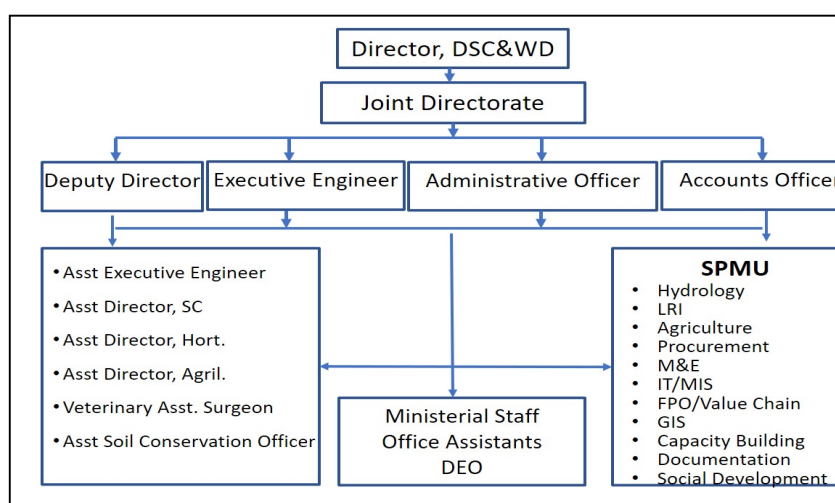


Fig: State Project Implementing Agency (SPIA)

4.8 District Project Implementing Agency (DPIA) headed by Project Director, Watersheds will supervise and monitor the watershed projects in the district. Three Assistant Directors and one Asst Agril. Engineer will assist the Project Director with the support of a team of experts from different domain.

4.9 District Project Management Unit (DPMU) will be established in the office of the Project Director with a team of experts from Hydrology, LRI, M&E, IT, MIS, GIS, Capacity building, Social development, FPO & Value chain. They will be responsible for coordinating with other departments at district level for convergence, prepare Annual Action Plan, scrutiny of DPR and hand holding support to PIA, WMT and WC in planning and smooth implementation of the project.

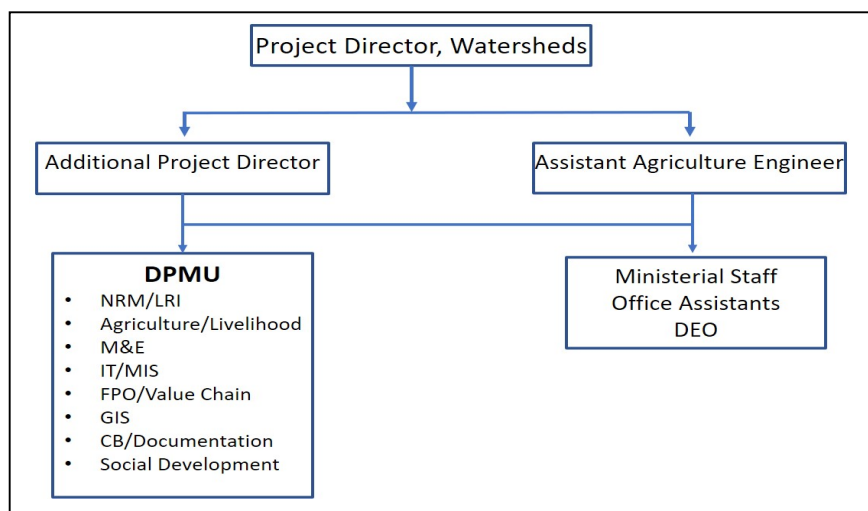
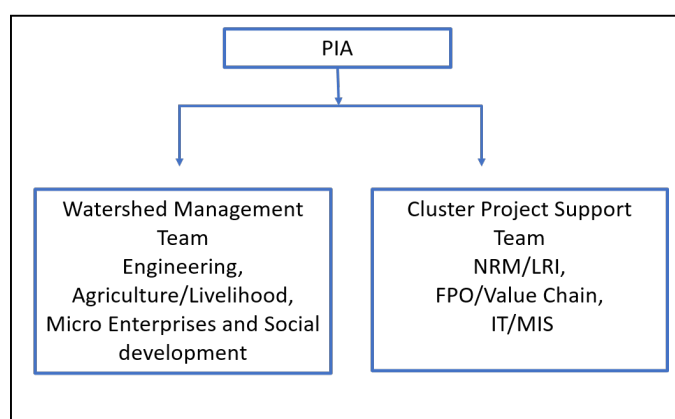


Fig: District Project Implementing Agency (DPIA)

4.10 Project Implementing Agency (PIA) will be placed at block level for implementation of the projects in the block. Block level soil conservation officer designated as PIA will be appointed by the Project Director after approval of the DPMC and SPMC. PIA will be responsible for preparation of DPR and implementation of the project activities as per DPR in a participatory approach. Team of experts (WMT) and Cluster PST will be placed for each project to support PIA.

4.11 Watershed Management Team (WMT) will be placed for each project to support PIA for implementation and monitoring. Experts from Engineering, LRI, Agriculture/Livelihoods, Micro Enterprises, Social Development and FPO will be engaged for the team. They will be responsible for hand holding Watershed Committee in planning and execution of planned activities, maintaining records and formation of different groups, forward and backward linkage of their produce.

4. 12 Cluster Project Support Team (PST): Additional human resources (three members team) will be placed for each project in the domain of NRM/LRI, FPO/Value Chain and IT/MIS to support PIA, Watershed Committee, FPOs, SHGs, UGs and other CBOs for supporting science based watershed management, value chain activities and on information technologies, MIS, GIS etc.

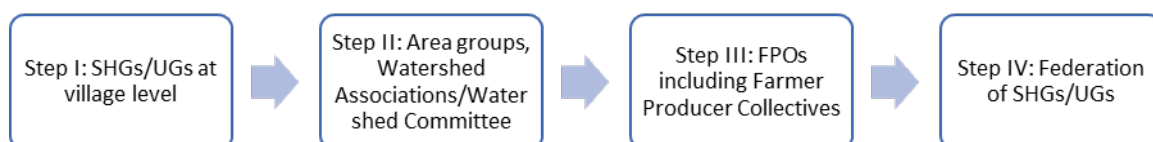


C. Community Level Institutional Arrangement (CBOs)

4.13 Watershed Management under REWARD, though emphasize on more science-based data driven planning, is first and foremost a social process. Given the current emphasis on community-based approaches to planning and implementation of watershed projects, REWARD appreciates the role of CBOs in integrating science effectively into community-based decision making. Hence, the programme intends to make adequate investments to aligning people's institutions appropriately with the project objectives. Steps will be taken to build on CBOs, expand their skills and assets, and convert them to meaningful livelihoods through a dedicated support structure.

4.14 Sequencing of the CBOs (both existing and new) will be carried out in such a way that they are organized as and when the need arises. The following specific sequence will be considered as a general guideline:

- Step I: - SHGs (of women as well as men)
 - UGs (of men as well as women)
 - Community Link Workers (Social, NRM, Agriculture)
- Step II: - Area groups and Watershed Association
 - Watershed Committee
- Step III: - FPOs including smaller Farmer Producer Collectives
- Step IV: - Federation of SHGs
 - Federation of UGs



4.15 Watershed Association (WA)

The WA is the association of all households owning land within the delineated watershed boundary as well as landless households who depend on the watershed resources for their livelihood. Various issues and complexities may arise when a watershed programme endeavours to involve various stakeholders in the programme such as;

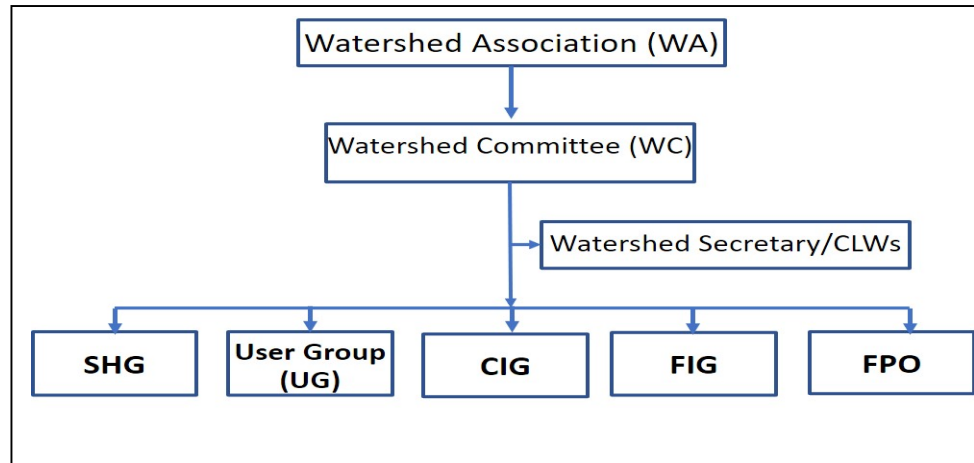
- People owning land within the watershed and living outside its boundary
- People owning land outside the boundary, but living within the watershed
- Landless people living inside the watershed, but dependant on its resources like fuel wood, fodder, tank water etc
- People living outside the watershed, but depend on watershed resources
- Absentee landlords with lands leased out
- Absentee land lords with cultivable waste lands

- Public institutions like schools, temples, revenue departments etc having land within the watershed.

The community will be taken to confidence while addressing these issues amicably.

4.15.1 The Watershed Association will meet, at least, twice a year to evolve/improve the watershed development plan, monitor and review its progress, approve the statement of accounts, resolve differences of disputes (if any) that the project may impact.

4.15.2 Care will be taken to see that organizing WC is not hastened. It will be constituted only after organizing at least 50 % of population into SHGs and UGs



and also after preparation of first year action plan for development of individual oriented natural resources (through SHGs) and of community-oriented natural resources (through UGs). The WC will be organized (after this stage) for consolidation of above action plans and also for taking follow-up actions related to approval of plan, release of funds, implementation of approved works, etc.

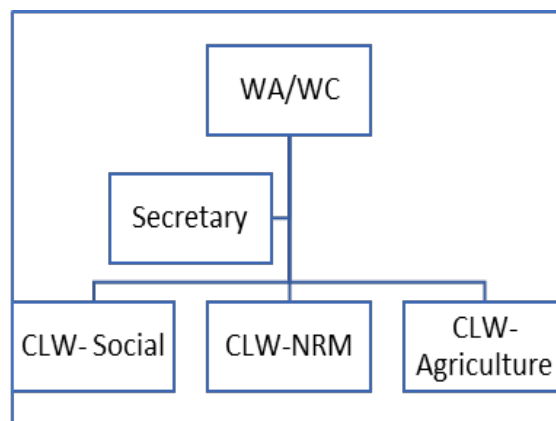
4.16. Watershed Committee (WC) : The Gram Sabha/ WA will constitute the Watershed Committee (WC), which will be responsible for coordination and liaison with the Gram Panchayat, the Watershed Management Team and Government Agencies concerned to ensure smooth implementation of the programme. The Committee shall be registered as a Society under the Societies Registration Act, 1860. Watershed Association will function as a decision-making body and WC as its executive body. The Committee shall comprise a minimum of 11 members. 5 (five) members representing various user groups and the SHGs; 3(three) from the FPO; 1(one) GP member; 1 (one) WMT. Further, the Secretary selected will serve as Member-Secretary. The 11 member committee (excluding the Secretary) shall have at least 2(two) representations each among the women and SC/ST members.

The Committee members in a specially convened meeting shall choose one among themselves to serve as the Chairperson and another as Co- chairperson, while ensuring that either of them is a woman. However, both shall be other than the GP member on the board and the member – secretary.

4.16.1 The Secretary of the Watershed Committee (WC) will be selected in a meeting of the WA. This person would be a dedicated paid functionary with no responsibilities other than the assistance to the Watershed Committee (WC) and would work under the direct

supervision of the Chairman of the WC. The secretary will convene meetings of the WA and WC, take follow up actions on all decisions and maintain all the records of project activities. The expenses towards the honorarium to be paid to Secretary of Watershed Committee (WC) will be charged from the administrative support to the Project Implementing Agency (PIA).

4.17 Area groups: It is now recognized that the current size of Watershed Association (for an area of 500 ha) is too large for functioning in a coherent manner, particularly in cases where participants are spread over more than one habitation. This is due to various reasons including large size of membership, conflict in negotiations, difficulty in participation due to distant location of certain habitations etc. It is therefore proposed to promote habitation based area groups to facilitate participative democracy in place of representative democracy.



4.18 Community Link Workers (CLW): It is proposed to promote three community workers in each micro watershed – one CLW (Social), one CLW (NRM) and one CLW (Agriculture). They will serve as community level facilitators in field of social, NRM and agriculture & allied sectors respectively. The above resource persons perform their functions on service charge basis against specific outputs and hence play a crucial role in sustained delivery of services during post project period.

4.19. User Group (UG)

4.19.1 UGs will refer to those groups which are associated with one or other community-oriented asset/ common property resource, etc. Efforts will be made for organization of women UGs (besides men UGs) particularly with respect to development and management of community water resources for drinking water, management of fisheries and production of biomass etc.

4.19.2 The following Steps will be taken to improve the functioning of the UGs.

- Demand-driven approach in planning of CPR
- Genuine contribution to Watershed Development Fund from actual users
- Resource use agreement or benefit sharing mechanism based on the principles of gender, equity and sustainability.
- Formal allocation of provisional user rights
- Working out modalities for repair, maintenance and protection of CPRs
- Advising UGs to either become SHGs (in case its members are homogeneous) or to join different SHGs (if their members are heterogeneous)

4.19.3 Federation of UGs: The federation of UGs will consist of members from not only men UGs but also women UGs associated with common property resources. It will be organized wherever 8-10 UGs are functioning. This is needed where size of CPR is large and where there are multiple User Groups in each CPR so that it can help in conflict resolution, protection of natural resources, etc. This body will be trained to take charge of the operation and maintenance of CPRs in post project period.

4.20. Self Help Groups

4.20.1 The Self Help Groups, of women in particular, are now promoted and nurtured under Mission Shakti movement of GoO and many other agencies such as OLM, Mission Shakti, NABARD etc. GoO has created Mission Shakti Department, an exclusive Administrative Department to work with around 70 lakh rural women involving nearly five lakh women self-help groups (SHGs). REWARD will focus on follow up nurturing of existing groups through gaining access to trainings, information, resources and further linkages. Efforts will be directed towards formation of men SHGs, particularly those belonging to the poorest of poor category (besides women SHGs). The SHGs (both men and women) will be involved not only in micro enterprises, but also in natural resource development, livelihood development, execution of various works, management of CPR, etc.

4.20.2. Federation of SHGs: This body will consist of members from not only women SHGs but also men SHGs. To begin with, it will be organized at village level to diversify livelihood activities through the use of revolving fund. It will be formed wherever more than 50 percent of the families in a village are represented in one or other SHGs. Towards the end of the project this body would also manage the revolving fund available with the WC.

4.21. Farmer Producer Organisations

4.21.1 The farmers are organised into smaller groups at the village level for limited purpose of implementation of product-specific cluster/ commercial crop cycles. These groups will be known as Farmer Interest Groups (FIGs). Existing FPOs (such as Farmers Clubs promoted by NABARD, Producers Groups promoted under the Odisha Livelihood Mission, Directorate of Horticulture and Odisha Millet Mission etc) promoted in the area under various government and non-government programmes will be considered for financial and capacity building assistance. The programme will ensure their participation through gaining access to trainings, information, resources and further linkages.

4.21.2 These Producer Organizations would be facilitated with resilient agriculture technologies, agro advisories, infrastructure development, value chain development, IT applications, market intelligence & finance arrangements so that they can ensure availability of end to end services to their members. The project will develop a concerted strategy to establish effective linkage of these FPOs with other line departments such as Horticulture,

Animal resources, Fisheries and leveraging flagship agribusiness and livelihoods programs such as Millets Mission, National Horticulture Mission, NRLM etc.

The proposed roles and responsibilities of different institutions under REWARD Project at different levels are listed below.

Table-5: Roles and Responsibilities of Key Institutions

UNIT	Members	Envisaged Role
State Level Sanctioning Committee (SLSC)	- The committee chaired by Chief Secretary, Govt of Odisha - Agriculture Production Commissioner will be the Vice-Chairman of the committee - Secretary- Finance, P&C, Fishery & ARD, F&E, PR & DW, Water resources, Cooperation and RD along with VC, OUAT, Directors of line departments, representatives from NITI Ayog, Ministry of RD, A&FW, WR will be the members in the Committee. Secretary A&FE, GoO will be member Secretary	- The SLSC shall be responsible for the overall strategy, approach and supervision of the watershed development projects in the state. - The SLSC shall lay down the broad contours for successful implementation of the projects, keeping in mind the state's natural resources, vision, impact of climate change, vulnerability of districts to drought and the recommendations of the District Irrigation Plans etc. - It shall approve the cumulative funds available for the watershed projects for the year, and assign it to the SLNA, and authorise it to decide on specific projects in adherence with its broad guidelines. - The SLSC will approve and indicate the annual budget in time, so that SLNA and other institutions down the line are able to decide and roll out their respective tasks in sync with the season bound nature of project works
State Level Nodal Agency (SLNA)	- Chaired by Agriculture Production Commissioner, Govt of Odisha - Secretary- A &FE, PR&DW, WR, Finance, F&ARD, F&E along with VC, OUAT, representatives of NRAA, DoLR, GoI, Director- A&FP, Director-Horticulture, Director-ICAR-IIWM, CGM- NABARD, Regional Director-CGWB, Representative of VO and Director, DSC&WD will be the CEO-SLNA and Member Secretary	- Prepare a Perspective and Strategic Plan of watershed development projects for the State on the basis of plans prepared at the block and district levels. It shall then submit this along with implementation strategy, expected outcomes and financial outlays to the NLNA for appraisal and clearance. - Recommend SLSC for approval of Annual Action Plan - Establish and maintain a State Data Cell (SDC) and connect it online with the National Data Centre (NDC) - Provide technical support to all the Watershed Cell cum Data Centres (WCDC) at the district level - Approve a list of independent institutions for capacity building of various stakeholders within the state, and work

		out the overall capacity building strategy in consultation with NRAA/NLNA/SLND • Arrange sanctioning of individual watershed and springshed development projects submitted by the WCDC after appraisal and recommendation of NLND, keeping in mind the budgetary authorization made by the SLSC, the state perspective and strategic plan • Approve Project Implementing Agencies (PIAs) identified/selected by WCDC by adopting objective and transparent selection criteria. • Establish monitoring & review, evaluation and learning systems at various levels (internal and independent external systems) • Constitute a State level Panel of Independent Evaluating Agencies. • Undertake regular on-line monitoring of implementation projects in the state • Design and obtain approval of competent authority to release 'Guidelines for Establishment and Utilization of Watershed Development Fund (WDF)
State Project Monitoring Committee (SPMC)	• Chaired by Secretary, Agriculture & FE, Govt of Odisha • Directors of all the line departments, Director- Special Project (PR&DW department), State heads of ORMAS, OLM & Mission Shakti along with VC, OUAT will be the members. Director, DSC&WD will be the member secretary.	• Monitor project implementation • Reviewing project implementation partners and other stakeholders • Approval of State-specific Process Guidelines, and Technology Manuals etc. in coordination with the SLND • Approval of HR policy and procurement policy, project implementation partners, consultants etc. • Coordinate among various departments for effective convergence
State Project Implementing Agency/ DSC&WD	• Headed by Director, DSC&WD • Assisted by JD, DDSC, Accounts officer, Administrative Officer, ADSC, AEE, ADH, AAO, VAS, ASCO at Directorate • Supported by SPMU and Administrative staff	• Sign MoUs with qualified scientific and technical partners • Strengthen the MIS/M&E system • Prepare perspective and strategic plans • Prepare preliminary Project Reports (PPR) • Monitor project progress • Preparation of project progress reports • Monitor fund flow and audit • Evaluation of the projects at different levels

		• Handholding support to the districts and PIA for preparation of DPR and project implementation • Capacity building of the project implementation teams
State Project Management Unit (SPMU)	Experts in the following domains: • Hydrology • Procurement • LRI • M&E • IT/MIS • GIS • Capacity Building • M&E • Documentation • FPO & Value chain • Social & Community mobilization	• The SPMU will be responsible for coordinating with agencies and universities on technical matters. It will be the vehicle primarily responsible for overseeing the project implementation, M&E • Reporting on the project progress and outcome. • Handholding support to the districts and PIA in particular in preparation of DPR and project implementation
Watershed Cell Cum Data Centre (WCDC)	• Headed by District Collector • P.D, DRDA and Co-Chairman • District heads of all line departments along with district head of ORMAS, OLM, Mission Shakti and representative from KVK & FPO will be the members of DPMC.	• Overseeing the project implementation • Monitoring and periodical review of the programme • Coordinating among departments for convergence
District Project Implementing Agency (DPIA)/P.D., Watersheds	• Headed by the Project Director, Watersheds • Assisted by ADSC, AAE and administrative staff at district office • Supported by DPMU	• Supervise and support the work of the project implementation agency • Scrutiny of consolidated DPR • Coordinate with the district level line department units for programmatic synergies • Maintain district level MIS data • Coordinate with the SLNA/DSC&WD • Conducting Capacity building programmes for different stakeholders • Reporting project progress
District Project Management Unit (DPMU)	Technical Experts in the following domains: • NRM/LRI • Agriculture • M&E • IT/MIS • CB& Documentation • GIS • FPO & Value chain • Social & Community mobilization	• Hand holding support to the PIA and WMT in preparation of DPR and project implementation • Preparation of Annual Action Plan • Preparation of progress reports • Capacity building plan and programme of different stakeholders • Documentation of project activities • Coordinating line departments, Banks and agricultural markets for value chain developments and market linkage • Convergence of different programmes
Project	• Block level Soil Conservation	• Develop DPRs for selected micro/sub--

Implementing Agency (PIA)	officer (ASCO) Supported by experts (WMT) in the following domains: • Engineering • Agriculture/Livelihood • Micro-Enterprises • Social Additional human resources (three member team) will be placed for each project in the domain of NRM/LRI, FPO/Value Chain and IT/MIS to support PIA	watersheds using science-based site data, DSS tools • Educate communities on the science-based approach, form user groups and watershed committees and actively engage them in the project cycle • Maintain and update all records in the MIS system • Support WC in implementation and resolving any critical issues • Coordinate with line departments and other stakeholders • Capacity building of the communities • Preparing Annual Action Plan • Project progress reports • Documentation of project activities • Formation of SHG, UG & FOP • Forward & Backward linkage and Value chain
Watershed Association (WA)/ Gram Sabha	All the adult members of the Watershed households	• Approves the watershed development plan • Monitor and review its progress • Approves the statement of accounts and resolves any dispute • Appoints watershed committee for execution of project activities.
Watershed Committee (WC)	• Headed by Chairman selected/elected by WA • 10-12 members representing all stakeholders • Assisted by a Secretary and CLWs for implementation and maintenance of Watershed records	• WC will be formed at watershed level with representation from all stakeholders • Executive body of the WA/ Gram Sabha • Conflict resolution • Actively participate in preparing DPRs • Implement plans in a timely and effective manner • Ensure effective O&M of treated watersheds • Finance mobilization and management • Maintain all required records • WC will be supported by a Secretary and CLW for execution and maintenance of WC records.

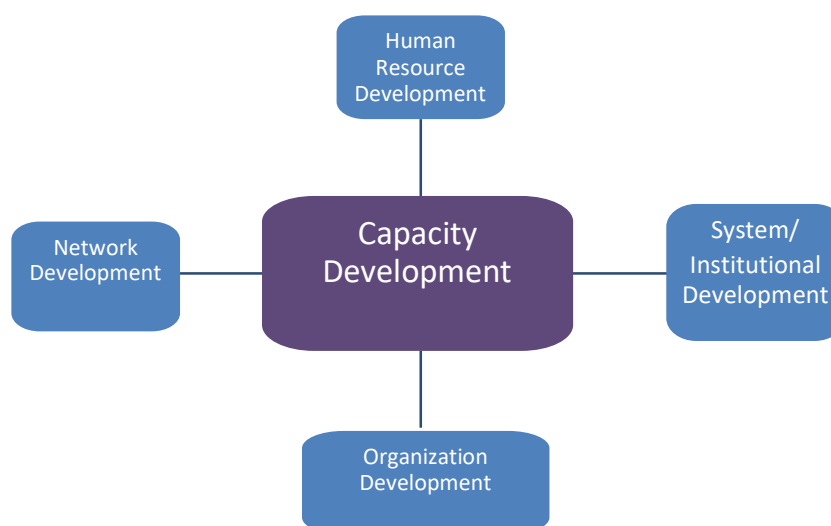
4.22 Role of Gram Panchayat

The Gram Panchayat would perform the following important functions:

- a. Participate in the DPR preparation and approval processes.
- b. Participate in the formation of watershed committee and different CBOs / FPOs.
- c. Facilitate the conduct of Gram Sabha, social audit and review of project progress at least twice in a year.
- d. Will be part of beneficiary selection process, benefit sharing mechanism and conflict resolution in the implementation process.
- e. Facilitate convergence of ongoing schemes, mobilise funds from MGNREGS or other development programmes and mobilise services of line departments in an integrated manner. This will reduce the financial and HR strain on REWARD.
- f. Safeguard and enhance access of the poorest to CPRs and NTFP. Be instrumental in issue of usufruct rights over pastures, plantations and water bodies etc.
- g. Responsible to create a database of assets created and for effective O & M of treated watersheds.
- h. Watershed Committee will remain as a subset of G.P. Supervise, support and advise Watershed Committee from time to time. After project completion, GP shall take over the complete charges of the Watershed Committee.

5. Training and Capacity Building

5.1 Capacity Building is the process of assisting the group or individuals, organization and system to identify and address issues and gain the insights, knowledge and experience needed to solve problems and implement change. It is an ongoing process through which individuals, groups, organizations and societies enhance their ability to identify and meet development challenges. A fundamental goal of capacity building is to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options, based on an understanding of environment potentials and limits and of needs perceived by the people concerned. Now a days it is generally agreed that capacity enhancement involves more than the strengthening of individual skill and abilities. Trained individuals need an appropriate environment, proper mix of opportunities and incentives to apply their acquired knowledge. Understanding capacity development therefore requires a more comprehensive analytical framework that takes in to account the individual, the organizational and institutional level of analysis. Capacity development programme has four distinguished dimensions.



5.2 The watershed sector is a sector of particular complexity and therefore highly dependent on strong institution and individual capacities. Since REWARD would be implemented in a scientific approach for deriving desired goals in a time bound manner, the capacity building strategy would emphasize on:

- Preparation of science based DPR using LRI and DSS
- Adoption of cropping system as per DSS
- Use of high science tools in project implementation
- Use of information Technology in project monitoring
- Farmers Producer Organization (FPO) and Value chain concept
- Environmental and Social system
- Post project management

5.3 The basic concepts of Capacity Building in a Watershed programme:

- To strengthen the knowledge base and skill development
- Promotion of Social mobilization and Community driven decision making
- Watershed treatment and village development
- Awareness about the approach and activities
- Strategic Planning & Livelihood Enhancement
- Monitoring and Evaluation mechanism
- Water resources appraisal
- Enhance awareness through knowledge sharing
- To develop the ability to train further
- Co-ordination and linkage with line department and PRIs
- Institutional and Financial arrangements, co-ordination, linkages, convergence of programmes
- Participatory approach in watershed management

5.4 Training Need Assessment

The first task in the process of Capacity development is to assess the training requirements of the stakeholders at different level. REWARD Watershed programme being science driven multidisciplinary approach, has to address the multi-dimensional needs of all stakeholders. The training needs and requirements, thrust area of training and its contents need to be assessed for concerned group of stakeholders. Emphasis would be on Institutional, Technical and behavioral capacity development of individuals and institutions involved in the process of project planning, implementation and monitoring for deriving desired outcomes.

5.5 Capacity Building Strategy aims at the following target groups:

1. Policy makers at state and district
2. Master trainers at state and district (Partner organizations, SPMU, DPMU and KVKs)
3. Project managers
4. Watershed Management teams (WMTs)
5. Watershed Committee (WC)
6. Watershed secretary and CLW
7. CBOs at village level (SHG,FIG,CIG,FPO)
8. PRI representatives

5.6 Institutional set up for Capacity Building

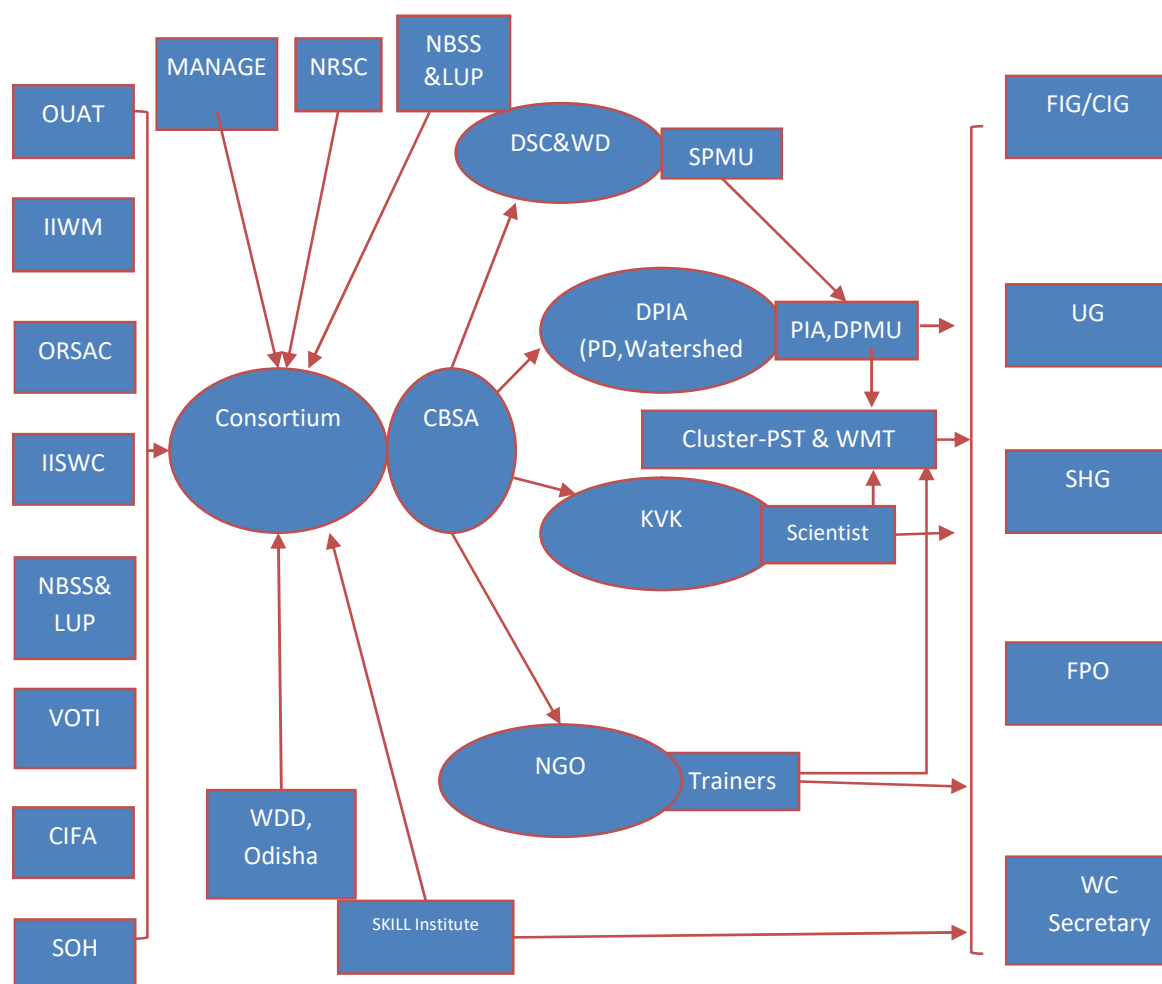
5.6.1 A state level consortium of Capacity building under Watershed programme would be set up for capacity development in all the facets of watershed management. State level resource organization like OUAT, ICAR-IIWM, Bhubaneswar, ICAR-IISWC, Sunabeda, ORSAC, VOTI, CIFA, School of Horticulture, Khurda along with NBSS & LUP, Kolkata and some identified Skill institutes and NGOs would be brought under the platform of Consortium.

Function of the consortium would be:

- Evolution of overall Capacity building strategy
- Planning for strengthening Capacity building inputs
- Selection process of Resource persons and organizations
- Selection of potential skill institutes
- Suggesting required policy support needed for improvements

5.6.2. Capacity Building Support Agency (CBSA)

One state level institute will be designated as Capacity building support agency (CBSA) to conduct TNA, formulating training modules, training materials and coordinating and monitoring all the CB events conducted by different Resource Institutes at different levels as per the recommendations of the Consortium.



Role of CBSA will be as follows;

- A comprehensive assessment of the systemic and specific CB-related challenges encountered within the Watershed Development Component - PMKSY

- A broad-based needs assessment of various stakeholders, both individuals and institutions to understand the appropriateness and adequacy of current CB initiatives and recommend appropriate solutions. This effort would include identification of the various stakeholders, understand their specific requirements and recommend appropriate and cost-effective solutions for these requirements.
- Development of training material including online courses/learning material with special focus on watershed activities. Review of all training material/ resources available within the state.
- Identification of different training institutes as per need and coordinate different training programme.

5.6.3. Capacity building at State Level:

The CBSA will organize different Capacity building programmes at state level for Project Director, Asst Project Director, PIA, WMTs, Line department officials, KVK scientists and master trainers through different resource institutes. CBSA will also organize workshop, seminars and exposure visits for the officials.

5.6.4 Capacity building at District Level:

Project Director, Watersheds at district level will implement Capacity building programme for PIA, WMT, line department officials, PRI members, WC office bearers with the help of KVK and master trainers on functional as well as technical aspects. He will also take up skill based training for watershed community through various institutes at district and state level. Objectives of different Capacity building programme at district level are,

- To update and enhance professional knowledge and skills needed for better performance of individuals and team as a whole.
- To bring about efficiency in delivery of better services to the masses.
- To bring about the right attitudinal orientation in every employee

5. 6.5 Capacity building at Village/Block Level:

Selected NGO will carry out awareness and sensitization programs in the villages to create awareness among the community members and motivate them to actively involved in all the activities of the program right from project planning to maintenance of the assets created in the watershed area.

5.7 Technical Training & Demonstration:

Orissa University of Agriculture & Technology (OUAT) as a partner institution under REWARD has the role to develop Land Resource Inventory (LRI) and DSS for watershed planning and implementation. The technology is to be disseminated to the community so as to enable them for adopting science based technology. Hence OUAT through its Krishi Vigyan Kendra (KVKs) at district level will be responsible for village level thematic training and demonstration.

Role of KVKs at village level will be as follows:

- Technical know-how to farmers in the project areas on the scientific advisories
- Guiding the farmers in preparation of scientific watershed action plan as per the LRI recommendations.
- Quality implementation of planned watershed interventions
- Sustainability of the assets created under the project
- Adoption of scientific recommendations
- Guiding farmers in crop planning

The effectiveness of these trainings will be monitored by the independent M&E agency under the program. The agency will also provide timely and appropriate suggestions for improvement of the quality of the training programs.

5.8 Capacity Building strategy for FPO

Collectivisation of producers, especially small and marginal farmers, into producer organisations has emerged as one of the most effective pathways to address many challenges of agriculture but most importantly it will lead to improved access to investments, technology, inputs and markets. To achieve a sustained growth path and generating higher returns to farming communities by establishment of FPOs in the sector of Agriculture, Horticulture, Fisheries, Dairy, and Animal Husbandry is another Project Development Objective under REWARD. These Producer Organizations would be facilitated with new technology, infrastructure, knowledge, IT applications, market intelligence & linkage and credit and finance arrangements so that they can ensure availability of end to end services to their members.

To overcome the challenges like creating a well-governed organization to carry out desired functions efficiently and effectively, identifying appropriate business opportunities, incorporating business principles, ensuring statutory compliances, initiating collective enterprises etc. a dedicated system to be established to provide handholding supports and monitoring each and every activity of FPOs resulting towards its social, environment and economic sustainability.

An organisation/ NGO with experience in the field of market-led development in agriculture sector and promotion of rural livelihood would be hired for the following assignments:

- Baseline survey and Awareness campaigns
- Formation, registration and governance of the producer companies/ organizations
- Development of training modules, training & capacity building of the beneficiaries and identification of group activities
- Skill assessment, market-survey
- Development of Business Plan
- Critical management support in the operation of the business enterprises
- Documentation of entire process and results

Table-6: Capacity Building at different Levels

Levels	Stakeholder	Training Topics	Primary responsibility	Trainer/ Institute
Village	Watershed Community	• Awareness and sensitisation like meetings, household visits, street plays, distribution of leaflets, focussed group discussions	PIA	NGO
	SHG	• Orientation on Watershed Concept and REWARD and role of SHG • Concept of SHG, Functions, Roles and Responsibilities, Accounting and book keeping, how to conduct meetings, Framing rules/regulations • Gender and Equity in Watershed programme • How to prepare IGA plan • Leadership, Decision Making, Conflict Resolution • Skill trainings • Exposure visits to successful SHG Federation	PIA	KVK/ WMT
	User Group/FIG/ CIG	• Orientation on Watershed Programme and REWARD • Land Resource Inventory (LRI) • Soil and water conservation • Environmental issues in WSM • Concept of UG,FIG,CIG and their role in REWARD • Preparing Watershed plan, addressing gender, equity, social and environmental safe guard • Crop production management, IPDM • Livestock promotion, fodder and pasture development • Value chain and FPO • Exposure visit to a FPO	PIA	NGO/ KVK
	Watershed Committee (WC)	• Orientation on Watershed Concept and REWARD • Concept of Community based Organisations, and their role in WC • Land Resource Inventory (LRI) • How to prepare Watershed Plan addressing Equity and Gender, • Steps of ESSA • Roles, responsibility of WC • Record-keeping and Financial Management, Procurement procedures, Project implementation and Monitoring • Exposure visits to completed projects	PIA	NGO/ KVK
Block	Watershed Management	• Orientation on Watershed Concept and REWARD	PIA/PD, Watersheds/	NGO/ KVK

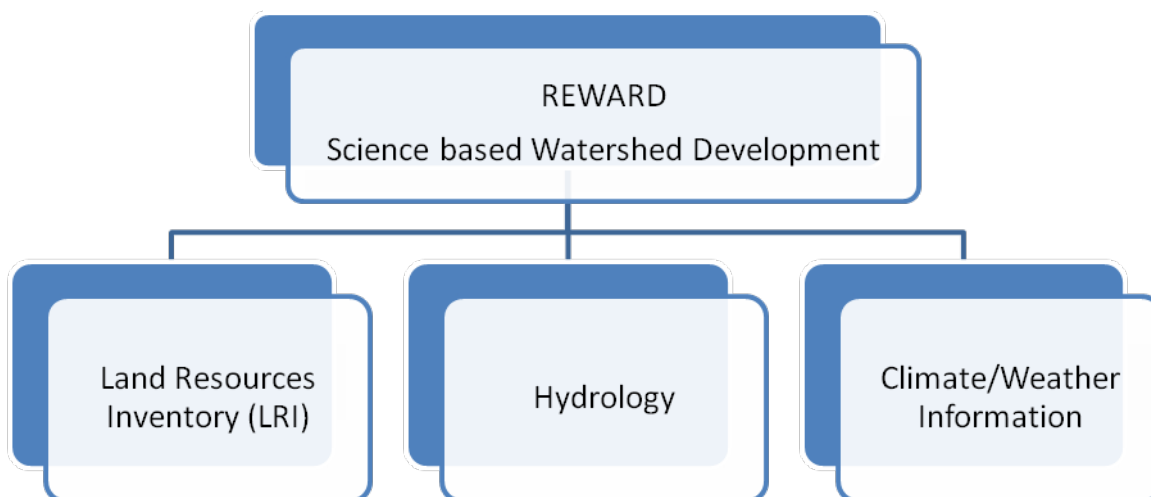
	Team WMT / Cluster PST/ SCEW / SCO/ TE	• DPR preparation • Land Resource Inventory (LRI) • Use of GIS & DSS in watershed planning • Soil & Moisture conservation interventions • Crop Management, Crop diversification, Horticultural crops, Crop planning • Livestock, fodder, Pasture and forest development • Leadership, Decision Making • Conflict resolution • CBO/FPO, Value chain and market linkage • Reporting, MIS & documentation	CBSA	
District / State	PPD/PIA/ KVK Scientist, SPMU	• Orientation on Watershed Concept and REWARD • DPR preparation • Land Resource Inventory (LRI) • Use of GIS & DSS in watershed planning • Watershed hydrology • Soil & Moisture conservation interventions • Crop Management, Crop diversification, Horticultural crops, Crop planning • Livestock, fodder, Pasture and forest development • Leadership, Decision Making • Conflict resolution • CBO/FPO, Value chain and market linkage	DSC&WD/ CBSA	OUAT/OR SAC/ IIWM/IIT /IISWC/ MANAGE /WDD,

Capacity building plan and skill training identified for different stakeholders is at **Annexure-II**

6. Science Based Watershed Development

6.1 The REWARD Program is expected to strengthen the science based watershed management by introducing innovations in the planning process through: (a) characterization of natural resources at cadastral level; (b) understanding hydrological dynamics and develop tools to measure them; (c) Development and maintenance of a digital library for integrated landscape approach for WSM planning, watershed management portal for the decision support system; (d) enable and strengthen the local watershed institutions in a participatory bottom up approach. The Programme design focuses on generating climate adaptation benefits, and to a limited extent, mitigation benefits. The Program focuses on improving farmers' resilience and soil moisture outcomes, and emphasizes on capacity building of institutions to implement science-based watershed development. The REWARD programme science based watershed development stands on three pillars i.e. Land Resources Inventory (LRI), hydrological Research Inputs and weather/climate information which are used for development and implementation of watershed program.

6.2 Karnataka has rich expertise in implementation of science based watershed management including the application of Land Resource Inventory (LRI), hydro-geology, Decision Support Systems (DSS) to planning; and the use of remote sensing and GIS for planning and monitoring. It has therefore been identified as the 'lighthouse' state in the REWARD Program to support the participating States like Odisha and Andhra Pradesh.



A. Land Resource Inventory (LRI)

6.3 The purpose of land resource inventory is to delineate similar areas at watershed or village level, which respond or expected to respond similarly to a given level of management. This is achieved in the field by detailed study of all the sites (like slope of the land, erosion, drainage, salinity, occurrence of rock fragments etc) and soil characteristics

(such as depth, texture, colour, structure, coarse fragments, porosity, soil reaction etc), grouping similar areas (fields or survey numbers) based on soil-site characteristics into management units (phases of series) and showing their extent and geographic distribution on a suitable base map. The various activities involved in the generation of land resource data and maps can be broadly grouped under pre-field, field and post-field activities. The same are listed below.

6.4 Pre-field activities:

1. Preparation of base maps on 1:7920 scale
2. Image interpretation for Geology
 - At Block level (1:50000 scale)
 - At GP/Cluster/Micro-watershed/Village level (1:7920 scale)
3. Image interpretation for Physiography
 - At Block level (geology, landscapes/physiography/major landforms)
 - At GP/Cluster/MWS/Village level (landforms / physiographic units based on image characteristics).
 - Finalization of physiography map with legend

6.5 Field Activities

- Identification and checking of rock types and their boundaries
- Checking of landscapes, landforms/physiography divisions and land use
- Correction of geological/physiographic divisions and other physical and cultural features
- Examination of soils through available cuts (road, well, gully) and with few transects
- Establish broad soil-landform relationships
- Preparation of identifying characteristics table for major soil series identified
- Finalization of soil map with preliminary soil legend (Soil series)
- Selection of probable transects for study later at village level

6.6 Field Survey and Soil Mapping at Village/Micro-watershed Level

- Rapid traverse of the area (micro-watershed/sub-watershed/village) with the help of cadastral map, image and physiography map to get an idea of the rock types, landforms/ physiography, crops and cropping systems, soil and site characteristics
- Identification and checking of rock types and physiographic/ image interpretation
- Corrections if any on rock types and physiographic units
- Selection of transects (cutting across as many physiographic units as possible)
- Digging of soil profile pits up to 2 m depth or hard rock whichever is earlier
- Examination and description of soil profiles in transects
- Study and record of soil-site characteristics
- Photographs of soil profiles, landscapes, land use and any other significant feature like erosion, salinity etc.
- Grouping of soil profiles studied at each transect into soil series
- Development of Progressive Soil Legend

- Mapping of soil phases (management units)
- Mapping of current land use/land cover, wells, existing soil and water conservation structures etc.
- Finalisation of soil phase map with soil legend
- Collection of soil samples from each soil series
- Collection of soil samples for bulk density
- Collection of surface soil samples at every 160/320 m grid interval for fertility status
- Collection of water samples from wells, tanks, reservoirs, canals etc., for water quality analysis
- Field review (preliminary, progressive and final) for soil correlation

6.7 Post Field Activities

- Submission of soil phase map with legend to GIS section
- Submission of current land use/ land cover and wells map to GIS section
- Submission of soil samples (profiles, bulk density, fertility and water) to Soils Laboratory
- Soil Series description write up
- Descriptive soil legend
- Interpretation of land resource inventory data
- Transformation of data as Information-LCC, LIC, LSC etc
- Generation of thematic maps
- Compilation of data
- Preparation of LRI Atlas
- LRI Report write - up
- Input to Digital Library, DSS and distribution of reports and maps to user agencies (hard and soft copy)
- Dissemination of information to all stakeholders.

Table-7: Particulars of partner wise Watersheds allocation for LRI

						Area in Ha.
Organisation		Pilot District	Area		LRI District	Area
NBSSLUP	1	Koraput	32406.01	1	Koraput	48112.62
	2	Sambalpur	44053.84		Total	48112.62
		Total	76459.85			
OUAT	3	Dhenkanal	13307.70	2	Sambalpur	91742.31
	4	Deogarh	12738.85	3	Dhenkanal	41565.48
	5	Nayagarh	12877.09	4	Deogarh	47149.66
		Total	38923.64	5	Nayagarh	36235.9
				6	Nabarangpur	39036.31
				7	Sundargarh	107469.58
					Total	363199.24
		G. Total	115383.49		G. Total	411311.86

B. Hydrological Studies

6.8 The REWARD project is designed, based on the experience of Sujala III project, to provide site-specific land resource information, recommendation, and advisories (data, maps, thematic outputs, guidelines, expert systems/DSS, advisories, tools etc.) needed for planning, implementation and monitoring of watershed, agriculture, horticulture and other line department programs and advisories to the farmers and other land users at the grassroots level.

Towards this, and specifically for taking up hydrological interventions, the major outputs to be generated for the project areas by hydrology partners are

- Runoff estimation at field and watershed levels
- Soil moisture-surface and root zone or profile moisture
- Appropriate soil and water conservation structures needed
- Type, and location of water harvesting structures needed
- Identification of recharge and discharge zones
- Aquifer characteristics
- Ground water recharge, transmissivity, and storage
- Ground water quality
- Status of ground water exploitation
- Water balance
- Water budget
- Water productivity and water use efficiency for different crops under different AEZs
- Measures for improving surface and ground water use, identification of suitable crops and cropping pattern, irrigation practices, package of practices etc.
- Measures for ground water augmentation
- Protocols/guidelines for participatory ground water management
- Training and capacity building-partners, departments, farmers, and others
- Impact assessment of the watershed/catchment level interventions

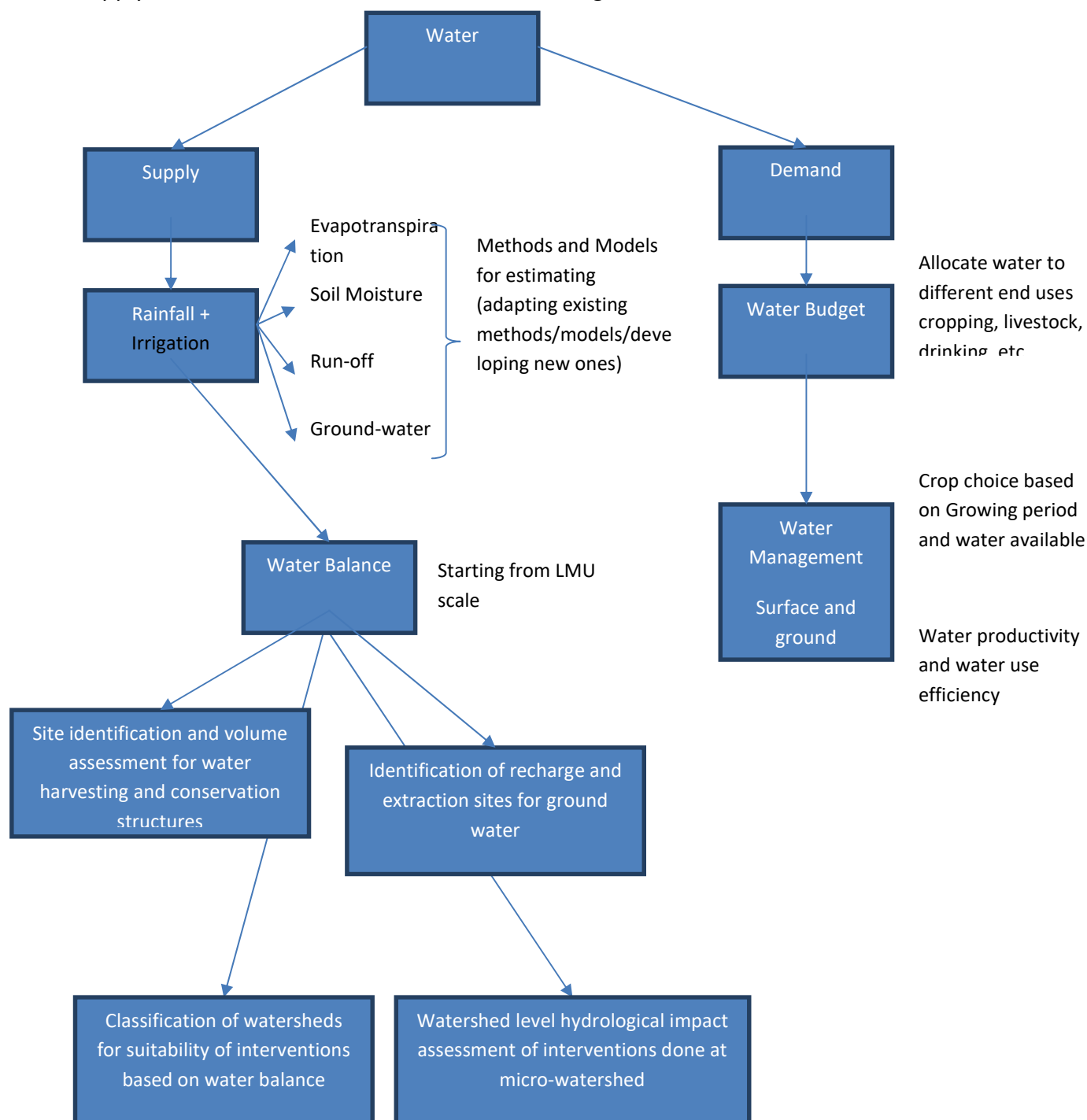
The tentative list of data requirements (Meteorological, hydrological, land resource (LRI) and other datasets), equipment/instruments needed for data capture, and guidelines, methods, expert systems, models to be followed/adopted to generate the outputs indicated above are to be defined by the hydrology partners has been elaborated in the Hydrological assessment and Monitoring section below.

6.9 Apart from the above, for intensive monitoring of the variables and for validation of the outputs, **model watersheds and bench mark sites** representing geology, landform, soil, site, land use, hydrological and other variations observed in the state, particularly in the selected project districts are to be selected.

In the **model watersheds**, the list of instruments/equipment to be installed, mode and frequency of data capture and responsibility for their maintenance to be worked out by the partners identified. Similarly, the datasets to be collected, frequency of collection, and details of equipment to be installed in the **benchmark sites/soils** to be elaborated in the project districts.

The lead institute need to prepare a **Field Guide or Implementation Manual**, encompassing all the activities elaborated above, for the project.

However, while conducting hydrological assessment; the partners shall look into the Supply-side and Demand-side issues as shown in figure below:



I. Supply Side

6.10 Water Balance: Models for estimation

- i. Water received as rainfall in a watershed gets converted into 4 fractions namely, Evapotranspiration, Soil Moisture, Run Off and Groundwater. Methods and models for estimating these fractions starting at the LMU/ micro watershed scale and going up to watershed scale are needed for preparing the Water Balance in a given area.
- ii. REWARD would encourage the use of existing methods and models or where required existing models could be adapted, calibrated and validated for use at the indicated scales. New models may be developed and used after suitable validation only where no models exist or are not suitable for use at the scale required or are not at the desired resolution.
- iii. Models adapted or developed must be easy to use, extendable to use in new areas with minimal requirement of calibration.
- iv. Using outputs from these models, tools for estimating water balance from LMU to watershed scale needs to be prepared.

6.11 Water Harvesting and Conservation Structures: Siting and volume estimation

- i. In conjunction with land resources data, models/tools for deciding location of water harvesting and conservation structures and the volume of water expected at those sites are to be developed.
- ii. These models must take into account existing structures, their actual storage, overflow, expected, run off from independent catchments for proposed structures, etc.
- iii. In designing siting and volume of these structures, upstream and downstream externalities up to watershed scale should be accounted for and built into the model.

6.12 Groundwater Recharge and Extraction: Siting of structures, sustainable extraction volume estimation

- i. Based on hydro-geological studies, models/tools for different LMUs are to be developed for siting ground water recharge and extraction structures. Parameters such as infiltration, permeability, hydraulic conductivity, water holding capacity, field capacity, PWP etc., need to be characterised for different LMUs and used in the model.
- ii. Methods/models to be identified for estimating the amount of recharge at the micro watershed/SWS levels; and if need be to recalibrate/refine/develop new ones
- iii. A simple community/farmer level groundwater tool needs to be developed to estimate recharge based on rainfall received and quantum of extraction that is sustainable at the micro/sub watershed level.

6.13 Characterisation of Watersheds for Suitability of Intervention Based on Water Balance

- i. Develop rapid assessment tools to characterise watersheds into surplus, adequate and deficit categories based on water balance. The tools should characterise at the micro watershed level, but take into account hydrologic issues at least upto the watershed scale.
- ii. Micro/sub watersheds characterised a Surplus and Adequate would benefit from both supply and demand side interventions, while Deficit ones would need only demand side interventions.

II. Demand Side

6.14 Water Budget: Model for matching water balance to water needs

- i. Develop a model for assessing water needs of various sectors such as crops, livestock, drinking water, etc., at micro watershed scale and match with water balance.
- ii. The model should allow communities to allocate water to various sectors based on rainfall-linked water balance that is assessed every season.

6.15 Surface and Ground Water Management: Crop selection, water productivity, water use efficiency

- i. Develop a model for use by communities for selection of crops/varieties based on **growing period** and **water budget**. This model is expected to apply a water lens to crop suitability classification that is based on LRI data.
- ii. Once crops/varieties are selected, models to assess/predict crop response to water (rainfall + irrigation) in different agroclimatic conditions and LMUs are needed to find ways to increase **Water Productivity** and **Water Use Efficiency** in watersheds.
- iii. Based on these models provide advisories to farmers on crop selection and water management to maximise water productivity.
- iv. Develop protocols/guidelines needed for participatory ground water management at village/watershed level.

6.16 Hydrological assessment and Monitoring under REWARD Project

6.16.1 The hydrological parameters like rainfall variability (spatial and temporal), evapotranspiration (PET), rate of infiltration, runoff (event wise), soil moisture variability (spatial and within the soil profile) and ground water depth, recharge, quantity and variability (spatially and seasonally) are critical variables that impacts the sustainability of farming, water availability and livelihood opportunities at the watershed level. Their measurement/estimation on real or near real time basis at finer scale is important for

designing and implementation of soil and water conservation measures, estimation of growing period, selection of suitable crops, evolving appropriate cropping pattern, developing location and crop specific package of practices, estimating crop water requirement, scheduling supplementary/life-saving irrigation, ground water recharge, estimating water balance, water budgeting and for developing ground water augmentation and management plan.

6.16.2 The tentative list of hydrological parameters to be considered, instrumentation/equipment needed for their measurement and methods available for estimation/computation are indicated in the Table below. The parameters that affect or influence the hydrological parameters are many, complex and varies both spatially and temporally. Hence, their precise measurement and quantification, and that too on real or near about real time, is a big challenge. In this context, REWARD project can bring in the state of art instrumentation and sensor technologies available for precise measurement of the variables wherever possible and use the standard and global best practices to estimate/compute other variables at watershed or other scales as needed.

Table-8: Tentative list of hydrological data requirements and methods of assessment

S.No	Parameters needed	Instruments needed/mode of data capture	Data/map outputs
1	Rainfall Temperature, Relative humidity, evapotranspiration, wind speed etc.	Automatic Weather Station (AWS), Net Radio meter, Telemetric Rain Gauges (TRG), Met satellites, both public and private & from historical data	Weather and climatic data at spatial and temporal scale, Maps/graphs on variability and distribution, Length of growing period, PET, AET etc.
2	Infiltration rate	Double ring infiltrometer (on site and through the profile), pedo-transfer functions	Rate of Infiltration, Infiltration curves
3	Runoff	Silt monitoring station (Thalimide method), In-situ field measurements-V notch and velocity meter, SCS Curve Number, Rational & Intensity-Infiltration (under calibration) methods, Computation models like Soil and Water Assessment Tool (SWAT), Monitoring water levels in nearby water bodies	Runoff and silt load (Event wise/seasonal/annual runoff & silt load), Time of concentration
4	Surface moisture Soil	Sensors-Theta probe & gravimetric methods, optical and Microwave remote sensing, NDVI/LSWI indices, Drone sensor	Surface soil moisture status, Management unit wise soil moisture maps and time series graphs
5	Profile soil	Hydra probe and Time Domain	Sub soil & profile moisture status,

	moisture	Reflectometer, gravimetric method, Pedo-transfer function (PTF) and remote sensing	time series graphs and reports (daily, weekly, seasonal and annual)
6	Hydraulic conductivity/permeability	Permeability apparatus through core samples, PTF	Data on Hydraulic conductivity/permeability
7	Field capacity Permanent wilting point, Available moisture holding capacity (AMHC)	Pressure plate apparatus, through pedo-transfer functions and models, soil core or knees cup method for AMHC	Water availability, Available water holding capacity
8	Aquifer characteristics	Electric Resistivity Meter (Resistivity survey), Aquifer & lineaments mapping	Aquifer maps, storage and transmissivity coefficients, Zones of recharge
9	Ground water status	Pumping/discharge tests, Piezometer and Telemetric water level recorder, Intermittent measurement through sensor tape	Well inventory, Ground water depth, draft and recharge and Time series graphs and maps of the GW status
10	Ground water quality	Sampling and testing	Quality of the GW and Time series graphs and maps
11	Crop growth parameters	Leaf Area Index (LAI), NDVI/LSWI, Yield from demo plots, Drone	Biomass, LAI curves, indicating the moisture of the crop

6.16.3 Apart from the type of instruments to be used, selection of an appropriate unit for measurement/estimation is especially important for monitoring the hydrological parameters. All the measurements cannot be done at the field level. Only few variables can be measured at the field scale, and others can be at the MWS/SWS or other higher levels like watershed or catchment. Accordingly, geographical units/areas and benchmark sites need to be selected for establishing the equipment or for computing the variables as indicated below.

Table-9: Hydrological parameters and Instruments for measurements

Variables	Instruments	Unit/scale
Weather and climate	Automatic Weather Station (AWS)	Sub watershed/cluster of sub watersheds or at hobli level [approximately@every 25 sq.km or as needed]
	Telemetric Rain Gauge (TRG)	Micro watershed or cluster of MWS [@ 5 sq.km or as needed]
Infiltration	Double ring infiltrometer	In selected Benchmark site/soils in MWS, @5/MWS
Runoff	Silt monitoring station	Representative MWS in a SWS

	In-situ field measurements-V notch and velocity meter	Fields of Benchmark soils
Surface Soil moisture	Sensors-Theta probe & gravimetric methods	Benchmark soils and in other fields as needed
	Optical & Microwave remote sensing, NDVI/LSWI, & other indices	Soil unit (cluster of fields), MWS, SWS and larger areas
Profile soil moisture	Hydra probe & TDR, gravimetric methods;	Benchmark soils
Hydraulic conductivity	Permeability apparatus,	Benchmark soils
FC, PWP, AMHC	Pressure plate apparatus,	Benchmark soils
Aquifer characteristics	Electric Resistivity Meter, Aquifer & lineaments mapping	Sub watershed or higher levels
Ground water status and quality	Pumping tests, Piezometer and Telemetric water level recorder	Selected observation wells

Note: Selection of Benchmark sites/soils based on LRI and hydrological investigations is critical for up scaling the results and experiences to similar areas within and outside the watershed areas and for monitoring the impacts.

6.16.4 By selecting a combination of instrumentation and estimation or by computation as elaborated above, the required data on the hydrological parameters can be obtained at different resolutions and scales (from the watershed to the field level). Except aquifer mapping, ground water assessment and to some extent runoff, the other variables can be measured and quantified at any scale or resolution depending on the resources available. Whereas, for aquifer mapping sub watershed (or higher levels) is the preferred unit and in REWARD project detailed characterization and mapping of the aquifer can be attempted at the sub watershed level or cluster of sub watersheds if they occur in a contiguous manner. Above this level, the information available from the state/central ground water boards or from other concerned departments can be collected and used. Similarly, intensive ground water assessment can be done in selected representative micro watersheds, in which after detailed well inventory, optimum number of observation wells can be identified for ground water measurement, networking and monitoring.

Similarly, runoff can be measured by establishing Silt Monitoring Station, but it is not possible to establish this in all the watersheds. Alternatively, runoff is estimated or computed by using SCS Curve Number, Intensity-Infiltration, and other methods/models in all the watershed areas.

6.16.5 The generation of finer scale hydrological information is expected to significantly improve the understanding of the factors and processes affecting different hydrological components like runoff, soil moisture, ground water etc at the watershed level. This can help in designing location specific conservation structures; evolve appropriate cropping pattern and protocols for consumptive water use, water balance and budget in more scientific manner than earlier. Apart from this, by relating the hydrological data collected with the cadastral level LRI data, their inter-relationships can be understood and quantified much better than ever in the past. For example, the estimation of potential runoff, runoff available after the retention in the field bunds and net runoff available for harvesting after allowing the mandatory runoff as an environmental flow has become more precise due to the availability of both LRI and hydrological information at the field level. Similarly, the crop water requirement, available soil moisture during the crop growth period, possible occurrence of stress period, need for life saving or supplementary irrigation can be predicted with certainty, quantified and necessary advisories provided to the farmers with the availability of both hydrological and LRI information at the watershed level.

6.16.6 With the experience gained from Sujala III project in Karnataka (See the Box), the REWARD project can improve the data capture, develop models/algorithms needed for data interpretation, validate and refine the Decision support systems already developed, develop new DSS hydrology models, protocols needed for integrating the hydrology components with watershed and other development programs, group the watersheds based on water balance, prepare water budget at MWS/SWS levels and most importantly, help the departments and communities to develop ground water augmentation and management plan for the project areas.

Hydrological Investigations under Sujala-III

- Establishment of network AWS (For every 25 sq km) and TRG (every 5 sq km) in the project areas, and data capture at 15 minutes interval
- Establishment of model watersheds representing different agro-climatic zones and their instrumentation for data capture at finer resolutions
- Well inventory, ground water level recording and discharge measurements
- Runoff estimation by SCS Curve number and Intensity-Infiltration (under validation) methods
- Estimation of surface and profile soil moisture through RS, field sensors, and conventional methods and infiltration at map unit level
- Seasonal quality of ground water , ground water status maps, water balance, and water budget
- Development of DSS for soil and water conservation, runoff, soil moisture, check dams and farm ponds, crop water requirement, water balance and water budget.
- Development of pilot model for evapotranspiration, soil moisture, runoff and ground water estimation.
- Generation of Hydrology Atlas for each MWS

Further, under REWARD project, attempt can be made to develop simple easy to use field level sensors, hand tools, templates, ready reckoner tables, videos and mobile apps to sensitize the community on both surface and ground water issues and need for their wider

participation in planning, auditing and monitoring, particularly of ground water resources at the community level.

C. Weather Information

6.17 Weather parameters influence on agricultural operations and farm production. Aberrant weather is one of the most important reasons for crop losses in India. The losses could be minimized by making modification in field operation by using weather based agro advisories. Agro-meteorological Field Unit under the project of **Gramin Krishi Mausam Sewa** provides weather based crop and location specific advisories and disseminated to the farmers. Studies of different location showed an increase in benefit of farmers those are followed weather based advisories as compared to no advisory followed farmers. The additional benefit was due to the crop management done by the farmers according to weather condition.

6.18 Therefore, REWARD adopts **science-based and just-in-time agro-advisories** approach- a key element of building climate resilience in rainfed areas is empowering farmers with timely information on land resources, soil status, weather events, etc., along with recommendations on relevant crop selection and management practices (such as fertilizer selection and scheduling, irrigation management, etc.). The REWARD Program will support the WDC-PMKSY's emphasis on the role of agro-advisories in supporting climate change adaptation through incentivizing the LRI and weather-based agro-advisory system. The dissemination of the agro-advisories will be through information and communication technologies (ICT) channels as well as through the agriculture extension system. The Program will support multiple extension channels including trainings, exposure visits, field demonstrations, mobile solutions (interactive voice response (IVR), SMS, mobile apps), etc., in partnership with agriculture extension institutions such as the district level Agriculture Technology and Management Agencies (ATMA) and Krishi Vignan Kendras (KVK), block level GP level Farmer Counselling Centres in Odisha. The delivery of the extension modules, exposure visits, field demonstrations, information education and communication (IEC) materials and ICT channels will be tailored to meet the requirements of women farmers.

6.19 In order to provide precise weather related information, forecast and advisory to the farmers in REWARD, weather advisory released by IMD and Agro-Meteorology department of Odisha University of Agriculture & Technology (OUAT) shall be sent to farmers in the REWARD programme area. In addition, weather information such as weekly rainy days, daily rainfall, temperature, relative humidity, evapo-transpiration, mean wind speed etc are to be recorded and effectively used in the project by technical partners in selected MWS through establishment of automated weather stations. Advisories are to be prepared based on the composite information data set on LRI, Hydrology and Weather information and models developed. Based on real-time hydrological data gathered in the project and rainfall information from IMD, runoff estimation shall be done to assess whether the watershed is surplus or deficit in terms of water availability. Similarly, information on real time moisture

availability can guide the farmers about moisture stress period so that farmers are able to schedule irrigations.

6.20 Directorate of Agriculture & Food Production, Government of Odisha; Agro-Meteorology department, OUAT, the ICAR-Agricultural Technology Application Research Institute, Kolkata, OSDMA and IMD along with technical partners can play key roles in design and implementation of weather forecasting and advisory systems for the farmers on climate resilient agriculture in REWARD programme.

The weather advisory in REWARD can leverage on different ongoing schemes of Central and State Government such as **Gramin Krishi Mausam Seva Scheme and Kisan call Centres etc.**

7. Communication Tools and Methods

7.1 A wide ranging set of communication activities including intensive interpersonal approaches, production of printed materials & video clippings, ICT and other conventional methods are now in place to impact the agricultural and allied sector in Odisha. Knowledge management and communication strategy of REWARD will build on these distinctive set of working practices and communication activities. The intent is not for the strategy to replace the existing communication network, but to compliment it with the project's own information and communication needs.

7.2 The focus of the communication activities in REWARD will be to create and manage the systems that support Project Development Objective, efficient programme delivery, forge strategic partnerships, staff and community learning, and advocate for the data driven science –based watershed development.

- Effectively deliver the scientific information, knowledge and advisories to the target clients, so as to empower them to efficiently manage data (LRI in particular) driven watershed planning and management.
- Foster innovations within the stakeholder environment and use progressive farmers as a source of practical information worth sharing to influence other farmers
- Improve effective information flows within REWARD, technical / development partners and decision makers.

7.3 The proposed interventions to meet the communication needs of the project are as follows.

7.3.1 As Odisha will be learning LRI driven watershed planning and processes from the Karnataka's recently concluded SUJALA – III project, a critical activity will be immersion by visiting their program interventions, interactions with stakeholders and learning through exposure visits. Trainings and exposure visits will be scheduled for key stakeholders including technical partners, DSC & WD and its state / district / block functionaries, Line department officers, PRI members, and Micro Watershed level community members

7.3.2 REWARD will adapt an ICT enable communication service to rural area effectively. Farmers would be provided training and hand holding support to use ICT tools such as mobile apps and internet.

7.3. 2.1 The target clients of REWARD will be profiled under the DAFE's agro advisory service "AMA KRUSHI" which also supplements the integrated 24/7 call centre for farmers with platforms like Community Radio, Whats App, SMS to reach the last mile. The project will add value to the crop advisories through supplementing it with resilient agriculture technologies and LRI based and/or weather based agro-advisory information. The DAFE's website www.epestodisha.nic.in will be updated and made functional. There is a need to assess the willingness of farmers to pay for these services and develop sustainable business models.

7.3.2.2 FPOs will be trained to use, maintain and update blogs. They will be trained to create a blog and start posting entries where they can interact with their customers via their comments on blog. They will be encouraged to use the potential of online marketing.

7.3.2.3. The website of the DSC &WD will be better organised with the project specific information, user guides, procedures, policy directives, case studies and project learning to act as a viable knowledge source for the key stakeholders. The initiatives will include web 2.0 standards enabling users to contribute their experiences and locally developed knowledge.

7.3.2.4. The outputs of the M & E System will be integrated with the ADAPT state board for wider circulation of information among department staff and policy makers.

7.3.2.5. A central REWARD contact list (including addresses, phone and mobile numbers, and email) of all REWARD staff, development partners, resource agencies and agriculture & allied departments will be developed. This will facilitate information flows within REWARD and project partners.

7.4. *Krushak Sampark Mela* at the block level, district level *Krishi Mahotsav* and state level exhibitions-cum-knowledge sharing event “*Krushik Odisha*” now attract a large number of farmers as well as scientists, students and extension personnel from OUAT, Agriculture & Allied Departments and private sectors. REWARD will actively participate in these fairs with selectively woven information packages including live demonstration of technologies and systems.

7.5. As the state has no several competent experts on LRI based watershed planning, the relevant information, processes or procedures will be difficult to promote through conventional communication approaches. The project will therefore appreciate the need of high quality DVDs and its distribution to reach large audiences. This will include quality training videos for farmers on relevant themes.

7.6. Local cable service providers are more effective to reach women and the marginalised than others. Despite the overload of entertainment contents, the cable operators will be pursued to telecast select information packages.

7.7. REWARD will recognise Farmers Advisory and Information Centres (FIAC) placed at block head quarters serves as a multi stakeholder platform to collect farmers’ feedback and advocate project related information.

7.8. A quarterly learning work shop will be established at block, district and state level to create a more interactive environment for open discussion, cross learning and debate on issues that follow from REWARD.

7.9. Validate community achievement locally through participatory communication activities – Community Wall Paintings and Photo boards reflecting an accessible visual expression of community participation.

7.10. Financial information about how resources are directed within a watershed will be displayed on village notice Boards in a form most likely to be easily understandable at community level.

7.11. Community Resource Centres will be promoted in select G.P premises on pilot basis. These centres will grow into one stop shops for information exchange with potential for income generation and commercial sustainability.

7.12. The REWARD districts will publish and create a repository / digital library of a quality series of publications including user guides, policy directives, newsletters, technical magazines and best practice materials to support project implementation

7.13. Decision makers will be involved through advocacy e.g. exchange visits, invites to special events, sharing of project publications etc.

7.14. The research wing of the DAFE will be supported to function as a communication hub. It is proposed to equip the research wing with communication and other necessary resources to play an important role in coordinating knowledge management and communications across the entire programme and related sectors.

8. Community based Scientific DPR preparation

8.1 Preparation of Detailed Project Report (DPR) is an important components of REWARD program around which the results and sustainability of the activities depends. Unlike the traditional approach, REWARD intends to use combination of top-down as well as bottom-up approach of DPR preparation by combining both scientific information as well as community participation. The DPR template is provided in **Annexure-III** .The process followed to ensure community participation to prepare scientific DPR is shown in the diagram below including its approval process.

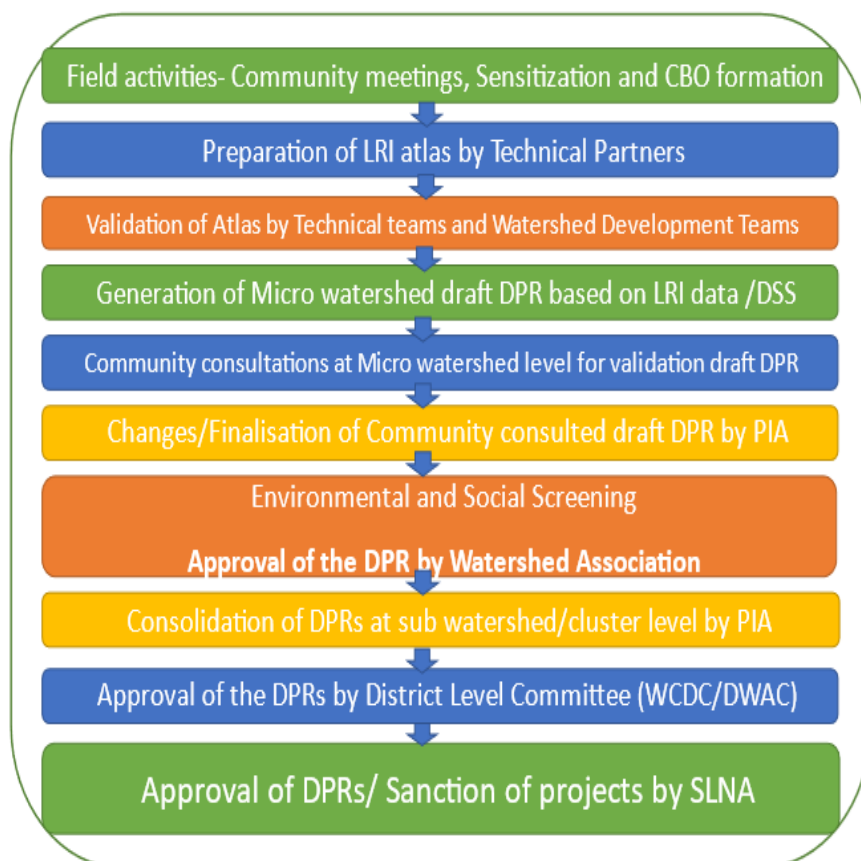


Fig: Process Flow for DPR Preparation

8.2 Project Implementing Agency (GO/NGO) working at each of micro watershed start sensitising the community from the beginning of the project initiation. Various awareness building activities on role of the community in watershed management, REWARD project development objective and intermediary result indicators are taken up to sensitise the community and the opinion leaders through use of appropriate IEC tools - street meetings, leaflets, entry point activities etc. and build the confidence of the villagers and motivate them for better participation in the program activities. At this stage, the community will be exposed to few modules of critical trainings such as;

- I. Vision Building
- II. Team building & leadership development
- III. Gender, equity and inclusiveness
- IV. Data driven watershed planning
- V. Institution building

8.3 With this sensitisation process, LRI partners initiate field work to get profile samples and other soil and water samples with the involvement of community members. Simultaneously, PIAs will conduct participatory rural appraisal, focussed group discussions (FGDs) and door to door survey to collect baseline information and gather insights into the community dynamics, social & environmental risks, priorities of different strata of the community - women, SC & ST households, small & marginal farmers and the farmers owning land on the upper ridge of the watershed etc.

8.4 With the help of spatial and non-spatial data base, the LRI partners prepare LRI plus Hydrology report (i.e. Atlas) for every micro watershed which covers site specific thematic maps, crop, nutrient advisories and treatment map. Once this LRI reports are integrated with the Digital library portal, with the help of DSS module, it will generate a draft DPR at the micro watershed level. This draft DPR undergoes first level validation on a sample basis by the LRI partner in consultation with district level technical officials and a few community representatives. Once draft DPR is validated, PIA takes the draft DPR to the village/micro watershed for second level validation with all the landholding families. Similarly, for drainage line treatments and interventions planned in common lands, the community-based organisations are to be consulted and validated. During these village level/micro watershed level interactions, it is the responsibility of the PIAs to explain the draft DPR to the villagers through village level meetings, PRA exercise, site visits, etc. At this stage, the PIAs will try to gather community perception of the probable environmental risks that may result from the programme interventions. Any discrepancy expressed by villagers with respect to draft DPR or LRI report should be brought back to the concerned LRI partner and necessary changes will be incorporated in the draft DPR.

8.5 Screening of Environmental and social risks

The process to be followed for screening of environmental risks will be two-fold; both LRI data driven and the community consulting processes. While displaying data on environmentally sensitive areas; LRI_DSS outputs will be key on upfront screening of environmental risks, community consultations will largely facilitate screening of social risks.

The LRI-DSS output will include;

- i. Forest land,
- ii. Area impacted with salinity (ECE = >4.0) or sodicity (ESP = >25),
- iii. Waterlogged areas,

- iv. Physical and cultural resources like monuments, temples, religious or socially sacred areas
- v. Designated wetlands.

The PIA will collect environmental baseline data (a specimen data sheet appended in **Annexure-IV**) for future assessment and comparison during mid-term and end term assessments. During consultation, which will take place at Watershed Development Committee/GP level for DPR finalization, data on Ground/ Surface water contamination can be captured at micro-watershed level. The same data can also be obtained from Benchmark sites and model Micro-watersheds to be used during the project.

To facilitate equity issues, with a particular focus on equity across land holding sizes, well-being classes, gender and caste categories, screening of SC & ST households, women headed households, small & marginal farmers and SC & ST households will be carried out through use of following participatory tools.

- I. Social Mapping : Through use of this tool, the PIA will understand the distribution of households and distribution of SC & ST households, women headed households and small & marginal farmers within the watershed.
- II. Wellbeing ranking : This option will result in information about households' relative wellbeing, rather than an absolute assessment. Cards will be used to sort households, ordered from very poor to well-off categories, according to a participatory ranking process.

These exercises will be useful for tracking changes over time, and for assessing which vulnerable households benefit from a project and whether they belong to the intended target group. An E&S Screening Checklist has been prepared and included in **Annexure -V** and to be used during DPR preparation.

8.6 DPR approval by the Watershed Association

8.6.1 After the second level validation of draft DPR at village/micro watershed level; third level and the most important level of validation takes at Watershed Association (Bhumi Panchayat) where in the micro watershed draft DPR is presented to the members of the Watershed Association. Key activities/points to remember at this stage include;

- Organising a special Watershed Association meeting with minimum quorum to validate the Draft DPR
- Conducting PRA exercise to depict draft DPR
- Environmental and Social Screening of DPR
- Ensure Inclusion and exclusion of interventions for all land holding farmers and interventions for landless households
- Ensure inclusion of gender participation

- Discussions about contribution and implementation arrangements, usufructs and O&M
- Participation of officials from line departments
- Participation of concerned LRI partner
- Documentation of all the proceedings of the Watershed Association
- Approval of community owned, scientific DPR by the Watershed Association

8.6.2 Once DPRs are approved by the WA, PIA will forward the DPR along with a consolidated DPR for the assigned cluster/projects to Project Director Watersheds (PDWS) at District level for technical security and approval. The technical experts in District Project Management Unit (DPMU) scrutinises technical feasibility of the DPR and also validates DPR for inclusion and exclusion of the activities, beneficiaries, gender participation, ESA, budgetary provisions, adherence to LRI recommendations, inclusion of activities in common land, forest area etc.

8.6.3 Then, the Project Director, Watersheds (PDWS) will place the DPRs in the DPMC which is headed by the District Magistrate cum Mission Leader for administrative approval. The District Project Management Committee (DPMC) approved DPRs are then placed before the State Level Nodal Agency (SLNA)/State Project Management Committee (SPMC) chaired by Agriculture Production Commissioner (APC)/Secretary, Agriculture & FE as per the prevailing WDC-PMKSY guidelines for sanction of the projects.

8.6.4 The SLNA will communicate the PIAs through PDWS about the sanction of projects. After receipt of the approval; the DPR is implemented by the PIA/Watershed Committee through concerned farmers in the case of private land interventions and through CBOs/User Groups in the case of common land interventions/ value chain and livelihoods activities. While implementing land based interventions, it is always advisable to follow ridge to valley and saturation approach. Hence, from day one of project implementation community participation shall be ensured to ensure ownership, participation, transparency, equity, inclusion, gender participation and quality of intervention and for social and environmental sustainability.

9. Implementation of Watershed Interventions

9.1 Preparatory Phase

The major objective of this phase is to build appropriate mechanisms for adoption of participatory approach and empowerment of local institutions (WC, SHG, and FIGs). The role of PIA and its WMT and/or FNGO engaged for awareness building play an important role in this phase. In this phase, the main activities will include:

- a. Taking up entry point activities to establish credibility of the Watershed Management Team (WMT) and create a rapport with the village community through various awareness building program such as street plays, street meetings, village meetings, distribution of leaflets, wall writings etc.
- b. Community mobilisation and strengthening Village level institutions such as Watershed Committees (WCs), Self-Help Groups (SHGs), User Groups (UGs), Farmers Interest Groups (FIGs) and Farmers Producers Organisations (FPOs) and capacity building of different stakeholders on institutional and work related aspects.
- c. Collection of baseline information at the house hold as well as from secondary source such as Anganwadi centres, Livestock office and GP.
- d. Environment building, awareness generation, undertaking of intensive IEC activities, creating involvement and participatory responses of the community.
- e. Building up a network of technical support agencies.
- f. Capacity building the Community Based Organisations (CBOs) through various training programs
- g. Conducting scientific Land resource Inventory and Hydrological studies.
- h. Working out detailed resource-use agreements (for surface water, groundwater and common/forest land usufructs) among CBOs in a participatory manner based on principles of equity and sustainability.
- i. Participatory monitoring of progress and processes.
- j. Community consultation, scientific DPR preparation at micro watershed level and consolidated at the Cluster level. Environmental and Social Safeguards Screening through PRA.
- k. Approval of final DPR at Watershed Association District as well as State level.

9.2 Watershed Works Phase

This phase is the heart of the programme in which the DPR will be implemented. Some of the important activities to be included in this phase are:

- a. **Ridge Area Treatment:** All activities required to restore the health of the catchment area by reducing the volume and velocity of surface runoff, including regeneration of vegetative cover in forest and common land, afforestation, staggered trenching, contour and graded bunding, bench terracing etc.

- b. **Saturation Approach:** Treatment of at least 70 percent of all the parcels of watershed area within the selected sub watershed as per the recommendations of LRI and Hydrological studies and treatment plans. In addition to the land based activities; livestock and livelihood promotion activities for the land less and asset less and non-land holders in the sub watershed/cluster will also be taken up.
- c. **Drainage line treatment** with a combination of vegetative and engineering structures, such as earthen checks, brushwood checks, gully plugs, loose boulder checks, gabion structures, underground dykes etc.
- d. Development of **water harvesting structures** such as low-cost farm ponds, nalla bunds, check-dams, percolation tanks and ground water recharge through wells, bore wells and other measures.
- e. Nursery raising for fodder, fuel, timber and horticultural species. As far as possible local species may be given priority.
- f. Land development including in-situ soil and moisture conservation and drainage management measures like field bunds, contour and graded bunds fortified with plantation, bench terracing in hilly terrain etc.
- g. Crop demonstrations for popularizing new crops/varieties, water saving technologies such as drip irrigation or innovative management practices. As far as possible varieties based on the local germplasm may be promoted.
- h. Pasture development, sericulture, bee keeping, back yard poultry, small ruminant, other livestock and micro-enterprises.
- i. Veterinary services for livestock and Fisheries development in village ponds/tanks, farm ponds etc.

9.3 Consolidation and Withdrawal Phase

In this phase the resources augmented and economic plans developed are made the foundation to create new nature-based, sustainable livelihoods and raise productivity levels. The main objectives under this phase are:

- a. Consolidation and completion of various works.
- b. Building the capacity of the community based organizations to carry out the new agenda items during post project period.
- c. Sustainable management of (developed) natural resources and up-scaling of successful experiences regarding farm production systems/ off-farm livelihoods.

An indicative list of various activities during this phase is given below:

- Preparation of project completion report with details about status of each intervention;
Documentation of successful experiences as well as lessons learnt for future use.
- Formal allocation of users right over common property resources (CPRs);
Collection of user charges for CPRs;
- Repair, maintenance and protection of CPRs;

- Sustainable utilization of developed natural resources;
- Involvement of gram panchayat/corresponding institutions (as a governance body) in addressing the above aspects.
- An O&M Policy will guide the post project management aspects.

A. Implementation of Model Saturation Watersheds

9.4 As per the recommendations of scientific investigations and recommendations which will be done in consultation with the community, REWARD plans to implement the recommendations in 17 pilot sub watersheds/clusters on a saturation approach covering an area of one lakh hectares where in each and every land holding family are benefited through land based interventions and land less and asset less households are supported with livelihood promotion activities in terms of skill improvement training and one time grant for initiating or improving the income generation activities for improving the livelihoods. The land based interventions cover both private, common as well as public lands and the activities includes soil and water conservation activities, Agro-horticulture, Agro-forestry, Animal husbandry, drainage line treatment etc.

All the private land activities will be implemented by cultivating farmers while common land and drainage line treatments will be implemented by the community based organizations such as User Groups (UGs) and Farmers Interest Group (FIGs) etc. Hence, in order to inculcate the ownership in the activities and to ensure sustainability community members will be actively involved not only during planning state but also during implementation as well as post project implementation stage.

B. Implementation of Innovative Pilots

REWARD promotes several State-specific innovative pilots to support adoption of climate resilient agriculture by target farmers through promotion of climate resilient technologies, tools and practices and also linking to value chains. Odisha State Specific innovative pilots include building system level resilience through integration of LRI driven landscape based interventions with field level resilient crop practices, orientation of fertilizers and micro-nutrients use and subsidies based on LRI data, hydrological monitoring for selection crops and providing Agro-meteorology advisory services.

9.5 LRI technology can be linked with the Inputs Distribution under Departmental subsidy Programmes:

In Odisha, the important agriculture inputs like micro nutrients, gypsum, lime, dolomite, bio-fertilizers, organic fertilizers, green manure, seeds are distributed to the farmer's on a subsidized rates and incentive is given to the farmers for encouraging them for construction of vermi- compost units and bio-digester units. The main objective of providing subsidy is to motivate the farmers to use micronutrients, organic manures and bio-fertilizers in order to overcome the deficiency of plant nutrients in the soil and to increase the productivity. The subsidy is given to the farmers who are actually involved in farming activities.

The MRP of P&K fertilizers provided to farmers were much higher cost than straight nitrogenous fertilizers cost. This led to increase in consumption of nitrogenous fertilizers. However, it was observed in last few years that the marginal response of agricultural productivity to additional fertilizer usage in the country had fallen sharply, leading to near stagnation in agricultural productivity and consequently agricultural production. The disproportionate NPK application, rising multi nutrient deficiency and lack of application of organic manures leading to reduction in carbon content of the soil, was attributed to the stagnating agricultural productivity. LRI technology will help the farmers to judicious use of fertilizers; intern will reduce the cost of cultivation and improve the economic status of the farmers.

Based on the LRI we can also estimate the amount of inputs required for the specific watershed. Based on LRI cards, suitable crops (field crops as well as horticulture crops) can be recommended to that specific site, accordingly seed/planting material requirement for the particular crop can be calculated. Hence, Odisha State will pilot in few watersheds (10-20 ha in each of the sub watershed) to provide subsidized micro and macro nutrients as per the recommendations of LRI studies, to study its implications on the economic condition of the farmer and ecological status of the soil and other natural resources. The success of this pilot will help to bring in a State as well as National fertilizer policy their by reducing excessive application of nutrients to the soil resulting in negative ecological externalities and contributing the exchequer of the government. This pilot will be undertaken by the research institutes of eminence /State Agriculture University from second year of project implementation.

9.6 Weather based agro-advisory services to the farmers.

REWARD is planned to deliver LRI / hydrology based crop and weather advisories. This initiative will empower the farmers through informed decisions on crop selection, crop management, weather information, nutrient advice, crop water management, market information and conservation need. This will involve knowledge dissemination through use of appropriate digital tools and alternate extension channels and is expected to facilitate adoption of resilient crop practices by the farmers.

- a) REWARD's Agro Advisory service will include following broad Interventions.
 - Farmer Participatory Technology (resilient practices in particular) demonstration, their validation and refinement.
 - Policy innovation pilots to show case system level resilience through integration of landscape based interventions with field level resilient practices. These pilots will serve as sites of learning.
 - Knowledge dissemination through use of digital tools and alternate channels including LRI cards, trainings, demonstrations etc
- b) DSC & WD will develop partnership with an agency of national and international repute as an Agro-Advisory Support Agency (AASA) having demonstrated expertise in

the field of agro advisory services and promotion of resilient crop practices. The Agro-Advisory Support Agency (AASA) should have demonstrated expertise in following areas.

- Farmer Participatory Technology Demonstration, their validation and refinement.
 - Policy innovation pilots in respect of resilient technologies & practices.
 - Agro Advisory services including use of digital tools and alternate channels.
- c) The Agro Advisory support agency (AASA) in consultation with the technical partners (OUAT, IWM & NBSS&LUP) and line departments will develop and manage delivery of LRI / hydrology based crop and weather advisories and dissemination of knowledge on resilient practices at state, district and cluster levels. The Agro Advisory system will build on the set of ongoing practices and communication activities such as trainings, exposure visits, field demonstrations, mobile solutions (interactive voice response (IVR), SMS, mobile apps. A concept note along with detailed Terms of reference will be developed to identify detailed service requirements, institutional arrangements, hardware and software requirements, web portal etc. to strengthen and enable the implementation of REWARD's goal of disseminating its agro advisory.
- d) The programme will also promote Information, Education and Communication (IEC) activities to build awareness of target communities. IEC materials and ICT channels will be tailored to meet the requirements of women farmers. Resources and infrastructure available at Institute for Management in Agriculture Extension (IMAGE) at state level and Krishi Vigyan Kendras at district level will be effectively utilized for the purpose.
- e) All REWARD districts currently have Krishi Vigyan Kendras (KVKS) under the aegis of Directorate of Extension Education of OUAT. These KVKS develop crop weather advisories for their respective districts on weekly basis which are available to farmers in the University website @ <http://ouat.nic.in/agro-advisory-service-system-view>. REWARD will collaborate with KVKS to customize and refine these advisories based on LRI and hydrology data.
- f) *Krushak Sampark Mela* at the block level, district level *Krishi Mahotsav* and state level exhibitions-cum-knowledge sharing event “Krusha Odisha” now attract a large number of farmers as well as scientists, students and extension personnel from OUAT, Agriculture & Allied Departments and private sectors. REWARD will actively participate in these fairs with selectively woven information packages including live demonstration of technologies and systems.
- g) REWARD will recognise Farmers Advisory and Information Centres (FIAC) placed at block head quarters serve as a multi stakeholder platform to collect farmers' feedback and advocate crop advisories to the farmers.
- h) DAFE, GoO vide Notification No 2464 dated 1.2.2020 has made Panchayati Raj Institution (GP Office) a suitable platform for an interface between extension officers

and farmers between extension officers and farmers. A committee under the chairmanship of respective district collectors finalise the roaster of line department extension officers including Village Agriculture Workers, Agriculture Overseers, Horticulture Extension workers, Soil Conservation extension workers, Soil Conservation Overseers and Livestock Inspectors. The extension officer as per the roaster makes him / herself available in the Gram Panchayat office assigned to him / her every week on Monday between 12 Noon – 2 PM. REWARD will use this platform to disseminate agro advisories through audio-visual aids and printed leaflets.

- i) Scope of integrating the DAFE's free mobile phone based Agricultural Advisory Service "AMA KRUSHI" with REWARD's goal of disseminating its agro advisories will be explored to accomplish the following;
- Customized weekly advisories and early warning systems
 - Answers farmers most pressing queries
 - Supplements the "two-way Interactive Voice Response (IVR)" service with platforms like WhatsApp, SMS.
 - Provides agro-advisory service on evidence based resilient practices
 - Objective measurement of farmer outcomes in alignment with the agreed DLIs / result indicators.

9.7 Value Chain Improvement through FPOs & PPP-IAD

Introduction: Odisha is largely a rural and agrarian economy wherein 62 % of populations are employed in Agriculture. Even though the state has shown discernible progress on growth in farmer's income since 2001-02, the income expected from farm produce are always unsatisfactory as the farmers depend on local market and traders to sell off the harvest. To strengthen farmer's income, the State has initiated measures in the form of formulation of agriculture policies and creation of Farmer Producer Organisations (FPOs) to develop value chain management through which farmers can earn more return. Out of the 342 FPOs formed so far, majority are very nascent and promoted by NABARD, Department of Agriculture & FE and Odisha Livelihood Mission.

a. Enabling ecosystem exists to form and support FPOs

To promote the FPOs, Government of Odisha has formulated Policies, Guidelines for ease of successful operation.

- **" SAMRUDHI", Odisha's New Agriculture Policy (2020):** focus on measures on efficient use of resources and marketing through creation of efficient value chains in vegetables, livestock, poultry for ensuring farmer's profitability through skill development and formation of FPOs⁹. In this regard, MoU has been signed between GoO and National Co-operative Development Corporation (NCDC) during September 2020 for promotion and

⁹ (Page 24,1e) (<http://agriodisha.nic.in/content/pdf/SAMRUDHI%20-Agriculture%20Policy%202020.pdf>)

management of FPO in accordance with the Central Scheme “Formation and Promotion of 10,000 FPOs”¹⁰.

- **Odisha Farmer Producer Organization (FPOs) Policy 2018:** To create conducive environment for formation and successful operation of FPOs, FPO policy was rolled out during 2020.
- **Odisha Credit Guarantee Fund Scheme for FPOs (OCGFSFPO):** During July 2020, Government of Odisha has approved “Operational Guidelines of the OCGFSFPO” for ease of operations in credit flow to the farm sector wherein access to collateral free loan to FPOs from financial lending institutions are facilitated¹¹.
- **Cluster Development Programmes:** The state has also pioneered in several product specific cluster development under flagship programmes such as *Odisha Millet Mission, National Food Security Mission, National Horticulture Mission, Odisha Livelihood Mission* etc. The *Mukhyamantri Krushi Udyog Yojana (MKUY)*, *WDC – PMKSY (erstwhile IWMP)* encourage formation of FIGs/CIGs/SHGs to access support under livelihood through PSME component and RAD component of NMSA which is operational as a climate change effective measure through undertaking of integrated farming system, encourages formation of FPOs in the clusters for income augmentation and sustainable livelihood.

REWARD, further to scientific development of land resources, intends to design, pilot, adopt and disseminate agriculture in Odisha with improved crop practices and support informed interventions along the value chains of select crops through investments in FPOs and market linkages. The initiatives will impact farmers and they would generate higher yields, and more income through collectivisation and marketing the produce through value chain improvement.

9.8 Value Chain Improvement

Value chain is the range of activities which are required to bring a product or service from conception through different phases of production, delivery to consumer and final disposal after use. In agriculture sector flow of seeds to farmers and output (grain) to the market occurs through long chains. As the product moves from one chain actors to another it gains value. It examines all possible aspects like inputs, labour use, technology, grades and standards, regulations, products, processes and markets.

REWARD’s value chain initiatives will contribute to the optimal use of available resources within the existing policy framework. For this purpose, 5 to 6 crops/commodities will be selected following a two-step screening process (detailed at step 1 of the value chain process). A national level consultancy and research agency, to be hired, will support value chain analysis including prioritization 4-5 promising crops / commodities, benchmarking and

¹⁰ <http://agricoop.nic.in/sites/default/files/English%20FPO%20Scheme%20Guidelines%20FINAL%200.pdf>).

¹¹ <http://www.agriodisha.nic.in/content/pdf/Notification%20No.%2011358%20dt.%2017.7.2020%20for%20Odisha%20Credit%20Guarantee%20Fund%20Scheme%20for%20Farmer%20Producer%20Organisations.pdf>.

gap analysis, development of strategies and action plans. The key steps related to value chain improvement is explained below.



Step 1 / Year 1 : Choosing Priority Sectors for Value Chain Interventions

A preliminary list of products / value chains has been identified and compiled as mentioned in **Annexure-VIII** whose competitiveness could further be enhanced through project interventions. **This will be further reviewed and finalized.** The selected crops/ commodities have growth potential and have the ability to contribute significantly to the income of households. The primary stakeholders will be involved in the selection process as early as possible, especially through workshops to discuss the current status of the product/value chain and to test their willingness and commitment to the process.

Step 2 / Year 1: Designing Informed Strategies across the Value Chain

A value chain product unit financial analysis will be conducted to understand distribution and flow of resources and profits along the chain. This will be followed by a participatory SWOT analysis to qualitatively characterize the state of the value chain. In the process, quality of supply chain management, human resources & gender differentiated roles across the value chain, and the business environment will be studied in depth.

Step 3 / Year 1: Conducting Benchmarking and Gap Assessments of Value Chains

Global best practices will be compared against data from benchmarking exercises to identify areas of operational improvement, ways to reduce transaction costs, quality and service improvements, availability and quality of supporting services, and ways to improve competitiveness strategies. In this stage, existing producer group already promoted by different agencies in the select production clusters will be identified and agreed. An action

plan for upgrading and deepening the select value chain will be developed followed by identification of projects for implementation in PPP-IAD mode.

Step 4 / (Year 2, 3 &4): Upgrading and Deepening the Value Chain

Upgrading activities will be achieved by deepening the value chain through vertical and horizontal integration, forward and backward linkages, and investing in new technologies. These actions will be facilitated by consolidating available resources, fragmented producers and market opportunities through strengthening FPOs, Public Private Partnership for Integrated Agriculture Development (PPPIAD), and / or a combination of both. REWARD will facilitate value chain stakeholders to implement a pilot enterprise.

Step 5 / (Year 5 & 6): Positioning Products for Greater Value and Competitiveness, as well as applying Standards and Certifications to Achieve Greater Quality

The programme will understand the possibilities and requirements for repositioning the product, and develop a repositioning strategy. Repositioning a product in a more competitive space requires a combination of activities that both enhance product differentiation and increase in-country, value-added activities. The value chain must meet requirements relating to product health and safety, intrinsic product qualities (shape, color, taste, texture, etc.), packaging and labeling, and accompanying information. If required, the value chains can be shifted targeting different, more attractive markets and business strategies in a dynamic market environment.

9.9 Farmer Producer Organizations in REWARD

Farmers Producer Organizations are the emerging models for innovative solutions to help farmers collectivise the value chain development efforts of chosen agri-commodities. Collectivization of small and marginal farmers to form their organizations as Farmer Producer Organizations (FPOs) has been recognized as the most effective and appropriate institutional mechanism to reduce cost of production, increase per unit productivity, access to investment, technology, finance, inputs and facilitate better market linkages through value chain development so as to enhance their net income.

In the REWARD project, 15 FPOs will be promoted and developed to improve the value chain eventually impacting farmers' income. The target of 15 FPOs will be achieved through a mix of existing and new FPOs. The emphasis will be to mostly target and strengthen existing FPOs. The status of existing FPOs in REWARD districts are as follows.

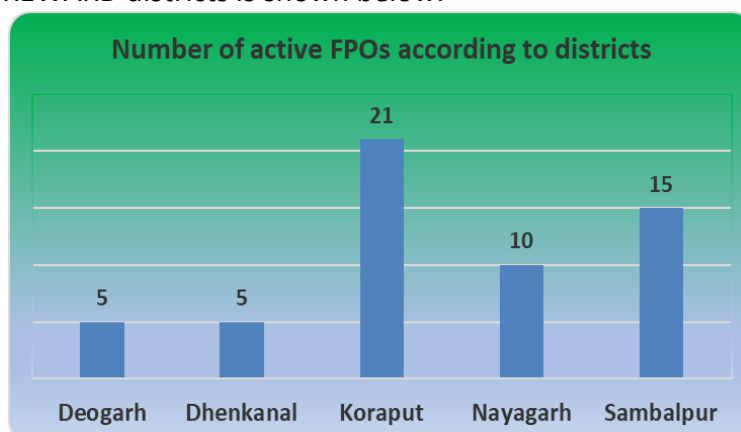
9.9.1 Snapshot of FPOs in REWARD Districts

- There are 62 FPOs present in REWARD districts and out of them 56 are active. The four departments or organizations that have promoted the FPOs are Department of Agriculture -7, Department of Horticulture -5, NABARD- 43 and Odisha Rural Livelihoods Mission -1.

- The distribution of active FPOs in REWARD districts is shown below.

- Out of the 56 active FPOs, 29 of them are either 3 years or younger in terms of age; 25 of them are between the age of 4-6 years and two are more than 6 years old

- The district wise active FPOs in REWARD districts are presented in the bar chart.



The turnover data for year 2019-20 is available for only 31 FPOs out of the total active 56 FPOs.

- The data is available for two FPOs that are 6 years old. One of them had annual turnover of INR 1.07 crore in 2019-20 whereas the other one had INR 6.62 lakh.
- The average turnover of FPOs that are 3 years or younger is INR 6.8 lakhs in 2019-20. The highest turnover in this category is INR 16.2 lakh, while the lowest is INR 0.02 lakh.
- The average turnover of FPOs who are between the age group of 4 – 6 years is INR 8.4 lakh. The highest in this category is INR 24.7 lakh.

A detailed trend analysis is required to set the base line for annual turnover to measure the DLI relating to business turn over of FPOs to be assisted under REWARD.

9.9.2 FPO selection process in REWARD:

FPOs under REWARD shall be identified / formed and strengthened as mentioned hereunder and as per the timelines at section 6.0 below.

Step 1	Meeting with Line Departments / Other Agencies who are actively involved in FPO formation.
Step 2	Identify Potential Area of Overlap and FPOs by various Depts. and REWARD
Step 3	Assessment or grading of FPOs – based on Age/ turnover / paid up capital, Membership etc
Step 4	Final selection of FPOs based on this process and select potential FPOs under REWARD
Step 5	Business Plan Development of selected FPOs
Step 6	Execution of interventions as planned under FPO through hiring of technical service providers

At present FPOs promoted through Odisha Millet Mission; interventions have been taken up for creation of value chains of Millets in Koraput District through formation of FPOs (**Annexure-VIII**). Similarly, FPOs for Horticultural products are formed, some of which are active in REWARD operational area. (**Annexure-IX**). Series of meetings with Agriculture Directorate / Horticulture Directorate with REWARD team shall be organised to discuss the mode of inclusion and promotion of existing FPOs under REWARD programme. Initial assessment on performance of the already formed FPOs by Technical support institute shall be made based on following

✓ Active Members	✓ Regular Savings	✓ Sales / turn over	✓ No of Share holders
✓ AGM meeting	✓ Equity grant	✓ Paid up Capital	✓ CRI
✓ Book Keeping	✓ Annual Audit	✓ Business Planning	✓ Bank loan repay

9.9.3 Interventions to promote FPOs:

Following activities shall be undertaken to strengthen the FPOs

- **Provision of study on market information and intelligence**
 - Value chain and market assessment studies will be commissioned to identify opportunities to increase participation in value chains
 - Study on constraints to market access and information. The studies will inform the preparation of FPO-level business plans and will also cover the role and contribution of women across the value chains.
 - Better understanding of the constraints and opportunities.
 - Forward market linkages wherein partnerships with private sector agencies for implementing turnkey projects on scaling up existing and new models that successfully link markets with producers through various market-led strategies.
- **Capacity building of different stake holders of the FPO**
 - Training on functioning, vision building and other aspects related to FPO strengthening. The training themes will be identified during FPO gap assessment and business planning stage, which will be carried out by an external technical service provider.
- **Preparation of bankable business plans for the FPOs,**
- **Provision of advisory to services** on private sector investment, formalizing private sector partnerships
- **Provision of Startup Fund:** The fund will be used to support the identify the best performing FPOs within REWARD with additional funds to provide matching grant, working capital, infrastructure development, performance grant, etc. The process of identifying and supporting best performing FPOs will be laid out in the first year of the project in the FPO Operational Manual. Provisioning of startup fund for New as well as existing FPOs be made after due assessment by Supporting agency.

- **Development of Web portal for REWARD FPO:** A designated portal for FPOs shall be made or the relevant REWARD FPOs data shall be captured in the state web portal on FPOs from end of first year of implementation of REWARD.

9.9.4 Public Private Partnership for Integrated Agriculture Development (PPP-IAD)

a. **REWARD** will encourage appropriate Public Private Partnership to implement need-based responsive recommendations across infrastructure, technology, finance, credit and institution building for Integrated Agriculture Development. Following action plan development for upgrading and deepening select value chains, SLNA will issue operational guidelines indicating the list projects for implementation in PPP-IAD mode, and a framework for selection of partner agencies as well as governance. The indicative list of thematic areas for PPP-IAD shall be on

- Formation of FPO and their management
- Capacity Building and development of training modules
- Upgrading / Deepening select value chains on pilot basis
- ICT and communication of tools
- Infrastructure Development
- Farm mechanisation
- Value chain monitoring and documentation

Ongoing of PPP-IAD programme across the select value chains will continue, if they have the potential to complement or supplement the programme initiatives. The process for implementation of PPP-IAD by Corporates / Companies / Private Partners shall be as per the procedure laid out in Agriculture policy 2020 of Government of Odisha

b. combination of FPO & PPP-IAD

The private partner/Corporate in PPP-IAD programme can choose to partner with the FPO formed or can identify group of farmers who will be mobilized into commodity interest groups in the project area. On behalf of producer farmer members, FPOs can participate in PPP-IAD. Apart from activities of production they themselves or along with another end user company may establish the marketing linkage. Collection/ procurement centre, Cold Storage facility, refrigerated transport facility, processing and value addition centres may be set up based on the needs by FPO and shared with company, wherever possible.

9.9.5. Human Resource for FPO promotion

9.9.5.1 State level: The State Project Management Unit (SPMU) shall be constituted and report the day to day developments to the Director/Joint Director, DSC&WD consisting of following members

- State Project Coordinator
- Specialists, Agribusiness planning

- Specialists, Agriculture Financing, Marketing
- Specialists, FPO capacity strengthening.
- MIS expert

The suggestions of the Consultants / Resource institute, Technical institute shall be taken for effective implementation of the programme.

9.9.5.2 District Level: District Project Management Unit (DPMU) shall constitute following members and report the proceedings to the Project Director and to the SPMU.

- Assistant Project Director
- District Project Coordinator

The suggestions of the Consultants / Resource Institute/ Technical Institute shall also be taken for crop specific / Intervention specific identification and execution of activities. These consultants / RIs will be responsible for ensuring smooth convergence with the department (including access to government grant schemes, training and technical support, etc.).

9.9.5.3 Block Level: Assistant Soil Conservation Officer (ASCO) shall act as field thematic coordinators and will work closely with community service providers at the village level.

- Soil conservation extension workers (SCEW)
- Cluster project coordinators

The service providers will be responsible for the formation and functioning of Producer Groups (PGs) and provide the last-mile link in delivering project services to beneficiaries. In case-to-case basis help of line department officers/ officials shall be taken.

9.9.5.4 Engagement of technical service providers

The project will hire technical service providers to carry out different activities for FPO formation / interventions including that of value chain development / PPP-IAD activities as mentioned. The specific activities for which external service providers will be engaged are market and value chain assessment, FPO gap assessment and business planning, financial and market linkage, and capacity building. Based on the detailed FPO assessment, decision will be taken to engage agencies to provide hand-holding support to the FPOs.

9.9.6 Timeline for key interventions: The timeline for achieving the key milestones is as follows.

Sl.No	Key Milestones	Y1	Y2	Y3	Y4	Y5
1	Hiring of consultant / Resource Institute / Agencies for value chain analysis.					
2	District wise prioritisation of Value Chains for intervention					
3	Bench Marking & Gap Assessments, including identification					

	of existing producer groups					
4	Action Plans for upgrading & deepening select value chains					
5	Development of Manuals – FPO Operational Manual for organising members, mobilising share capital, collective marketing, Start-up Fund, MIS, etc					
6	Identification of projects for PPP-IAD					
7	Finalisation of TORs and Signing of MoU with partner organisations for PPP-IAD					
8	Implementation of proposed interventions to upgrade & deepen value chains.					
9	Performance assessment and evaluation					
10	Standardisation and Certification of Products, including shifting of strategies to meet dynamic market environment.					

9.9.7 Investment on FPOs (Per FPO)

Activities related to DLI6 - FPO	Responsibility	New FPO		Existing FPO	
		Source of fund. *	Cost (INR in lakhs)	Source of fund	Cost (INR in lakhs)
Identification and mobilization, Initial assessment, Capacity Building / value Chain study and Business Planning and others	External Agency	GOI / REWARD	25	REWARD	0
Registration cost (per FPO)?	External	GOI / REWARD	0.5	REWARD	0
Management / Admin Cost	External	GOI / REWARD	18	REWARD	18
Value chain study per district or commodity. Assessment and business planning	External		-	REWARD	20
Capacity building / Study Tours – vision building,	External Agency	REWARD	4	REWARD	4
Funds for Creation of SPMU / DPMU , Technical Service Providers	External	REWARD	21.5	REWARD	21.5
Startup Fund (Matching Grant, Infrastructure Development, Performance Grant, etc) – per FPO?	External	REWARD	15	REWARD	15
Common Facility Centre / Seed Storage / Input hall / Value addition hall / Machinery for Post Harvest activities	External	REWARD	50	REWARD	50
Hoisting of web portal and for unforeseen items	External	REWARD	4	REWARD	4
Total			138.00		132.50

* The sharing of cost by GOI, GoO, REWARD can be ascertained after the process of selection of FPOs are completed and the status of grants that already have been availed by the existing FPOs

9.9.7.1 Additional investment in the REWARD districts through Convergence

- Assistance to the Beneficiaries under Mukhya Mantri Krushi Udyog Yojana in REWARD districts upon fulfilment of prescribed criteria.
- Activities for development of clusters under RAD programme upon approval by SLEC.
- Assistance to FPO @ 10 Lakh Rupees under central assistance scheme PMFPI. The eligibility of FPOs shall be ascertained as per guideline of PMFPI.
- Benefits applicable under Odisha Agricultural policy 2020 upon approval by competent authority.

10. DLIs and their verification protocol

The REWARD programme adopts the P4R approach, science-based planning and are keen on demonstrating ultimate results linked to livelihoods and climate change adoption. The P4R financing instrument encourages participating state on result-focused implementation than business as usual. The funds flow process from the World Bank to the states is linked exclusively to the achievement of agreed results or disbursement linked indicators (DLIs).

The cycle of disbursement on achievement of results associated with each DLI and their verification by the third party verification agency and will be repeated on an annual basis. Selection of DLIs has been guided by activities which need to be done for scientific and sustainable development and management of watersheds. These DLIs, while focusing on the objective of the program, provide incentives for achieving key milestones in the desired results area the program.

Four DLIs specific to Odisha State have been identified. The details of DLI wise description, data source, and verification protocols are summarized in the below **table-10**.

Table-10: DLIs and Verification Protocol

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
1	Watershed Committees and Gram Panchayats demonstrate satisfactory watershed management as measured through a performance assessment tool.	This DLI is defined as the percentage of Watershed Committees and/or Gram Panchayats (WCs and/or GPs) in the REWARD Program's science-based micro-watersheds, covering 0.25 million hectares areas, that achieve score above 50% (considered as satisfactory) on the 'Performance Assessment Tool' (PAT) that is developed specifically for the purpose. The PAT will contain indicators covering each phase of the watershed sub-project (preparatory phase, execution phase and O&M phase). It is measured in Year 2, 3 and 5. The DLI comprises the following Disbursement Linked Results: • DLR 1.1: In Year 2, score on the indicators pertaining to Preparatory Phase in the Performance Assessment Tool is considered. The indicators will	MIS/ SWDs	IVA	Procedure for DLRs 1.1, 1.2 and 1.3: (i) The IVA will undertake desk verification of the MIS data to determine the number of WCs/GPs that scored more than 50% on the Performance Assessment Tool. (ii) The IVA will conduct field verification in a representative sample of WCs/GPs. The field verification will involve checking records of WCs/ GPs for information on all the indicators pertaining to the phase being considered and confirming the scores reported in the MIS.

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
		include improved representation of women in the WCs and greater weightage for women in leadership positions in the WCs. • DLR 1.2: In Year 3, score on the indicators pertaining to Execution Phase in the Performance Assessment Tool is considered. • DLR 1.3: In Year 5, score on the indicators pertaining to O&M Phase in the Performance Assessment Tool is considered. In each year, at least 30% of the WCs and/or GPs in the science-based MWS need to achieve score of more than 50% on the PAT All participating states shall develop an appropriate PAT with key performance indicators for all three phases and reflect the same in the Program Manual. The performance assessment scores will be captured in the state MIS systems.			
2	Land area treated with	This DLI is defined as the area (in hectares) of watersheds where science-based	MIS / SWDs	World Bank will carry out	Procedure for DLR 2.1 (Prior Result):

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
	science-based watershed management technologies.	watershed development has been implemented in a saturation mode. This is measured in Year 2, 4, 5. The DLI comprises 3 Disbursement Linked Results, including a Prior Result. • DLR 2.1. (Prior Result): Memoranda of Understanding are signed with Technical Partners for LRI, Hydrology and RS/GIS. This is verified in year 1. • DLR 2.2: DPRs have been prepared utilizing LRI outputs with key environmental and social data/information, and are approved by Gram Sabha. This is measured in year 2. • DLR 2.3: Watershed works have been implemented in a saturation mode. This is measured in years 4 and 5.		the due diligence for prior results; and IVA for all other results	The Bank will carry out the due diligence of the MoU documents signed with Technical Partners for LRI, Hydrology and RS/GIS. The due diligence procedure will involve reviewing the hard copies or softcopies of the signed MoU documents. Procedure for DLR 2.2: The IVA will verify the DPRs through desk review, and check that the DPR is generated by utilizing the LRI outputs with key environmental and social data/information and is approved by the Gram Sabha. This will involve confirming that all of the following are part of the DPR: • Soil and water conservation plans and drainage line treatment plans covering each land management unit in the micro-watershed with supporting GIS maps. • Productivity improvement plans for major agriculture and horticulture crops with supporting GIS maps. • Nutrient management plan. • Record of community consultations.

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
					- Record of Gram Sabha approval. - Maps and data on environmentally sensitive areas, common properties including physical and cultural resources. Procedure for DLR 2.3: The verification by IVA will involve both desk review and field verification, as detailed below: a) Desk review: The IVA will undertake desk review of the Project Completion Reports (PCRs) of the micro-watershed sub-projects. The purpose of the review is to check if the watershed development works have been implemented in a 'saturation' mode. 'Saturation' refers to soil and water conservation and drainage line treatment of every parcel of land that has been recommended for soil and water conservation and drainage line treatment on the basis of LRI as specified in DPR. This will be verified through a comparison of the total number of parcels recommended for soil and water conservation and

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
					drainage line treatment in the micro-watershed and the number of treated parcels as reported in the PCRs. This criteria will be considered as met if at least 70% of the total parcels recommended for soil and water conservation and drainage line treatment are listed as treated in the PCRs. b) Field verification: The IVA will undertake field verification of a representative sample of soil and water conservation and drainage line works in a representative sample of the micro-watershed sub-projects. The purpose of the field verification is to check if the soil and water conservation and drainage line works have been implemented. Compliance with Environmental and Social guidance, including the Excluded Activities List, will also be verified. This will be verified through a comparison of the works as listed in the PCRs and the completed soil and water conservation and drainage line works

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
					noted during the field verification. This criteria will be considered as met if 90% of the sampled soil and water conservation and drainage line works are found to be completed during the field verification. Double counting of micro-watersheds for disbursements in years 4 and 5 will be avoided (that is, the micro-watersheds that have been verified as suitable for disbursements in a year will not be considered for verification in the subsequent years) .
3	Adoption of resilient agriculture technologies and practices by farmers.	This DLI is defined as the number of farmers who adopt at least one technology/practice from a core set of resilient agriculture technologies and practices recommended through agro-advisory (delivered through LRI cards, weather based agro-advisories over mobile, bulletins, communication from	MIS/ SWDs	IVA	The verification by IVA will involve both desk review and field verification, as detailed below: (i) Desk review: The IVA will undertake desk review of the MIS data on farmer adoption. (ii) Field verification: The IVA will undertake field verification of a representative sample of farmers in

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
		extension workers, farmer training programs, etc.). The core set of resilient agriculture technologies and practices will be as defined by Government of India / respective state governments and include measures related to crop diversification, water use efficiency, and other package of appropriate practices that strengthen resilience to climate change impact for the given agro-climatic zone. Such a short list of approved resilient technologies will be reflected in the Program Manual. This DLI is measured in Year 3, 4 and 5.			the program areas and verify if the farmers have adopted at least one of the recommended technologies/practices. This criterion will be considered as met if 90% of the sampled farmers are found to have adopted the recommended technologies/practices. Double counting of farmers for disbursements will be avoided (that is, farmers verified as suitable for disbursement in a year will not be considered for verification in the subsequent years).
4	Farmer Producer Organizations with 25% increase in business turnover	This DLI is defined as the number of Farmer Producer Organizations (FPOs) supported under the REWARD Program, that achieve an average annual sales turnover that is at least 25% higher than their baseline levels. The average sales turnover will be calculated based on the	MIS/SWDs; Annual audited accounts	IVA	The verification by IVA will involve desk review of the MIS data and on-site (at FPO offices) review of the annual audited accounts statements of the FPOs.

#	DLI	Definition / Description of achievement	Data Source / Agency	Verification Entity	Procedure
	relative to baseline.	annual sales reported by the FPOs in their annual audited financial statements during the reporting period (the average of all years in the reporting period will be considered). This DLI is measured in Year 3, 4, 5. Each year a fresh set of FPOs will be considered for this DLI. The baseline will be the year preceding the FPOs entry into the Program (for existing FPOs) All states shall develop appropriate criteria to shortlist FPOs eligible to be supported under this program and use the same to select target number of FPOs. The criteria for shortlisting FPOs shall be reflected in the Programme Manual.			

11. Monitoring and Evaluation, MIS and IVA

A. Monitoring, Evaluation and Learning:

11.1 Monitoring is a systematic and continuous assessment of the progress and direction of all activities throughout the project period, watching closely the project implementation trajectories and the results achieved. In the process, shortcomings are identified and brought to the notice of decision-makers, to facilitate implementation of corrective measures. Evaluation consists of determining the net contribution of the project to agricultural intensification in the project area adopting science-based farming and benefits that are accrued to the stakeholders, by using a set of indicators.

Therefore, a broad framework of functional M&E is to be developed in consultation with key partners. Key performance indicators are to be identified & frequency of monitoring & methodology is to be developed for data collection. Besides, the project component and related indicators are to be understood to track the progress in each component so developed. However, there shall be a scope for flexibility to revisit these indicators & methodologies down the project time line. A broad framework would be developed with intensive desk review & consultation with other key partners.

The project has to adopt a functional result based monitoring system during the life of project itself. It is a near real time monitoring system including high learning option with on course corrective mechanism. Learning comprises the corrective measures identified to bridge the gaps observed in the programme during the monitoring. The learning insights that emerge in the process should be documented for generating a **knowledge base** that will be used in developing contingency plans to overcome shortcomings in implementation of similar programmes elsewhere. The learning, therefore, triggers multiplier effects across space and time.

11.2 Purpose:

Monitoring and Evaluation provides an insight to the management regarding the course of implementation of the project vis-a-vis the development objectives. It could be on two planes namely Physical and Financial. It alters the management to take appropriate steps. Further, it helps in identifying best practices for replication elsewhere and documentation for future use. As this is DLI (disbursement linked indicators) project, it is imperative to monitor the project based on the DLIs as well.

The M&E system shall consist of the following elements:

- Baseline studies
- Process monitoring
- Pathway analysis
- Thematic studies and case-studies
- Impact evaluation

11.3 Baseline Studies:

- The socio-economic & bio-physical data of the micro watershed level will be obtained along with the related remote sensing imageries and its analysis of the same with reference to the indicators selected.
- This study should provide a benchmark to the indicators identified for monitoring with a synthesized analysis based on micro watershed to agro climatic region of the state.

11.4 Process Monitoring:

- The M&E agency will conduct quarterly rounds of process monitoring to answer specific area of investigation related to implementation activities in the preceding quarter.
- Process monitoring will be done in the 1st, 2nd, 3rd and 4th years of the project.
- The process monitoring will be done using qualitative methods and short surveys
- It will focus on providing recommendations on specific areas to the project senior management and to gain insights into implementation. It will also focus on selected intermediate outcomes and test links in the theory of change.

11.5 Input-output monitoring:

- The M&E agency will generate input-output monitoring reports annually with analysis of MIS data. The report will capture any information considered as necessary for sectoral analysis in line to Results framework, theory of change and Key Performance Indicators (KPIs). The MELD agency will verify the MIS data integrity through periodic field verification.
- The M&E agency will also conduct stakeholder workshops, refine the theory of change and the definition of success of indicators, and suggest new KPIs to cover the theory of change.

11.6 Pathway Analysis:

- Based on the 'process check' & MIS data progress analysis, a pathway analysis would be carried out by the MEL agency.
- The analysis would highlight the critical issues that need managerial intervention at the operational or policy level within the specified time.

11.7 Thematic studies:

- The MELD agency will carry out certain thematic studies on key issues as identified by the agency and accepted by DSC&WD. These could include social inclusiveness, women's empowerment, O&M and sustainability, income generating activities, Value Chain, land cover transformation, awareness and participation, effectiveness of PIAs in project implementation, etc.
- The MELD agency will take up 5 thematic studies during the course of the project. Focus would be on capturing the bigger picture for the theme specified.

11.8 Case study / success stories:

- The agency has to identify, study in detail and prepare the documents on important learnings, success stories and case studies following standard methodological approach.
- To support the studies, the report has to be substantiated with appropriate photographs.

11.9 Impact Assessment:

Impact Assessment of the project is done to evaluate the overall impact of the project on the natural resources and socio-economic aspects. This is done through 10% sampling (socio-economic & natural resources) with respect to baseline, mid-term and final assessment.

Impact assessment will be carried out in 3 stages: -

- **Baseline survey:** The first stage will be initiated with baseline survey, which forms the benchmark for the mid-term and final assessment. The sample watersheds under the project will be selected through simple random sampling with 'control' watersheds selected outside the project area. The baseline surveys would draw information from the Digital Library and Portal and data from other sources. The Baseline survey Report should be submitted by MEL agency within 6 months of signing of contract/agreement.
- **Mid-term assessment:** will be carried out to coincide with the half way point of project implementation. It will make use of baseline information as benchmark. Mid-term assessment of all the projects should be completed within 3 years of completion of Baseline Survey Report by MEL agency.
- **Final assessment:** The final evaluation would coincide with the end of the project. At this stage, the evaluation would focus on the project's overall objectives of improved productivity, reduction in poverty across the target population through scientific land-use, performance of the local level institutions regarding their ability to manage the resources, level of convergence with other development programmes to determine equity, inclusiveness and optimum allocation of financial resources. It will also focus on the best management practices identified involving research organizations. Final Assessment Report should be submitted by the MEL agency within 6 months of completion of all the projects.

Table-11: Indicators to be measured

Sl. No.	Parameter	Indicator
1	Household Income	• Increase in income • Diversification of income sources
2	Farming intermediate outcomes	• Improvement in crop productivity • Changes in crop selection, cropped area, cropping intensity • Diversification to horticulture, livestock • Increase in the irrigated area
3	Practices	• Adoption of core set of climate resilient practices • Adoption of Soil and moisture conservation measures
4	Climate adjusted Soil Moisture in targeted watershed area	• 20% increase in soil moisture in sampled sites out of the 1,00,000 ha under science based watershed management.
5	Ground water	• Increase in ground water table
6	Soil erosion	• Reduction in soil loss, run-off, silt load
7	Value addition and marketing system improved	• Increase in returns to farmers due to improvements in value addition and marketing
8	Empowerment and equity	• Increased participation and opportunities for women and vulnerable groups
9	Effective development and management of Common Property Resources (CPR) and sharing of benefits	• Management of CPRs by GP/WC/SHGs • Activities proposed and undertaken in CPRs • Signing of Agreement for usufructs sharing mechanism and utility to the community • Actual usufruct sharing instances.

B. Program Management Information Systems (MIS):

11.10 Input-output and results monitoring would be supported by a web-enabled computerized MIS which would be an integral part of the M&E system. To start with, REWARD will have a dedicated MIS system which will then be integrated into the overall DSC&WD MIS systems. DSC&WD will design MIS with the help of other key partners. MIS support in this area would cover;

- I. Initial assessment of management information requirements and potential for ICT automation
- II. Software development
- III. Customization
- IV. Field testing and system rolling out
- V. Sustained technical support for maintenance, including further adaptation and refinement.

The tentative time line for all the above from I to IV will be within one year from signing of contract with the agency.

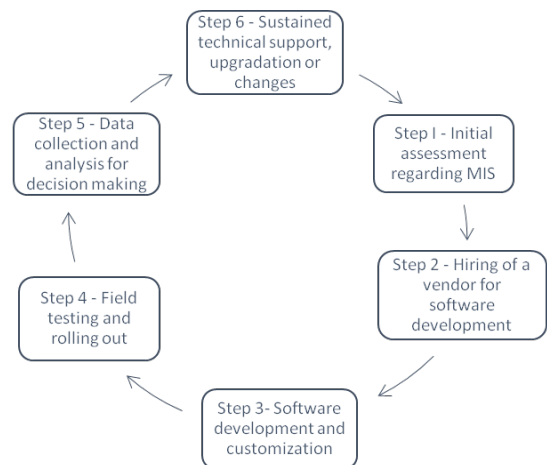
C. Independent Verification Agency (IVA):

11.11 As the REWARD program is a P for R program, an Independent Verification Agency (IVA) will be hired to verify the progress of Disbursement Linked Indicators [DLIs] and provide feedback on a periodical interval. The Independent Verification Agency (IVA) selected to carry out this assignment will be engaged for a period of 6 years subject to satisfactory performance. For verification of DLIs, the Consultant is expected to carry out the assignment

with detailed outline of methodology, which will be intended to verify the achievement of specific targets aligned with the DLIs. The information shared by DSC&WD to IVA agency will serve as the data source for assessing progress towards the DLIs. The detailed ToR of IVA is enclosed at **Annexure-X**.

The specific scope of Services would include:

- To carry out an independent verification of achievement of the DLIs reported by DSC&WD for each of the disbursement claim under the program based on the verification protocol agreed between GoO and the World Bank.
- Preparing and submitting independent and comprehensive verification reports to DSC&WD for DLI achievement reports for each disbursement claim prepared by DSC&WD in the form and substance acceptable to DSC&WD and the World Bank.
- The IVA will verify the DLIs as per the agreed terms, through desk review and physical inspection to confirm the accuracy and quality of results and eligible disbursement amounts claimed by the DSC&WD in its supporting documentation with each disbursement claim.
- In accordance with good audit practice, verification will take place against a sampling framework and frequency, described in detail in the Verification Protocol.
- The IVA will develop a detailed verification protocol that builds on the verification protocol contained in the Program Appraisal Document [PAD] for collecting and processing of data required for assessment and validation of DLIs.



12. Fiduciary Arrangements

12.1 As per Integrated Fiduciary Systems Assessment (IFSA), the REWARD Program's fiduciary systems, subject to implementation of proposed mitigation measures, will provide reasonable assurance that financing proceeds will be used for intended purposes, with due attention to the principles of economy, efficiency, effectiveness, transparency and accountability. The IFSA followed the World Bank's Policy for PforR and the related directive, identified key fiduciary risks that may affect the REWARD Program's development outcomes and recommended systems improvement and capacity-strengthening/risk mitigation measures that will be implemented during the life of the REWARD Program. Based on the IFSA, fiduciary risk of the REWARD Program is assessed as 'Moderate'.

A. Financial Management

12.2 Financial management arrangements for the REWARD Program will mostly be predicated on the lines of IWMP/WDC-PMKSY. The REWARD Program will be budgeted for as a separate line under the implementing departments/ministry and approved annually by the respective legislative processes. In Odisha, the financial management arrangements are in part, embedded within the State's public financial systems using the computerized treasury systems to meet funds for State/district and block levels. At the WC level, REWARD Program funds will be transferred into bank accounts. The key risk with the fund flow arrangements identified during the assessment is that a significant quantum of project funds remains outside the State Consolidated Fund in external bank accounts. This practice also does not lend itself to efficient cash management as unspent funds could be better utilized elsewhere. Several challenges have also been identified with respect to the State's ability to compile the program expenditures and prepare consolidated annual program financial statements. As a mitigation measure, it has been agreed that the implementing departments in consultation with the State Finance department (and treasury directorate and PFMS SPMU) will determine the road map for improvement in the accounting and financial reporting arrangements. These may include, but not be limited to providing additional resources to ensure that all scheme expenses are accounted for under the EAT module of PFMS; mainstreaming all scheme expenses into the State IFMS; and reviewing the process followed for uploading financial expenses on the DoLR IWMP MIS. The detail accounting and financial management procedure is at **Annexure-XI**.

12.3 For IWMP/WDC-PMKSY, annual external audits are conducted by private CA firm/s engaged by Directorate of Soil conservation & Watershed Development (DSC&WD). The audits are conducted as per agreed ToR at **Annexure- XII**. The audit reports have been submitted on a timely basis and limited essentially to the certification of the annual financial statements of the scheme. The audit arrangements as for IWMP/WDC-PMKSY will be extended to cover REWARD. The ToR may require to be reviewed and strengthened to ensure that the audit coverage is comprehensive and covers procurement aspects as well. The ToR of the Program Auditor would have a scope to validate that none of the contracts

awarded under the REWARD Program Expenditure Framework are above the 'high value thresholds' limits defined for this Program and awarded to a firm/individual debarred by the World Bank. The DSC&WD will establish an Audit Committee, comprising senior departmental staff to review the audit observations and ensure that the recommendations are implemented.

12.4 Implementing Entity and Implementation Arrangements: Directorate of Soil conservation & Watershed Development (DSC&WD) Government of Odisha (GoO) would be the implementing agencies for the project along with scientific partners. The Director Soil conservation & Watershed development would be assisted by one Accounts Officers (AO) who would be responsible for all matters relating to project financial management.

12.5 Budgeting: DSC&WD: The proposed REWARD funds would flow through budget head 23-2402-00-3441REWARD - Externally Aided Project (EAP) which has been created. To capture Project Director Watersheds (Deputy Director Soil conservations) at district level and scientific partner wise flows, the Directorate would work with State Treasury to create DDO wise codes which would help in providing funds through treasury to those offices directly as well as account for the expenditure based on bills submitted in the Treasury. This action needs to be carried out within three months of effectiveness.

12.6 FM Staffing and capacity building: The FM unit in DSC&WD would be headed by The AO who would be a senior Odisha State Accounts Department (OSAD) officer. The AO would be supported by accounts and audit officers from OSAD. Apart from them, the DSC&WD will engage two existing Assistants (with experience in computerized accounting) after effectiveness at Head Office (HO) level. In case of project head office and scientific partner one commerce graduate (with experience in computerized accounting) for each office would be appointed within three months of effectiveness.

B. Procurement

12.7 Based on the activities identified in the REWARD Program scope, the main procurable items are: (i) community procurement of works and supplies towards watershed development, (ii) consultancy services such as engagement of implementing agency, technical partners, capacity building, M&E, (iii) goods such as Scientific Equipment, laboratory equipment and Information Technology (IT) systems such as development of DSS. The REWARD Program is not expected to procure any high value contracts. Procurement under the REWARD Program will follow the respective laws and rules of the various implementing agencies. For Odisha, DSC&WD would follow the Odisha General Finance Rules, 1957 (OGFR third edition, 2000) prescribed procurement rules in Chapter 8:stores & Chapter 9:Works. Delegation of financial powers Rules, 2013 has detailed thresholds which defines various thresholds on which financial powers are delegated to departments of GoO. Multiple administrative instructions were issued from time to time to

regulate / amend these governing documents including use of e-Procurement platform. As mandated under their respective regulatory framework, each implementing entity/technical partner would follow their respective e-tendering systems and for procurement of goods, Government e-Marketplace (GeM) portal of the central government would be used by all implementing/technical entities. The procurement plan for the first 18 months of project implementation is given at **Annexure-XIII(A,B,C)**

12.8 Watershed development sub-project activities are implemented by the local communities. Activities such as need assessment, DPR preparation, implementation of DPR, cost estimation for watershed sub-projects, are governed by the Common Guidelines for Watershed Development Projects dated 2008 (revised 2011) of GoI. Manpower for such works is sourced from the local community/market and paid maximum at the wage rates notified by the GoI; supplies are sourced from the local market at the rates no more than those specified under SoR (Schedule of Rates) published by the respective governments. The assessment found that the legal and regulatory frameworks were adequate for the implementation of the REWARD Program and that the provisions of the respective laws and rules were followed by implementing agencies to a large extent.

12.9 Governance and accountability systems: Frameworks for governance and accountability under the REWARD Program will include RTI Act 2005, Prevention of Corruption Act, Central Vigilance Act, Civil Services Conduct Rules, Controller and Auditor General Rules and World Bank Guidelines for combating fraud and corruption in Program for Results Financing dated February 1, 2012 and revised July 10, 2015. The Comptroller and Auditor General of India (C&AG) carries out audits annually which includes aspects related to procurement. Respective implementing/technical agencies have online Grievance Redress systems to cater to grievances of all types. This will be strengthened through a dedicated time-bound procurement related complaint system. Specific officials will be identified as focal persons for dealing with fraud and corruption. It has been agreed that each implementing agency through DSC&WD will regularly share incidences of fraud and corruption with the Bank. The assessment found the arrangements to deal with complaints and fraud and corruption to be adequate subject to improvements.

12.10 World Bank Anti-Corruption Guidelines (ACG):

The World Bank's "Guidelines on Preventing and Combating Fraud and Corruption in Program for Results Financing" dated February 1, 2012 and revised on July 10, 2015, hereafter referred as Anti-Corruption Guidelines or simply ACG shall apply to all activities within the Program Boundary. As there is no distinction between World Bank financed activities and Government financed activities within the Program boundary, these guidelines shall be applied in an unrestricted manner on all activities within the Program boundary. Requirements under these guidelines include but are not limited to (a) borrower's obligation on informing the World Bank about all fraud- and corruption-related allegations

and investigations, (b) the World Bank's right to conduct administrative enquiries, and (c) ineligibility of debarred firms for contract awards. It is clarified to implementing agencies that these guidelines shall be applicable on all activities within the Program boundary and not the parts of the government program that are outside these boundaries.

12.11 In summary, to operationalize implementation of the various areas covered in the ACGs, it has been agreed that office of Principal Secretary, Department of Agriculture, Government of Odisha shall:

- a) maintain and compile a six-monthly report on all fraud-and corruption-related allegations and investigations that are related to the Program and share it with the Bank in the prescribed format.
- b) report on six-monthly basis stating that none of the contract awards under the Program are made to any of the World Bank debarred firm.
- c) Each of the procurement entity shall;
 - ensure incorporation of the Bank's debarment list in the filter used by implementing entities when they conduct due diligence. This list may be found in the following website:
<https://www.worldbank.org/en/projects-operations/procurement/debarred-firms>
 - for every bidding opportunity under the Program, each participating bidder shall be required to submit (as part of their bid) a self-declaration that the firm is not subject to debarment or has not been sanctioned under the World Bank system of debarment and cross-debarment.

The web link to ACG for Pfor R is

<https://policies.worldbank.org/en/policies/all/ppfdetail/3682>

C. Program Exclusions

12.12 The REWARD Program will not finance any activities that would cause high or substantial risks and impacts, such as: any land acquisition and/or involuntary resettlement; use of child labor; destruction of any physical cultural resources; any work that would covert or encroach forest land, notified wetland or any eco-sensitive area; any work that would bring large scale submergence beyond drainage line; any work that would convert common property resources including grazing land; any work that would restrict minimum ecological flow of the rivers and rivulets; any activity that would use most toxic pesticides classified as 'Class I' (based on toxicity of the active ingredient) by the World Health Organization; and any work that would use or generate hazardous material or chemicals beyond permissible levels specified in Schedule II of Hazardous Waste Handling and Management Rules, 2016. The REWARD Program will also not procure any high value contracts valued at or above Operational Procurement. The total project cost is US\$70 million.

Based on the integrated fiduciary system assessment (IFSA), key risks and proposed mitigation actions have been proposed as Programme Action Plan (PAP) action points which have been discussed in a separate Programme Action Plan chapter.

13. Environment and Social Management Rules and Procedures

A. Environment and Social Systems Assessment

13.1 An environmental and social systems assessment (ESSA) for the REWARD Program has been completed in line with the World Bank policy and directive on P for R financing. The broad scope of the ESSA include the following: (a) identify potential environmental and social benefits, risks, and impacts applicable to the Program interventions; (b) review the policy and legal framework related to management of environmental and social impacts of the Program interventions; (c) assess institutional capacity for environmental and social management systems within the Program system; (d) assess Program system performance with respect to the core principles of the P for R instrument and identify gaps, if any; and (e) describe actions to be taken to fill the gaps that will be used as inputs to the PAP. In Odisha, the process of ESSA involved wide consultation with Department of Land Resources (DoLR) at Government of India (GoI), and State level nodal agency (SLNA)/ Directorate of Soil Conservation and Watershed Development, and other stakeholders including Agriculture Department, Horticulture Dept., and some of the technical partners across the implementation chain. Also, two rounds of multi-stakeholder consultations were carried out in preparation of draft ESSA report including with primary stakeholders. Findings of the assessment have also been used in the formulation of the Program Action Plan (PAP) and have been discussed and agreed with SLNA/DSC&WD in Odisha.

ESSA core principles

13.2 ESSA assesses or considers the extent to which the Program's environmental and social management systems are adequate for and consistent with six core environmental and social principles (hereafter, Core Principles), as may be applicable or relevant under PforR circumstances. The Core Principles are listed below

- ❖ **Core Principle 1: *Environmental and Social Management*:** Environmental and social management procedures and processes are designed to: (a) promote environmental and social sustainability in Program design; (b) avoid, minimize, or mitigate against adverse impacts; and (c) promote informed decision making related to a Program's environmental and social effects
- ❖ **Core Principle 2: *Natural Habitats and Physical Cultural Resources*:** Environmental and social management procedures and processes are designed to avoid, minimize, and mitigate any adverse effects (on natural habitats and physical and cultural resources) resulting from the Program.
- ❖ **Core Principle 3: *Public and Worker Safety*:** Program procedures ensure adequate measures to protect public and worker safety against the potential risks associated with: (a) construction and/or operations of facilities or other operational practices

developed or promoted under the Program; and (b) exposure to toxic chemicals, hazardous wastes, and otherwise dangerous materials.

- ❖ **Core Principle 4: *Land Acquisition*:** Land acquisition and loss of access to natural resources are managed in a way that avoids or minimizes displacement, and affected people are assisted in improving, or at least restoring, their livelihoods and living standards.
- ❖ **Core Principle 5: *Indigenous Peoples and Vulnerable Groups*:** Due consideration is given to cultural appropriateness of, and equitable access to, Program benefits, giving special attention to the rights and interests of indigenous peoples and to the needs or concerns of vulnerable groups.
- ❖ **Core Principle 6: *Social Conflict*:** Avoid exacerbating social conflict, especially in fragile states, post-conflict areas, or areas subject to territorial disputes.

Table-12: Applicability of ESSA core principle

S. No.	ESSA Core Principle	Applicability
1	Promote environmental and social sustainability in the Program design	Applicable
2	Avoid adverse E&S impacts on natural habitats and physical cultural resources	Applicable
3	Protect public and worker safety against potential risks	Applicable
4	Avoids or minimizes displacement through land acquisition	Not Applicable
5	Rights and interests of indigenous people/ tribals and other vulnerable communities	Applicable
6	Avoid exacerbating social conflict especially in fragile areas	Not Applicable

B. Environment and Social IMPACTS & RISKS

13.3 The ESSA concludes that the overall environmental and social impacts of the REWARD Program are likely to be positive, owing to benefits such as increased ground water level, improved soil condition and increase in crop productivity, increased rural incomes and reduced poverty. The REWARD Program's overall environmental and social risk rating is Moderate, given that most of the Environmental and Social Effects of the program are localized, reversible and predictable, and can be effectively mitigated and managed through strengthening of existing environmental and social management systems of the implementing agencies.

13.4 Environmental & Social Risks

a. The key social risks relate to weak community preparedness to fully participate in the institutions, science based DPR preparation process, inadequate participation of women, tribals, smallholders/ landless and other vulnerable communities, as well as lack of systematic mechanism for management of E&S mitigation measures and citizen's grievances in the process of program implementation. However, these risks are designed to be mitigated under the REWARD Program through the Result area 1(a) by strengthening community institutions and local government bodies including by forging active participation and contribution of the community including from women and other vulnerable groups in the watershed planning process.

b. The potential environmental risk emerges from the varied geographical scope of the Program area spreading across rain-fed areas of Orissa, with high variations in climate conditions specially rainfall, physical characteristics including terrain and cropping pattern. The Program includes several elements of Climate Smart Agriculture including soil management, water management, provision of agro-advisories to farmers, appropriate crop selection which are clearly spelt out in Result Area-2 for supporting climate change adaptation through incentivizing adoption of LRI and weather-based just-in-time agro-advisories. Also, the risk of extension of watershed interventions to forest, wetland and other environmentally sensitive areas without initial screening at the DPR preparation stage is worth mentioning. REWARD will utilize LRI based planning, with data available at land parcel level that will screen out such risks at DPR preparation stage itself and would further be screened at WCs/GPs during DPR finalization stage. Other risks envisaged are - ignoring macro and micro-level environmental issues such as overall hydrology which includes water resource budget, conservation, flow, etc., in the macro watershed, change in ground water table, change in water quality, water intensive crop selection and increase in pesticide use. However, these risks are designed to be mitigated through Result Areas 1(e) Strengthened monitoring and evaluation systems at national and state levels on first, by deployment of a GIS-enabled MIS platform that: focuses on tracking activities, outputs and outcomes; integrates tracking of process efficiency and quality. Program will establish a scientific assessment and evaluation system, including a rigorous impact evaluation that encompasses application of remote sensing and GIS technologies; process monitoring, and thematic studies for assessing change in specific parameters (such as groundwater level, and sediment load, soil organic carbon) to evaluate effectiveness of watershed investments. Moreover, planned convergence of other programs of Agriculture & FE department such as Forest, Environment & CC, Panchayatiraj & DW departments etc. to conserve soil moisture will contribute to effectively managing all such environmental risks.

C. ESSA: key gaps and recommendations

13.5 Key Environmental and Social Gaps identified: The key environmental and social gaps identified are:

1. LRI based watershed planning and implementation being new to Odisha, hence require building institutional capacity for the same;
2. The LRI based watershed planning being top-down planning approach compared to currently 'bottoms up' approach, poses gaps in detailed process guideline in giving adequate priority to community participation and risk of compromising the community consultative process for preparation of the DPR/ watershed plan;
3. The current system lacks in doing systematic screening for environmental and social risks and issues including for any adverse effects on biodiversity and cultural resource;
4. There is increased chance of interventions spreading into forest boundary and/or common property resources in absence of mechanism to check it;
5. Lack of inter-departmental co-ordination mechanism in dealing with forest, wetland and other environmentally sensitive areas as part of watershed plan;
6. Lack in addressing trans-boundary impact of existing structures, forests, upstream users and impact on downstream users;
7. Intensive agriculture with crop growing conditions, may lead to risks of overuse of chemical fertilizers, pesticides, etc, thus polluting groundwater;
8. In absence of proper guidance, improper management of the civil activities may lead to worker safety issues;
9. Convergence of different schemes targeting tribal and vulnerable groups remains a challenge; and
10. Methods and parameters of M&E system is not spelt out properly for environmental and social risks and impacts e.g., monitoring gender specific data as well as data on equitable benefit sharing to SC, ST, landless and other socially disadvantaged groups.

13.6 ESSA: Recommendations and Actions

The key recommendations addressing the environmental and social systems gaps identified, as well as for enhancing environmental and social benefits includes:

1. Details SOP/ guideline to be prepared and adopted for community participation, building community ownership, and accountability mechanism in line with the new watershed development guideline within 6 months from the programme effectiveness.
2. Early screening of potential environmental and social risks and issues needs to be instituted in the process of DPR preparation.
3. Social Audit system in Odisha is a good practice and shall be followed in REWARD as well.

4. Land use and ownership should be made visible in LRI/ DSS platform to avoid any issue. Also, displaying the environmentally sensitive areas on LRI map and data.
5. Integration of Environmental and Social safeguards with the mainstream MIS within 12 months from the programme effectiveness
6. Preparation of an Environmental and Social Safeguard Manual for watershed program along with training modules.
7. Inclusion of training modules for capacity building of frontline workers on environmental and social risk management – WC, WMT, and PIA and NGOs.
8. Crop Advisories by the Government shall include the advisories on adverse impact of overuse of insecticides and chemical fertilizers as per the Pesticide & fertilizer management plan to be prepared by the Government.
9. Special Strategy to be prepared by DAFE focusing specific needs of the women, ST, SC and other marginalized groups.
10. DAFE to develop mechanism for effective coordination and convergence with other department including Tribal Welfare Department and ITDA in schedule-V areas to address the need of tribal population.
11. Extended handholding support to be provided focusing more on building overall capacity of the tribal and vulnerable groups including women for taking equitable benefits of the program.
12. Enhancing women participation including in local institutions by promoting more women to take leadership role in watershed development and income generation activities including FPOs along with capacity development.
13. DAFE will further assess existing Grievance Redress Management (GRM) system and based on requirements, will further strengthen it potentially by adding additional module to the farmer's help desk for registering, screening and redressing and monitoring grievances.

While most of the recommendations are incorporated in the program operations manual, a higher-level action is recommended as part of the program action plan (PAP).

D. Environment and social management

13.7 The draft ESSA document is an output of a series of desk reviews, in house discussions, consultations with primary & secondary stakeholders and feedback from the World Bank team. The ESSA recommendations focus on clear mechanisms and institutional arrangements for implementation, management and reporting of E&S aspects, including mechanism for screening of E&S risks and preparation of ESMP at the DPR stage.

13.8 Institutional Arrangement: Suitable Officials at State, district and cluster level will be co-designated to manage E & S responsibilities;

- i. WMT (Social) and WMT (Technical) at block level
- ii. APD (Livelihood) & APD (NRM) at district level

iii. Asst. Director (Agriculture) and Asst. Director (Soil Conservation) at State level

In addition to above responsibilities, one Social Development Expert at State PMU and one social development expert in each District Project Management Unit will be placed to ensure implementation of ESSA recommendations in true spirit. While Social Development Experts at State PMU and district level will be out sourced from open market out of REWARD fund, salaries of other HR personnel to manage ESSA activities will be met from State Budget and administrative component of next generation watershed projects under PMKSY:WDC.

13.9 Adoption of ESSA Guidance in Program Implementation

Based on the gaps identified in the process of watershed program implementation, ESSA recommends certain actions in the REWARD program to strengthen the system and processes for enhanced environmental and social outcomes. The adaptation of ESSA guidance is detailed out in three different phases of watershed program implementation as presented below.

13.9.1 Preparatory Phase: Following the IWMP guideline, major objective of this phase is to build appropriate mechanisms for adoption of participatory approach and empowerment of local community (including marginalized community such as ST, SC, minority, women etc.) and institutions (such as Watershed Committee, SHG, and FIGs). During this phase, entry point activities aims to establish credibility and rapport building through awareness generation, formation of community-based organizations (CBOs), capacity building of CBOs, collection of baseline information including environmental and social baseline. With science-based watershed planning, land resource inventory is also done prior to this or in parallel for preparation of watershed plans/ DPRs.

13.9.1.1 Preparation of detailed guideline/ standard operating procedure (SOP) for Community Participation

Preparation of detailed guideline/ standard operating procedure (SOP) for community participation, social inclusion, building community ownership, and accountability mechanism in line with the new watershed development guideline for different phases of watershed planning and implementation. This will include a detailed process guideline for undertaking consultations with community including with ST, SC, women and other marginalized community during DPR preparation and before approving and/or passing the DPR in Gram Sabha/WA for further considerations.

13.9.1.2 Environment and Social Data: At planning stage while preparing the DPR, Environmental Data sheet to be included to collect environmental baseline data for safeguards to help in capture baseline for future assessment and comparison during mid-term and end term assessments. The Environmental data Sheet is Included in **Annexure -IV**.

13.9.2 Early screening at DPR stage : To make the informed decision making possible and to capture any E&S sensitivity or issue at watershed and its immediate environment, an E&S Screening Checklist has been prepared and included in **Annexure -V** and to be used during DPR preparation. This checklist will be used to identify environmental and social risks. WC under the supervision of PIA will undertake screening of potential environmental and social risks and issues for the activities being considered in the DPR using screening checklist as per **Annexure-V** as part of DPR preparation and based on that preparing ESMP/ mitigation measures using the ESSA guidance (**Annexure-VI**).

Most of the environmental screening can be duly applied and displayed using following layers captured through LRI data outputs at planning stage. Displaying of map and data on environmentally sensitive areas on LRI-DSS based outputs will be key on upfront screening and needs to be prepared and enclosed in the DPR.

(a). LRI system currently can display following layers with excel databases as LRI outputs for DPR preparation, which are already captured in the LRI database:

- i. Forest land,
- ii. Area impacted with salinity (ECE = >4.0) or sodicity (ESP = >25),
- iii. Waterlogged areas,
- iv. Physical and cultural resources like monuments, temples, religious or socially sacred areas
- v. Designated wetlands.

The whole upfront environmental screening aspect can be made tool based and self-sufficient using LRI tool if additional layer is included as mentioned above. The possibility is either through state data on RS and GIS (if available), or this aspect can be added in remote sensing agency's terms of reference.

(b). In addition, one dataset will be added in TOR for remote sensing agency in addition to existing LRI data sets i.e. District wise Designated Wetlands.

During consultation, which will take place at Watershed Development Committee/GP level for DPR finalization, data on Ground/ Surface water contamination can be captured at micro-watershed level. The same data can also be obtained from Benchmark sites and model Micro-watersheds to be used during the project.

13.9.2.1 Guidance to ESMP: The watershed development activities generate significant positive externalities which have a bearing on all expected environmental outputs, achieved especially on conserving hydrological services like enhancing soil moisture, ground water storage, maintaining ecological/ downstream flow, controlling silt movement, protecting

intervention structures for designed life, etc. It has been revealed that watershed development activities generate significant positive impacts in the environment and the treatment activities help in conservation and enhancement of water resources. It is reported that water level in the wells increases leading to expansion in irrigated area in the watershed and also reduces the risk of crop failures due to climatic extremities. Construction of watershed structures also reduces run-off, thus increasing the soil moisture retention capacity. A healthy watershed provides habitat for wildlife and plants due to water and soil conservation. The floral diversity and density of a treated area is found to be much improved. Also, due to change in cropping pattern, development of water bodies, increase in water availability and varied biodiversity, the faunal population of the area increases.

Most of the watershed intervention activities would have very limited, reversible and small-scale adverse impacts which were designed to be mitigated under REWARD Programme by LRI-DSS supported advisories issued to farmers for crop selection including nutrition management, fertilizer use and water conservation efforts. The activities those were identified and its risk and mitigation is given in **Annexure-VI**.

13.9.2.2 Convergence of ongoing schemes: Appropriate platforms at Block level (Block Technology Team of ATMA), district level (District Project Monitoring Committee under the Chairmanship of District Collector) and state level (State Level Nodal Agency under the chairmanship of the Agriculture Production Commissioner) will discuss and sort out issues relating to effective coordination and convergence with other departments including Tribal Welfare Department and ITDA in schedule-V areas to address the need of tribal population, women and other vulnerable groups.

13.9.2.3 Trainings & Capacity Building:

For harnessing potential benefits and addressing the E&S risk by all the implementing partners, awareness creation and capacity building would be necessary. The capacity building activities may be taken up by Centre of Excellence as planned under REWARD. It can be also addressed in detailed E&S training manual, which will include key training modules such as Management of Environmentally sensitive areas, Team Building & Leadership development, Gender & Inclusiveness, environmental and social risk screening, ESMP preparation and risk management activities, Institution Building, Drudgery reduction and Integrated Pest/Nutrient management. The project will provide additional support to enhance existing capacities of these institutions to deliver trainings on environmental and social safeguards, participatory approaches and inclusion.

Training Aspects	Intended Audience	Trainers & Training partnerships
☐ E&S Benefits ☐ E&S Screening ☐ E&S Risk ☐ E & S Management ☐ M&E Indicators & Reporting for E&S	☐ Key officials of the project including implementing agencies – SLNA, District Level and PIU ☐ NGOs and members of community institutions	Master Trainers would provide by the Key Technical Resource Agencies/ Partners as discussed in previous section.

The key agencies involved for training and the training responsibility will be as below.

Agency	Key training responsibility
OUAT/ NBSS&LUP	Co-ordinate with SLNA in organizing stakeholder workshops and Training project staff, project partners, NGOs and other project States on LRI including the E&S aspects of LRI
OUAT/ NBSS&LUP	Provide training to district, PIA level project officials and NGOs on E&S safeguard management (as per E&S manual)
PIA	• To create effective awareness and sensitization on E&S aspects of the programs at the village level including role of various watershed institutions at the village level and PRIs on E&S safeguards. • Mobilizing community and conduct participatory rural appraisal exercises • Help support PIA in implementation of E&S activities at the watershed/ village level.

13.9.2.4 Negative List of Activities: The REWARD Program will not finance any activities that would cause high or substantial environmental and social risks and impacts, and the exclusion list is as follows:

1. Any activities that would impact any physical cultural resources like religious structures, etc.
2. Any work that would covert or encroach forest land, notified wetland or any eco-sensitive area
3. Any work that would bring large scale submergence beyond drainage line
4. Any work that would convert common property resources including grazing land
5. Any work that would restrict minimum ecological flow of the rivers and rivulets
6. Any land acquisition and/or involuntary resettlement
7. Use of child labor
8. Any activity that would use most toxic pesticides classified as 'Class I' (based on toxicity of the active ingredient) by the World Health Organization; and

9. Any work that would use or generate hazardous material or chemicals beyond permissible levels specified in Schedule II of Hazardous Waste Handling and Management Rules, 2016

13.9.3 Watershed Works Phase

Watershed work phase is the core of the program in which the approved DPR is implemented. E&S related activities in this phase will include:

1. Crop Advisories will include advisories on adverse impact of overuse of insecticides and chemical fertilizers as per the Pesticide & fertilizer management plan that is to be prepared by the Government.
2. Special Strategy will be instituted focusing on specific needs of the women, ST, SC and other marginalized groups including extended hand holding support by NGOs to ensure their participation in the program and access to equitable benefits.
3. Focus will also be on systemic engagement of women with targeted leadership and technical training for women leaders on effective watershed management practices and as decision-makers.
4. Promoting women participation in local institutions including promoting more women to take leadership role in watershed committee and other local institutions and income generation activities including FPO/Cs along with capacity development.
5. Existing Grievance Redress Management (GRM) system will be further reviewed and strengthened for registering, screening and redressing, monitoring grievances, and periodic reporting on the same.
6. Strengthening concurrent monitoring system by integrating E&S aspects into MIS system.

13.9.4 Consolidation and Withdrawal Phase: This phase focuses on sustainable management of (developed) natural resources and up-scaling of successful experiences regarding farm production systems/ off-farm livelihoods, and further strengthened sustainable livelihoods through FPO/Cs and raise productivity levels. E&S related activities in this phase will include:

1. M&E system will be strengthened with E&S aspects including in mid-term and end term evaluations and as presented in the M&E section at Para 13.11.
2. Establishing a scientific assessment and evaluation system, including a rigorous impact evaluation that encompasses the application of remote sensing and GIS technologies; process monitoring, and thematic studies for assessing change in specific parameters

(such as ground water level, sediment load, soil organic carbon, livelihood changes, and women empowerment) to evaluate effectiveness of watershed investments.

3. Adopting a system of valuation of ecosystem services like water budgeting and their contribution to watershed development scoping will be explored and also landscape approach for integrating planned convergence of other programs (including with DAFE, F&E and CC and PR&DW) to conserve soil moisture to improve outcomes on water yield, ground water and sediments in long run for environmental sustainability.
4. LRI-DSS offers huge opportunity to achieve larger scale goals of protecting and conserving hydrologic services and/or managing negative downstream and groundwater impacts if data on infiltration and run-off is given as input data in hydrological models used for DPR preparation and issuing advisories to farmers. Hydrological data on ground water storage, silt movement, surface water flow is collected periodically in the model watersheds and benchmark sites.
5. LRI data in select sample model MWS sites would be selected for hydrological investigation (including setting up instruments, collecting data, validating models, etc.) such that they represent the whole set. The same database can be effectively used during mid-term and end-term monitoring and evaluations to capture larger scale goals of protecting and conserving hydrologic services and/or managing negative downstream and ground water impacts which otherwise remains unaddressed. Thus, it will add value to project through an additional benefit by capturing environmental sustainability scientifically through LRI.

13.9.5 ESSA Budget: There will not be any exclusive budget allocation for implementing ESSA recommendations. The expenditures in respect of this will be integrated with respective budget heads such as DPR preparation (for screening), Capacity Building (for training and development of SOP, Guidelines etc), Agro advisories (for crop management advisories) and Land Resource Inventory (display of environmentally sensitive areas in LRI outputs) etc.

Though the ESSA activities will be part of the larger activities and embedded in the sectoral budget, below are the indicative budget as part of the sectoral budget for ESSA implementation.

Sl no.	Activity cluster	Main Budget Head (as per cost table)	Budget (INR in Lakhs)
1	E&S Training and Capacity Building	Training and Workshops	220
2	E&S screening; E&S Management in watershed activities	Planning; Implementation Budget	40

3	Promoting Gender and Social Inclusion related activities	Planning; Implementation Budget	50
4	E&S screening and Management in FPO and Value Chain activities	Livelihood Interventions	10
5	Meeting PAP Actions – (1) Preparation of SoP for Community Participation; (2) Capturing gender and social disaggregated data in baseline, MIS/ M&E system;	Planning	40
6	Strengthening GRM, Monitoring and reporting system	Monitoring	10
Total			370 Lahks

E. Grievance redressal mechanism

13.10 The current grievance redress mechanism in Odisha has multiple ways to register grievances and get redressal. This includes:

- Using Right to Information (RTI) Act to get information and resolution of grievances as mandated under the Act.
- Communities and individuals who believe that they are adversely affected by a watershed project take support of existing project-level grievance redress mechanisms. They submit complaints to the President of the Watershed Association, who ensures that the WC promptly reviews complaints in order to address project-related concerns. In case of the non-compliance of the complains at WA level, they submit their complaints to the Project Implementing Agency at cluster level, the Project Director, Watersheds at district level or the Director, Soil Conservation & Watershed Development at state level. Besides, grievance petitions are also received online through e-Abhijog portal (Odisha State Grievance Redressal Portal). It facilitates online availability of the grievance redressal mechanism to citizens thereby providing the facility to lodge their grievances at any time.
- The existing GRM system will be further strengthened after proper review to ensure systematic reporting and tracking of grievances received at PIA. Block and district level as the current systems being a manual system and it lacks consolidation and tracking of grievances received and resolved in specified period at the SLNA level.

F. Monitoring and Evaluation

13.11 Environmental and Social safeguards aspects will be integrated in the MIS and M&E system for concurrent monitoring and reporting. This will capture the information on benefits shared with socially disadvantaged groups including SC, ST, women and landless. Further, it will also capture key environmental and hydrological data from model micro-watersheds and benchmark sites for comparison and reporting.

Key indicators for mid-term and end term evaluation is presented below which may be further considered and re-worked during implementation phase. Similarly, the PRA based identification and quantification of watershed population in terms of different socio-economic and wealth ranking categories and skill sets will work as baseline for future assessments and impacts.

Key Areas of impact	Monitoring Indicator	Periodicity	Responsibility
Environmental Safeguard			
E&S Screening and management	1. DPRs with completed screening and ESMP 2. MWS with Satisfactory implementation of ESMP	Annual	PIA/ District team
Groundwater table is expected to rise with watershed activity.	Change in depth of water table during pre-monsoon and post-monsoon	Half Yearly (Month of May and Month of October)	PIA/ District team
With improvement of soil moisture, the downstream discharge i.e. flow in surface water bodies is expected to increase	Increase in flow in nearest stream/river/ Nala	Half Yearly (Month of May and Month of October)	PIA/ District team
With watershed conservation efforts, duration or months of water availability in the ponds/lakes/reservoirs should increase	Duration of water available on nearest ponds/lakes/ reservoirs	Half Yearly (Month of May and Month of October)	PIA/ District team
With treatment, there should be increase in vegetation cover.	NDVI Analysis	Annual	PIA/ District team (be taken from LRI Data either from State or from Technical Partner)
With bunding, trenching and other watershed	Silt Monitoring in nearest silt monitoring station	Annual after monsoon	PIA/ District team (To be taken from

Key Areas of impact	Monitoring Indicator	Periodicity	Responsibility
treatments, erosion is supposedly to be reduced			LRI Data either from State or from Technical Partner)
There might be risk of increase in salinity with over irrigation of land or over withdrawal of ground water	Ground water quality analysis with special Reference to sodium, potassium, cation-exchange capacity	Annual	PIA/ District team
Due to land treatment there will be improvement on the organic content of soil	Soil Analysis with special reference to organic content, organic carbon, NPK content.	Annual	PIA/ District team
There would risk of downstream surface water and ground water pollution due to overuse of pesticide and fertiliser with high value crop selection with increase in water availability	Ground water quality analysis with special reference to sodium, potassium, cation-exchange capacity, PAH, PCB	Annual	PIA/ District team
With availability of water there should be positive impact on bio-diversity. New species of trees, shrubs, medicinal plants, birds, animals may add to existing baseline.	Any new species of trees, shrubs, medicinal plants, birds, animals in the vicinity	Bio-diversity Survey Annual	PIA/ District team
There could be risk that intervention gets into nearest forest or common property areas.	If people have moved into nearest forest/ common property area or they have started cultivating near to/ inside forest land	Annual	PIA/ District team
Social Safeguard			
Community Participation and Empowerment	1. DPRs/ Watershed plans following community participation and conducted PRA exercises. 2. DPRs/Watershed Plans with community endorsement of DPRs	Annual	PIA/ District team

Key Areas of impact	Monitoring Indicator	Periodicity	Responsibility
There is increase in income from farm and non-farm activities adding to overall socio-economic and wealth status	Change in household income	Mid-term/ End-term	SLNA through independent survey
Increased involvement of women, landless and other marginalised groups - during watershed plan preparation	No. of women, landless, marginal farmers, SC, ST population participated in (a) PRA exercise; (b) DPR consultation process	During the DPR preparation phase - Annual	PIA/ District team
Increased involvement of women, landless and other marginalised groups - during implementation.	No. of women, landless, marginal farmers, SC, ST population participating in (a) Watershed Committee (b) Benefited through value chain initiatives including FPOs (d) Received credits/ linked for credits with other agencies/ schemes for entrepreneurial activities e. Participation in general body meetings of Watershed Association f. Access to Agroadvisory services g. Participation in Capacity Building events	Annual	PIA/ District team
Leadership role of women	Managing leadership role in Watershed Association, Watershed Committee and FPOs.	Annual	PIA
Grievances Resolved	1. Grievances received 2. Grievances resolved 3. Grievances pending and escalated to next level for resolution	Annual	PIA/ District team/ SLNA

The annual reporting shall include:

1. % Model DPRs or Watershed Plans for which ESMPs prepared;
2. % Model Watersheds implementing ESMP satisfactorily
3. % of Model Watersheds demonstrated positive change in ground water table with increase in NDVI
4. % of Model Watersheds that have increase in water flow in rivers/nalas downstream and increase in availability of water in ponds and reservoirs
5. % of Model Watersheds displayed reduction in soil erosion
6. % of Model Watersheds reported improvement or indicated pollution in downstream surface and ground water
7. % of Model Watersheds reported positive impact on bio-diversity in a way new species of trees, shrubs, medicinal plants, birds, animals found in the watershed
8. % Model DPRs/Watershed Plans with community endorsement of DPRs.
9. % WCs and FPOs provided training on ESMP, Community Participation and social inclusion
10. % of women led WC and women led FPO Boards;
11. % share of women among (i) direct REWARD beneficiaries; (ii) Watershed Committee members; (iii) FPO Board of Directors and FPO members
12. % share of landless/assetless, SC and ST households in (i) Direct REWARD beneficiaries; (ii) Watershed Committee members; (ii) Members of User Groups/ FIGs; (iii) Producer Groups/ FPO/Cs; and (iv) FPO/FPC Board of Directors; and (v) FPO/FPC shareholders
13. % of Grievances Resolved (Total Grievances Resolved / Total Grievances Received related to REWARD supported intervention.)
14. % MWS with positive change in depth of water table during pre-monsoon and post-monsoon
15. % MWS with Increase in flow in nearest stream/river/ Nala
16. % MWS with increased water availability in ponds/ lakes/ reservoirs/ dug wells

14. Program Action Plan (PAP)

The Technical Assessment, Environmental and Social System Assessment (ESSA) and Fiduciary System Assessment have identified Program Action Plans (PAP) which are the Key action points to strengthen the existing systems and procedures and minimises risks. Some of the action points are not covered under DLI. Hence, State needs to provide utmost importance in achieving PAPs in addition to the DLIs. The Program action points are listed below:

Action Description	Source	DLI#	Responsibility	Timing		Completion Measurement
For Karnataka, and Odisha, PFMS integration with IWMP/MIS portal will be completed for reporting of financial progress	Fiduciary Systems		DoLR	Other	Within 18 months after the Effective Date of the IBRD Loan Agreement	Bank review confirms completeness, reliability and timeliness of Program financial reports.
Use of PFMS/IWMP systems mandated; and all program expenditures, including PMKSY [new phase, when it starts] entered in PFMS/IWMP systems	Fiduciary Systems		SWDs of Karnataka and Orissa	Other	Within 6 months after the Effective Date of the IBRD Loan Agreement	Bank review confirms completeness, reliability and timeliness of Program financial reports.
Preparation of community procurement guidance manual (with provisions for annual social audit & provision for application of Bank's Anti-Corruption Guidelines), which ensures economy and efficiency; and its distribution to WCs.	Fiduciary Systems		SWDs of Karnataka, and Odisha	Other	Within 6 months after the Effective Date of the IBRD Loan Agreement	Review of the manual by Bank to assess whether it effectively ensures economy and efficiency.
Planning, monitoring and disclosure of all procurements of value above INR 500,000- Preparation of procurement plans; Reporting on KPIs; Public Disclosure of procurement plans and key information on contract award	Fiduciary Systems		DoLR, SWDs of Karnataka, and Odisha	Other	Within 2 months after the Effective Date of the IBRD Loan and on six monthly basis thereafter	After end of each six-month period- KPIs Reporting within 15 days; and Contract Award Disclosure within 30 days. Before commencement of next six-month period- Procurement Plan Publication before 15 days.
Establishment of aprocurement-related complaint handling mechanism, with an interface to accept complaint; detailed provisions on complaint resolution including appeal mechanism; and disclosure of complaint related statistics.	Fiduciary Systems		DoLR, SWDs of Karnataka, and Odisha	Other	Within 6 months after the Effective Date of the IBRD Loan Agreement	Establishment of webpage to receive complaints. Issuance & operationalization of guidelines on complaint resolution, process of decision making, and disclosure of complaint

						related statistics.
Standard Operating Procedure to be prepared and adopted by participating states detailing mechanisms for community participation, social inclusion and building community ownership of watershed plans based on science-based data inputs.	Environmental and Social Systems		SWDs of Karnataka, and Odisha	Other	Within 12 months after the Effective Date of the IBRD Loan Agreement	Process guideline prepared for participation/ community consultation covering women, tribal, and other marginalized groups during WS plan preparation and before Gram Sabha approval; and guidance/GO issued for adopting the same.
Adoption/ strengthening of capturing gender-disaggregated data for watershed planning and reporting towards enhancing women participation in local institutions.	Environmental and Social Systems		SWDs of Karnataka, and Odisha	Other	Within 24 months after the Effective Date of the IBRD Loan Agreement	Gender disaggregated data collection at watershed level and state-level reporting on a) representation in WCs, b) investments in common assets and c) women-led WCs.
Existing grievance redress mechanism (GRM) to be strengthened and streamlined for registering, screening and redressing, monitoring and reporting by each participating state.	Environmental and Social Systems		SWDs of Karnataka, and Odisha	Other	Within 12 months after the Effective Date of the IBRD Loan Agreement	Strengthened grievance redress mechanism (GRM) developed and implemented by participating states and periodic reports being generated.

Terms of Reference

Providing comprehensive hydrologic assessment and monitoring for science-based watershed planning and management

Background

The Department of Land Resources, Government of India has initiated a World Bank supported multi-State project namely *Rejuvenating Watershed for Agricultural Resilience through Innovative Development* (REWARD). REWARD is currently being implemented in Karnataka, and Odisha. It is proposed as a 6 years Project. It is expected to positively influence by promoting resource efficient growth in selected watersheds, investing in human capital at State and National levels, and developing networks of scientific and technical partners. The project will enhance productivity and net income of farmers and contribute significantly by implementing new science and data-driven approaches for climate resilient watershed management, land resource inventory, land use planning, and precision farming in a range of agro-ecological conditions in participating states. The project will directly address key strategic actions around agricultural and rural development, including doubling farmers' incomes, more crop per drop, water to every plot, soil health, and promotion of entrepreneurship through technical and financial support for better delivery and impacts through improved planning approaches, capacity building, coordination and convergence, and supportive research and development. The outcomes are prevention of soil run-off, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area

The REWARD project would be state-driven and a flexible approach to be adopted in participating states to select watersheds for developing improved data bases and watershed plans, as well as 10 – 20 Green field sites to establish model watersheds on saturation approach. The total allocation for the Project is approximately USD250 million of which USD178.5 million is International Bank for Reconstruction and Development (IBRD) loan from the World Bank and the balance is funded by the Government of India/ State Governments. Odisha is likely to get a credit of USD 70 million, based on a 70/30 World Bank-Gol/State cost sharing. The REWARD project will be designed following programme for results (PforR) framework and the fund release will be based on result indicators. The DoLR would also be an implementing partner through its own financing agreement with the Bank to implement a stand-alone national-level component. Technical guidance and support to other states would come through a Lighthouse approach with Sujala-III project from the Karnataka Watershed Development Department and its existing network technical partners.

Project Objectives

The Project Development Objective (PDO) is to improve land and water conservation and climate resilience in selected watersheds, and strengthen capacities of national and state institutions to deliver more effective science-based watershed development programs.

Key Results

PDO Element	Potential PDO Indicator(s)
Improved Land conservation outcomes in demonstration sites	Percentage of targeted watershed area showing an increase in Normalized Difference Vegetation Index(NDVI) correcting for climate effects
Improved agricultural outcomes in demonstration sites	Incremental change in agriculture/horticulture productivity and income for selected crops
Improved water outcomes in demonstration sites	Percentage of targeted landscape area showing an increased in Land Surface Water Index(LSWI) correcting for climate effects
Improved climate resiliency outcomes in demonstration sites	Changes in resilience index composed of a set of variables covering exposure, sensitivity to climate events and adaptive capacity
Strengthened capacities of watershed development institutions	Functional networks of scientific partner in project states

Revised policies for watershed programmes	Revised national Watershed Guidelines informed by project experience and lessons learned that will guide new national watershed programmes
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The activities under the REWARD Program are mapped for five key Results Areas.

Result Area 1: Strengthening institutional capacity for watershed development

- Enhancing human resources capacity at district and block levels – both skill sets and numbers
- Strengthening agriculture extension systems
- Enhancing systems and capacity of community institutions for effective governance
- Establishing a centre of excellence on science-based watershed management

Result Area 2: Building an enabling policy framework

- Development of guidelines for integrated science-based planning and resource deployment by state line departments in watershed areas
- Adoption of O&M policy guidelines to strengthen governance and sustainability of watersheds
- Creation of a multi-stakeholder platform for policy advocacy for management of rainfed areas and watersheds
- Piloting of policy innovation on the linking of fertilizer subsidy to soil health status

Result Area 3: Improving science based watershed management

- Partnerships between SWDs and technical and scientific institutions
- Creation of the digital library and portal with Land Resources Inventory (LRI) data, hydrology data and Decision Support Systems (DSS) for watersheds covering soil and water conservation planning, crop planning, land capability grouping, nutrient management, run-off, farm pond and check dam planning, crop water requirements, soil moisture and water balance, water budgeting among others.
- Planning and implementation of watershed development interventions in select sub-watersheds in a saturation mode
- Provision of weather-based agro-advisories for farmers

Result Area 4: Protecting and enhancing livelihoods in watershed areas

- Implementation of value chain development interventions through promotion of FPOs and PPPs in select watersheds
- Livelihood enhancement support for land-poor and land-less households

Result Area 5: Enhancing monitoring, evaluation, learning and knowledge sharing

- Strengthening the MIS on watershed management
- Developing a scientific assessment and impact evaluation system

Organizing national and international peer learning events on watershed management

1. **This assignment is related to providing comprehensive hydrologic assessment and monitoring for science-based watershed planning and management in selected areas in Odisha.**

Objective of the Assignment

2. REWARD seeks to create decision support systems (DSS) based on site-specific land resource information for planning, implementation and management of watersheds, agriculture, horticulture and other department programs in the state. Key interventions include soil and water conservation, water harvesting, ground water recharging, crop selection, nutrient management, etc. The DSSs are expected to work at various spatial scales such as cadastral, land management unit, micro watershed, sub watershed and watershed.
3. Detailed, site-specific data at the cadastral level on land resources (both physical and chemical properties) will be collected as a part of activities under REWARD. Hydrological data on similar scale is needed to be used along side land resources information to develop DSS for watershed planning and management.
4. Currently available hydrologic models are suitable mainly at the sub basin or catchment level and are of not much use in designing interventions at the micro or sub watershed level. Access to high resolution

remote sensing, IoT sensors and AI/ML for modelling now offer the opportunity to rapidly adapt and refine the existing models or develop new ones to address issues at the micro/sub watershed scales.

5. The objective of this assignment is to:

- Identify and apply appropriate methods/models/protocols for comprehensively assessing hydrological endowments for various spatial and temporal scales and agro-climatic conditions,
- Validate its accuracy and ease of use,
- Demonstrate its use in selected geographies for comprehensive hydrological assessments
- Demonstrate use of hydrological data collected in design of watershed treatment and management through use of DSSs
- Train end-users (including govt., departments and farming community).

Scope and Approach of Hydrology in REWARD

- Figure 1 provides an illustration of the framework for hydrology in REWARD. Annex 1 gives the details.
- REWARD being a PforR (Program for Results) project, payments are made by the World Bank to borrowers only on achieving agreed results. Therefore, technical partners are expected to respond to this ToR keeping in mind the need to achieve results in a time bound manner.
- A total of 705 MWS (micro watershed) covering an area of 5,26,694 Ha is expected to be covered under REWARD in Odisha over a period of 6 years starting from April 2021-22. Of this 152 MWS (Set 1) covering 1,15,383 Ha would receive investments for watershed treatment that is based on science (LRI, Hydrology, etc.). In the remaining 4,11,311 Ha (Set 2), all scientific investigations needed for watershed treatment and management would be collected, ported to the digital library such that draft DPRs (Detailed Project Reports) could be generated from the digital portal using relevant DSSs. The table below shows the timing of inputs needed for the two sets of MWS:

Table-Set1: District Wise Proposed Clusters of Micro Watersheds for Green Field Sites (Pilot)

Sl.No	Name of District	Name of Block	Number of Micro Watersheds	Geographic Area (Hectares)
1	SAMBALPUR	BAMRA	9	7210.84
		KUCHINDA	9	7670.87
		JAMANKIRA	9	7139.76
		RAIROKHOL	11	7611.42
		RENGALI	10	7186.03
		NAKTIDEUL	11	7234.92
		SUB TOTAL	59	44053.84
2	DHENKANAL	KANKADAHADA	13	6836.85
		HINDOL	10	6470.85
		SUB TOTAL	23	13307.7
3	NAYAGADA	ODAGAON	7	5847.79
		DASPALLA	10	7029.3
		SUB TOTAL	17	12877.09
4	DEOGARH	BARKOTE	8	6111.94
		REAMAL	8	6626.91
		SUB TOTAL	16	12738.85
5	KORAPUT	BORIGUMA	8	6680.54
		JAYPORE	6	6798.38
		KORAPUT	9	6439.21
		LAMTAPUT	8	6884.66
		BOIPARIGUDA	6	5603.22
		SUB TOTAL	37	32406.01
TOTAL			152	115383.49

Table-Set2: District Wise Proposed Clusters of Micro Watersheds for additional Land Resource Inventory

Sl.No	Name of District	Name of Block	Number of Micro Watersheds	Geographic Area (Hectares)
1	SAMBALPUR	KUCHINDA	29	19516.87
		RAIROKHOL	67	49621.06
		JUJUMURA	25	22604.38
		SUB TOTAL	121	91742.31
2	DHENKANAL	KANKADAHADA	37	21912.4
		HINDOL	30	19653.08
		SUB TOTAL	67	41565.48
3	NAYAGADA	RANAPUR	18	11147.5
		ODAGAON	9	5431.42
		DASPALLA	28	19656.98
		SUB TOTAL	55	36235.9
4	DEOGARH	BARKOTE	28	19276.54
		REAMAL	38	27873.12
		SUB TOTAL	66	47149.66
5	KORAPUT	BORIGUMA	19	14401.85
		JAEPORE	24	18572.94
		BOIPARIGUDA	17	15137.83
		SUB TOTAL	60	48112.62
6	NABARANGPUR	RAIGHAR	29	30151.82
		UMARKOTE	10	8884.49
		SUB TOTAL	39	39036.31
7	SUNDERGARH	LEFRIPADA	46	35490.86
		SUNDERGARH	28	22194.25
		BALISANKARA	30	24191.41
		BARGAON	18	11634.85
		KUANARMUNDA	23	13958.21
		SUB TOTAL	145	107469.58
TOTAL			553	411311.86

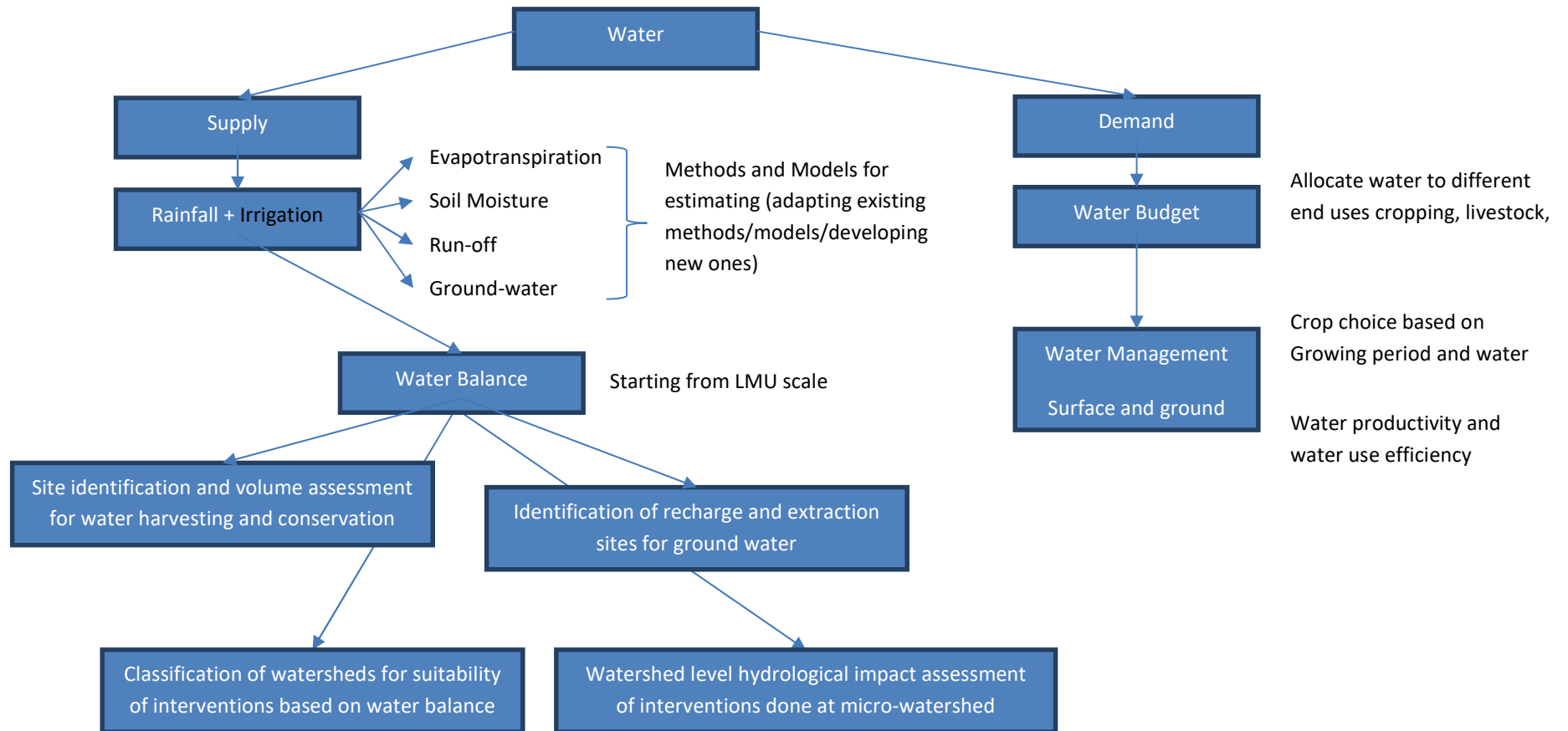
9. For each set of MWS (Set 1 and 2), a few model MWS sites would be selected for hydrological investigation (including setting up instruments, collecting data, validating models, etc.) such that they represent the whole set. The criteria, inter alia, could be based on geographic formations, dominant soil types, major crops and agro-climate of the area.
10. In Set 1 area, once the watershed treatment has been carried out, benchmark sites¹ would be selected (mainly based on LMU) where hydrological monitoring would continue till end of project.
11. Comprehensive set of data at the cadastral level (1:8000) on land, its use, shape, soil type, crops grown, etc., classified and grouped into Land Management Units will be available from LRI survey that will be carried out in Set 1 & 2 area under REWARD.

¹About 25% of the MWS in Set 1 are expected to be selected for post-treatment monitoring and in each a maximum of 3 sites are expected to be selected as benchmarked sites.

12. A consortium of technical partners comprising Agricultural Universities would work together under the leadership of a national institute to carry out the assignment in the entire area. Each partner, including the lead partner would be allotted a defined set of MWS to work in the field. The lead partner, in addition, to carrying out the work in their allotted MWS is expected to provide, guidance, handholding support, training and supervision to other partners.
13. For interfacing with the community, especially for demand side management pilots (ground water management and water advisories), REWARD will partner with the Groundwater department and/or hire capable NGOs. Technical partners for hydrology are expected to provide technical backstopping in the form of providing data, advisories, training, technical training materials, etc.
14. The IIT, Bhubaneswar/OUAT/ IIWM/ IISWC, Sunabeda has been identified as a lead technical partner for hydrology in REWARD for Odisha and is invited to respond to this ToR with a detailed proposal covering technical aspects², financial support needed, manpower proposed, timeline for various tasks and a list of deliverables.

²This should cover the technical approach for Set 1 and Set 2 MWS. It should provide details of what methods/models are proposed for use for each component of the water balance and why, base data needed, instruments and equipment needed for calibration, validation, etc.

Hydrological assessment will cover the following issues and is divided into Supply-side and Demand-side issues as shown in figure below:



Outlines of the tasks to be carried out

The lead agency is expected to work in close coordination with other hydrology partners (SAU) and the Watershed Department in delivering the tasks listed below but would be primarily responsible for the timeliness and quality of outputs.

The Specific tasks will include (but not limited to)

Sl. No.	Task
Manual, protocols, methods, models, etc.	
1	Provide protocols/guidelines needed for the selection and establishment of model watersheds sites (Set 1 & Set 2 MWS) for hydrological investigations in the REWARD program districts
2	Provide operation manual for the establishment, maintenance, and data collection from model watersheds and in bench mark sites by LRI/hydrology partners
3	Provide a manual that details step by step: • Methods/models for estimation of various components of water balance (ET, Soil moisture - surface & soil profile, Run-off at field scale, deep percolation/groundwater recharge) • Instruments/probes/sensors needed to collect in situ/ground truth data with respect to above components of water balance • Remote sensing products needed for hydrological assessment and procedures for using the same
4	Provide guidelines/methodology to be followed by project LRI partners for carrying out well inventory, selection of observations wells and frequency of data collection for monitoring ground water level, recharge, discharge and ground water quality at the watershed level
5	Provide methodology and guidelines required for • Estimation of water balance and water budget at the watershed level • Estimation of ground water draft at the watershed level • Deciding the location of water harvesting and recharge structures at the watershed level • Monitoring of benchmark sites in Set 1 area, including instrumentation, frequency of data collection, interpretation of data, etc.
6	Provide methodology and guidelines for validation of technical design of watershed treatment plans and measurement of technical outcomes through monitoring model watershed and benchmark sites.
7	Provide protocols, guidelines, data requirements/indicators and methodology to be followed for characterizing the watersheds into surplus or deficit based on the water balance or for grading them into different categories based on the status of ground water exploitation
8	Provide a framework/template needed for integration of LRI, Hydrology and other datasets, generation of thematic maps and preparation of LRI+Hydrology Reports and Atlas at the watershed level
9	Prepare a Manual/Field Guide on Hydrology to guide the project partners in data collection, interpretation, generation of reports/atlas, integration of hydrological outputs in DPR preparation, monitoring and other activities as per the objectives of REWARD Program
Trainings and Workshops	
10	Train project technical partners (hydrology and LRI) in carrying out hydrological assessment as detailed in the above mentioned manuals/protocols/methods
11	Train Watershed Department staff, NGOs, other departments, community, etc., in using outputs from hydrological assessment
12	Co-ordinating with WDD in organizing stakeholder workshops for orientation of the project partners, project staff, line departments, NGOs and others
13	Facilitate the WDD and other line departments to prepare their Detailed project report (DPR) for watershed interventions and their field validation
14	Participate in the stakeholder workshops organised by WDD in project districts for validating the watershed treatment plans (DPR) and incorporate the outcomes into the DPR
Field work	
15	Establish minimum of two model watersheds in the REWARD program districts with all necessary

	instruments/equipment for hydrological data collection for training project technical partners
16	Carryout hydrological assessment in allotted areas under Set 1 & Set 2 and produce agreed outputs (see section below) within given timeframes
17	Monitor hydrological data in allotted model watersheds and bench mark sites till the end of the project.
18	Migration of all data collected to Digital portal developed/maintained by WDD
19	Periodic review and setting priorities related to field work, correlation and data interpretation, data integration, generation of thematic layers and authentication
20	Assess water productivity and water use efficiency for selected crops in watershed area.
21	Undertake refinement and validation of the hydrology models developed under SUJALA III project (wherever applicable) based on the feedback and develop necessary guidelines, flow charts and sequence of activities to be followed for use/adoption in the watershed areas under REWARD Program
Advisory services	
22	Provide technical backstopping support to the pilot on participatory ground water management (to be executed in the field by Ground Water Department??). This will include support in design of the pilot, instrumentation needed, methods/models to be used, generation and validation of data and user-friendly tools for communities for decision making, etc.
23	Provide water advisories (soil moisture and irrigation) and hydrological outlook (season-wise) for use in the pilot on agro-advisories services.
24	To provide data and other inputs needed for the establishment of Management Information System (MIS) for the watershed programs of WDD and their periodic updating
25	Provide inputs and expertise needed for the development of any new models/decision support systems/Mobile applications planned based on the need assessment carried out under REWARD program in association with other project partners
26	Provide inputs needed to develop new Develop Decision Support System (DSS) in collaboration with WDD and project partners
27	Refine/modify the criteria, guidelines, flowcharts related to the hydrology related DSS already developed and to provide necessary support to validate the DSS developed based on the feedback from the users
Supervision & Quality Assurance	
28	Supervise periodically (at least once a quarter for each partner) in both field and lab hydrology work being carried out by partner institutions and provide report to WDD on quality of work being done.
29	Guide the SAUs and other agencies on hydrology related studies and review the data generated and its utility

Deliverables

Sl no	Deliverables	Scale	IISc Role
1	Models for estimating water fractions (ET, Soil Moisture, Run Off, Groundwater) leading to Water Balance	LMU (Soil unit consisting of a few land parcels) to Watershed (50,000 Ha) scale	OUAT will lead in selecting suitable methods/models and guide partners in validating the same
2	DSS for siting of water harvesting and conservation structures including estimation of volume	LMU/ Micro (500 Ha.) watershed. Impact to be taken into account at watershed scale.	IISWC will guide partners and Agencies
3	Models/DSS for estimation of groundwater recharge and draft	Micro/Sub watershed scale	IIT will guide and vet ground water recharge and draft models

4	DSS for siting of groundwater recharge structures and estimation of sustainable extraction	LMU to Micro watershed	IISWC & IIT will guide
5	Community level tool for estimation of rainfall-linked sustainable extraction of ground water	Micro/ sub (5000 Ha) watershed	IIT will guide
6	DSS for rapid characterisation of watersheds based on water balance for taking up interventions	Micro watershed to watershed level	IISWC will lead in establishing the protocols and guide partners in validating the same
7	DSS for Water Budget that is linked to rainfall for use by community	Micro/ sub watershed	IIWM will lead in establishing the protocols and guide partners in validating the same
8	DSS for crop selection based on LRI, Water Budget and Growing Period	Micro/ sub watershed	IIWM will lead in establishing the protocols and guide partners in validating the same
9	DSS for providing water advisories to farmers for increasing Water Productivity	LMU to micro watershed	IIWM will lead in establishing the protocols and guide partners in validating the same
10	Detailed documentation of protocols for each model/DSS. Protocols to cover how model was developed/adapted, calibration and validation procedures, limitations, etc.		OUAT will guide partners and Collaborating Agencies
11	Generation of Hydrology Report and Atlas	Micro and Sub watershed level	OUAT will lead the LRI partners and Agencies collaborating with LRI Partners
12	Development of training material and training to Watershed Department and other govt. department staff, communities for use of the models/DSS/tools developed	How many people/communities to be trained and how many times	IIT, IIWM, OUAT & IISWC

Financial Support

The required budget will be provided as per the program activities planned and executed by the Institute. The budget support will be towards the (1) Cost of Equipment and Goods (2) Cost of Manpower and (3) Operational costs (4) Institutional charges and any other contingency expenses likely to be incurred during the program period.

Schedule for completion of tasks

S No	Task	Time Schedule
Manual, protocols, methods, models, etc.		
1	Provide protocols/guidelines needed for the selection and establishment of model watersheds and benchmark sites in association with LRI Partners (Set 1 & Set 2 MWS)	Within 3 months of signing the contract
2	Provide operation manual for installing required instruments/equipment, maintenance, and data collection from model watersheds and benchmark sites	Within 3 months of signing the contract
3	Provide a manual that details step by step: Methods/models for estimation of various components of water balance (ET, Soil moisture -surface & soil profile, Run-off at field scale, deep percolation/groundwater recharge)	Within 4 months of signing the contract

	- Instruments/probes/sensors needed to collect in situ/ground truth data with respect to above components of water balance - Remote sensing products needed for hydrological assessment and procedures for using the same	
4	Provide protocols, guidelines, data requirements/indicators and methodology to be followed for characterizing the watersheds into surplus or deficit based on the water balance or for grading them into different categories based on the status of ground water exploitation	Within 6 months of signing the contract
5	Provide a framework/template needed for preparation of Hydrology Reports and Atlas at the watershed level	Within 6 months of signing the contract
6	Prepare a Manual/Field Guide on Hydrology	Within 4 months of signing the contract
Trainings and Workshops		
7	Train project technical partners (hydrology and LRI) in carrying out hydrological assessment	Within 4 months of signing the contract
8	Train Watershed Department staff, NGOs, other departments, community, etc., in using outputs from hydrological assessment	As and when needed
9	Co-ordinating with WDD in organizing stakeholder workshops for orientation of the project partners, project staff, line departments, NGOs and others	Within 3 months of signing the contract
10	Facilitate the WDD and other line departments to prepare their DPR for watershed interventions and their field validation	As and when needed
11	Participate in the stakeholder workshops organised by WDD in project districts for validating the watershed treatment plans (DPR) and incorporate the outcomes into the DPR	As and when needed
Field work		
12	Establishment of two model watersheds in the REWARD program districts with all necessary instruments/equipment for hydrological data collection for training project technical partners	Within 9 months of signing the contract
13	Hydrological assessment report in model watersheds allotted- baseline and periodic reports	
14	Facilitate the LRI partners on Hydrological assessment of the watersheds to be surveyed (under Set 1 & Set 2 and produce agreed outputs (see section below) within given timeframes	Throughout the project period
15	Monitor hydrological data in allotted model watersheds and benchmark sites till the end of the project.	Throughout the project period
16	Migration of all data collected to Digital portal developed/maintained by WDD	Throughout the project period
17	Periodic review and setting priorities related to field work, correlation and data interpretation, data integration, generation of thematic layers and authentication	Throughout the project period
18	Undertake refinement and validation of the hydrology models developed under SUJALA III project (wherever applicable) based on the feedback and develop necessary guidelines, flow charts and sequence of activities to be followed for use/adoption in the watershed areas under REWARD Program	Within 2 years of the Program
Advisory services		
19	Provide technical backstopping support to the pilot on participatory ground water management.	Throughout the project period
20	Provide water advisories (soil moisture and irrigation) and hydrological outlook (season-wise) for use in the pilot on agro-advisories services.	Throughout the project period
21	To provide data and other inputs needed for the establishment of Management Information System (MIS) for the watershed programs of	Throughout the project period

	WDD and their periodic updating	
22	Provide inputs and expertise needed for the development of any new models/decision support systems/Mobile applications planned based on the need assessment carried out under REWARD program in association with other project partners	Throughout the project period
23	Provide inputs needed to develop new DSS in collaboration with WDD and project partners	Throughout the project period
24	Refine/modify the criteria, guidelines, flowcharts related to the hydrology DSS already developed and to provide necessary support to validate the DSS developed based on the feedback from the users	Within 2 years of the Program
Supervision & Quality Assurance		
25	Supervise periodically in both field and lab hydrology work being carried out by partner institutions and provide report to WDD on quality of work being done.	Once in 6 months
26	Guide the SAUs/SHU and other agencies on hydrology related studies and review the data generated and its utility	Throughout the project period

Services and facilities to be provided by the watershed development department

The DSC&WD will support IIT/ OUAT/ IIWM/ IISWC by assisting in the following activities -

- It will provide a framework and guidelines to facilitate effective implementation of the REWARD Program.
- It will provide Financial support as needed and agreed as per the program needs
- It will enable conducive working environment for collaboration between various stakeholders involving Line Departments and Project Partners of the Project and also involve in State level workshops
- It will undertake periodic review of Project Progress and consultation processes with various groups of Stakeholders and Project Partners for mid-course corrections and as and when the need arises

8.0 Composition of review & coordination committee

A Review & Co-ordination Committee consisting of members from the DSC&WD Department of Horticulture/Agriculture including representatives from NBSS&LUP, SAUs and M&E agency will be formed to monitor project progress and undertake mid-term review and to suggest modifications and refinements if any as and when required.

9.0 List of key personnel

List of key persons from IIT/ OUAT/IIWM/ IISWC with their field of specialization and years of experience to be provided as indicated below. In case required expertise is not available in the institute then how the planned work will be managed needs to be elaborated.

Sl No	Name and Designation	Field of Specialization and years of experience
1	Lead Scientist	Ph.D in Civil Engineering/Hydrology/Soil and Water Conservation or related fields with at least 10 years of experience in Hydrology/Hydrogeology/Surface and Ground Water hydrology/Water Management etc.
2	Hydrologist	MSc/MTech/PhD in Agri Engineering / Hydrology/Water Management and related fields with 10 years experience, preferably in NRM/Watershed/Hydrology related activities
3	Remote Sensing and GIS specialist	MSc/MTech/PhD in RS and GIS with minimum 5 years experience, preferably in NRM/Watershed/Hydrology related activities

4	Soil Scientist/Agronomist/Agro-meteorologist	PhD in Soil Science, Agronomy, Soil and water Conservation, Water Management and related fields with 10 years experience, preferably in NRM/Watershed/Hydrology related activities
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10.0 Terms (Period of MOU)

The services of the institute are for the WDC-REWARD Program duration of about six years from 2020-21 to 2025-26. However, the service period could be extended on mutual consent as per the progress and need of the program.

Annex 1: Framework for Hydrology in REWARD

Supply Side- Key Tasks

Water Balance: Methods/Models for estimation

15. Water received as rainfall in a watershed gets converted into 4 fractions namely, Evapotranspiration, Soil Moisture, Run Off and Groundwater. Methods and models for estimating these fractions starting at the LMU/micro watershed scale and going upto watershed scale are needed for preparing the Water Balance in a given area.
16. REWARD would encourage the use of existing methods and models or where required existing models could be adapted, calibrated and validated for use at the indicated scales. New models may be developed and used after suitable validation only where no models exist or are not suitable for use at the scale required or are not at the desired resolution.
17. Models adapted or developed must be easy to use, extendable to use in new areas with minimal requirement of calibration.
18. Using outputs from these models, tools for estimating water balance from LMU to watershed scale needs to be prepared.

Water Harvesting and Conservation Structures: Siting and volume estimation

19. In conjunction with land resources data, models/tools for deciding location of water harvesting and conservation structures and the volume of water expected at those sites are to be developed.
20. These models must consider existing structures, their actual storage, overflow, expected, run off from independent catchments for proposed structures, etc.
21. In designing siting and volume of these structures, upstream and downstream externalities up to watershed scale should be accounted for and built into the model.

Groundwater Recharge and Extraction: Siting of structures, sustainable extraction volume estimation

22. Based on hydro-geological studies, models/tools for different LMUs are to be developed for siting ground water recharge and extraction structures. Parameters such as infiltration, permeability, hydraulic conductivity, water holding capacity, field capacity, PWP etc., need to be characterised for different LMUs and used in the model.
23. Methods/models to be identified for estimating the amount of recharge at the micro watershed/SWS levels; and if need be to recalibrate/refine/develop new ones
24. A simple community/farmer level groundwater tool needs to be developed to estimate recharge based on rainfall received and quantum of extraction that is sustainable at the micro/sub watershed level.

Characterisation of Watersheds for Suitability of Intervention Based on Water Balance

25. Develop rapid assessment tools to characterise watersheds into surplus, adequate and deficit categories based on water balance. The tools should characterise at the micro watershed level but take into account hydrologic issues at least upto the watershed scale.
26. Micro/sub watersheds characterised as Surplus and Adequate would benefit from both supply and demand side interventions, while Deficit ones would need only demand side interventions.

Demand Side – Key Tasks

Water Budget: Model for matching water balance to water needs

27. Develop a model for assessing water needs of various sectors such as crops, livestock, drinking water, etc., at micro watershed scale and match with water balance.
28. The model should allow communities to allocate water to various sectors based on rainfall-linked water balance that is assessed every season.

Surface and Ground Water Management: Crop selection, water productivity, water use efficiency

29. Develop a model for use by communities for selection of crops/varieties based on **growing period** and **water budget**. This model is expected to apply a water lens to crop suitability classification that is based on LRI data.
30. Once crops/varieties are selected, models to assess/predict crop response to water (rainfall + irrigation) in different agroclimatic conditions and LMUs are needed to find ways to increase **Water Productivity** and **Water Use Efficiency** in watersheds.
31. Based on these models provide advisories to farmers on crop selection and water management to maximise water productivity.
32. Develop protocols/guidelines needed for participatory ground water management at village/watershed level.

Annex 2: LRI Outputs

S.No.	Land Resource Inventory outputs
1	MWS/Village wise cadastral maps
2	MWS/Village wise imagery (Cartosat/QB imagery/Worldview)
3	Current land use map
4	Site maps-slope, erosion, texture., drainage, salinity etc
5	Soil maps-soil depth, texture, gravels etc.
6	Profile location map
7	Grid map for surface soil sample collection
8	Soil nutrient maps-All macro and micronutrient maps
9	Well inventory map (Open and bore wells)
10	Existing conservation and water harvesting structure map
11	Soil moisture map
12	Ground water status map-different intervals
13	Land Capability map
14	Crop suitability maps for cereals, oilseeds, pulses, etc
15	Suitability maps for horticultural crops
16	Suitability maps for Sericulture
17	Suitability maps for forest tree species
18	Suitability maps for forage crops
19	Suitability maps for commercial or any other crops generated as per the need of the area
20	Nutrient management plan maps
21	Soil and water conservation plan maps
22	Drainage line treatment/WHS plans
23	Location map for recharge structures
1	Weather and climatic data - rainfall, RH, Temp., Wind, PET etc
2	Hydrological data-ET, runoff, infiltration, soil moisture, recharge, draft, availability, water quality etc
3	Socio-economic data and reports
4	LRI Report (including hydrology) and Atlas at MES and SWS levels
5	Report on Soil Series
6	Benchmark soils report
7	LRI Cards
8	Package of Practices (POP) recommended for the crops
9	Updated Digital Library at the LRI institute level
10	Updated DSS on ▪ Soil and water conservation ▪ Crop planning ▪ Nutrient management ▪ Land capability classification ▪ Runoff ▪ Farm Ponds/Check dams ▪ Crop water requirement ▪ Soil Moisture/Water balance ▪ Water Budgeting

11	New DSS developed
12	Agro-advisories developed
13	Models/Patents etc developed
14	Draft and validated DPR

Note: The above listed deliverables are only indicative, may vary from partner to partner and from area to area as per the local needs

Terms of Reference

Providing improved programme integration through Land Resources Inventorisation in rain fed areas for science-based watershed planning and management

Background :

The Department of Land Resources, Government of India has initiated a World Bank supported multi-State project namely *Rejuvenating Watershed for Agricultural Resilience through Innovative Development* (REWARD). REWARD is currently being implemented in Karnataka, and Odisha. It is proposed as a 6 years Project. It is expected to positively influence by promoting resource efficient growth in selected watersheds, investing in human capital at State and National levels, and developing networks of scientific and technical partners. The project will enhance productivity and net income of farmers and contribute significantly by implementing new science and data-driven approaches for climate resilient watershed management, land resource inventory, land use planning, and precision farming in a range of agro-ecological conditions in participating states. The project will directly address key strategic actions around agricultural and rural development, including doubling farmers' incomes, more crop per drop, water to every plot, soil health, and promotion of entrepreneurship through technical and financial support for better delivery and impacts through improved planning approaches, capacity building, coordination and convergence, and supportive research and development. The outcomes are prevention of soil run-off, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area.

The REWARD project would be state-driven and a flexible approach to be adopted in participating states to select watersheds for developing improved data bases and watershed plans, as well as 10 – 20 Green field sites to establish model watersheds on saturation approach. The total allocation for the Project is approximately USD250 million of which USD178.5 million is International Bank for Reconstruction and Development (IBRD) loan from the World Bank and the balance is funded by the Government of India/ State Governments. Odisha is likely to get a credit of USD 70 million, based on a 70/30 World Bank-Gol/State cost sharing. The REWARD project will be designed following programme for results (PforR) framework and the fund release will be based on result indicators. The DoLR would also be an implementing partner through its own financing agreement with the Bank to implement a stand-alone national-level component. Technical guidance and support to other states would come through a Lighthouse approach with Sujala-III project from the Karnataka Watershed Development Department and its existing network technical partners.

Project Development Objectives (PDO) & Results Area

The Project Development Objective (PDO) is to improve land and water conservation and climate resilience in selected watersheds, and strengthen capacities of national and state institutions to deliver more effective science-based watershed development programs.

Key Results

PDO Element	Potential PDO Indicator(s)
Improved Land conservation outcomes in demonstration sites	Percentage of targeted watershed area showing an increase in Normalized Difference Vegetation Index(NDVI) correcting for climate effects
Improved agricultural outcomes in demonstration sites	Incremental change in agriculture/horticulture productivity and income for selected crops
Improved water outcomes in demonstration sites	Percentage of targeted landscape area showing an increased in Land Surface Water Index(LSWI) correcting for climate effects
Improved climate resiliency outcomes in demonstration sites	Changes in resilience index composed of a set of variables covering exposure, sensitivity to climate events and adaptive

	capacity
Strengthened capacities of watershed development institutions	Functional networks of scientific partner in project states
Revised policies for watershed programmes	Revised national Watershed Guidelines informed by project experience and lessons learned that will guide new national watershed programmes

The activities under the REWARD Program are mapped for five key Results Areas.

Result Area 1: Strengthening institutional capacity for watershed development

- Enhancing human resources capacity at district and block levels – both skill sets and numbers
- Strengthening agriculture extension systems
- Enhancing systems and capacity of community institutions for effective governance
- Establishing a centre of excellence on science-based watershed management

Result Area 2: Building an enabling policy framework

- Development of guidelines for integrated science-based planning and resource deployment by state line departments in watershed areas
- Adoption of O&M policy guidelines to strengthen governance and sustainability of watersheds
- Creation of a multi-stakeholder platform for policy advocacy for management of rainfed areas and watersheds
- Piloting of policy innovation on the linking of fertilizer subsidy to soil health status

Result Area 3: Improving science based watershed management

- Partnerships between SWDs and technical and scientific institutions
- Creation of the digital library and portal with Land Resources Inventory (LRI) data, hydrology data and Decision Support Systems (DSS) for watersheds covering soil and water conservation planning, crop planning, land capability grouping, nutrient management, run-off, farm pond and check dam planning, crop water requirements, soil moisture and water balance, water budgeting among others.
- Planning and implementation of watershed development interventions in select sub-watersheds in a saturation mode
- Provision of weather-based agro-advisories for farmers

Result Area 4: Protecting and enhancing livelihoods in watershed areas

- Implementation of value chain development interventions through promotion of FPOs and PPPs in select watersheds
- Livelihood enhancement support for land-poor and land-less households

Result Area 5: Enhancing monitoring, evaluation, learning and knowledge sharing

- Strengthening the MIS on watershed management
- Developing a scientific assessment and impact evaluation system
- Organizing national and international peer learning events on watershed management

Objective of the Assignment

The objective of the assignment is to support for improved program integration in rainfed areas which is central to the realization of Project Development Objective (PDO). The State Agriculture University along with National Bureau of

Soil Survey and Land use Planning (NBSS&LUP), Kolkata will be the key partners for characterisation of natural resource base in watershed area and establishment of Land Resource Inventory (LRI) at parcel level, setting up of base line through collection of data, support in establishment of digital library, formulation watershed master plan/detailed project report, hydrological assessment in selected watersheds for base line as well as concurrent monitoring and ex-ante evaluation of watershed projects and support in development of an watershed management portal and mobile app which will link the farmers with crop, weather and climate related advisories which shall make the farming climate smart and the farmers more climate resilient.

Geographical Coverage:

A total of 705 MWS (micro watershed) covering an area of 5,26,694 Ha is expected to be covered under REWARD in Odisha over a period of 6 years starting from April 2021-22. Of this 152 MWS (Set 1) covering 1,15,383 Ha would receive investments for watershed treatment that is based on science (LRI, Hydrology, etc.). In the remaining 4,11,311 Ha (Set 2), all scientific investigations needed for watershed treatment and management would be collected, ported to the digital library such that draft DPRs (Detailed Project Reports) could be generated from the digital portal using relevant DSSs. The table below shows the timing of inputs needed for the two sets of MWS. The list is given at table(set-1) and table(set-2) in ToR for Hydrology section above.

Scope of the assignment

The State Agriculture University and NBSSLUP will work in collaboration with DSCWD, Agriculture & FE department, Odisha, scientific and technical partners. The Scope of the assignment include (but not limited to) the following.

- i. Participate in stakeholder workshops & community interfacing
- ii. Undertake field surveys (Soil, Hydrology, Land use, Socio economic) and collection of baseline data for all the project micro watersheds in the project districts
- iii. Sub-watershed level Assessment in association with NBSSLUP for all the micro-watersheds in the project districts
- iv. Establish GIS Lab and Strengthen analytical Lab facilities at OUAT/Regional Centres/Colleges
- v. Hydro-geomorphological Survey with technical guidance from the lead Hydrology partner for all the micro-watersheds in the project districts
- vi. Hydrological Assessment for basic parameters with technical guidance from the lead Hydrology partner for the micro-watersheds in the project districts
- vii. Intensive Hydrological Monitoring for groundwater management with technical guidance from the Lead Hydrology partner for selected two micro-watersheds.
- viii. Climatic data analysis in association with IMD/OSDMA/ Agro-meteorology research centre
- ix. Laboratory analysis of soil & water samples for all the micro-watersheds in the project districts
- x. Data processing & Data authentication through social processing, in association with NBSS&LUP and the hydrology Lead Partner for all the micro-watersheds in the project districts
- xi. Generation of GIS based Thematic layers for all the micro-watersheds in with the support from ORSAC
- xii. Provide inputs for Establishment of Digital library for all the selected micro-watersheds.
- xiii. Provide inputs for Decision Support System (DSS)
- xiv. Prepare Participatory Micro-watershed Master Plan and develop treatment plans integrating with other Programmes for all the micro-watersheds and validate.
- xv. Landscape based Thematic Studies to identify best practices for Technology Transfer and Upscaling the identified Best Management Practices
- xvi. Provide inputs for Project Website & MIS
- xvii. Capacity Building, Farmers Field Schools including development of Training Modules & Training Delivery

Approach & Methodology:

- Collection of base maps (imageries, cadastral maps, etc.) along with MWS boundaries from ORSAC.
- Delineation of landforms and land use land covers on base map with expertise from ORSAC and NBSS&LUP.
- Harmonizing available legacy data using available soil resource map (SRM) of the selected area (1: 50,000 scale).
- Visual interpretation and ground truth verification of base maps.
- Identification and delineation of current land use land covers and landforms.
- Soil profiles will be investigated in both by transect survey in selected transects across all the landforms as well as by free survey techniques by intensive traversing of lands using cadastral maps.
- Random soil samples will also be collected from each landform for delineation of phases as mapping units.
- Soil map will be finalized by field level correlation of soils followed by routine soil analysis and interpretation of soil data.
- Soil and soil based thematic maps will be prepared on phases of soil series as mapping units in GIS platform.
- Lands will be evaluated for land capability, fertility capability classification and soil site suitability for crops and on phases of series.
- Collection and interpretation of socio-economic data from individual farm household (including size of the farm family, land holdings, crop performances, food consumption, yield gaps, net returns, etc.) through standard questionnaires.
- Generation of soil digital geo-data base and organizing soil and soil related data base of various thematic layers with village level socio-economic data sets to generate an effective Land Resource Information System as a Decision Support System (DSS).

Further, OUAT /NBSSLUP, Kolkata have to elaborate approach and methodology while submitting the proposal as per the requirement of the assignments along timelines for achieving key milestones and expected outputs/deliverables.

Outputs/Deliverables

S No.	Land Resource Inventory outputs
Maps-Base, Soil, Site, Thematic and other map outputs:	
1	MWS/Village wise cadastral maps
2	MWS/Village wise imagery (Cartosat/QB imagery/Worldview)
3	Current land use map-this will be generated during the course of LRI
4	Site maps-slope, erosion, texture., drainage, salinity etc
5	Soil maps-soil depth, texture, gravels etc.
6	Profile location map
7	Grid map used for surface soil sample collection
8	Soil nutrient status maps-OC, macro and micronutrients
9	Well inventory map (Open and bore wells)
10	Existing conservation and water harvesting structure map
11	Soil moisture map
12	Ground water status map-different intervals
13	Land Capability map
14	Land Irrigability map
15	Problem and Potential areas map
16	All the thematic maps will be prepared in collaboration with OUAT crop suitability maps for cereals, oilseeds, pulses, etc
17	Suitability maps for horticultural crops
18	Suitability maps for Sericulture
19	Suitability maps for forest tree species
20	Suitability maps for forage crops
21	Suitability maps for commercial/ other crops as per need of the area
22	Nutrient management plan (including Spatial variability and all thematic maps)
23	Soil and water conservation plan maps
24	Drainage line treatment/WHS plans
25	Location map for recharge structures
Data, Reports, Atlas etc	
1	Weather and climatic data - rainfall, RH, Temp., Wind, PET etc
2	Hydrological data-ET, runoff, infiltration, soil moisture, recharge, draft, availability, water quality etc
3	Socio-economic data and reports
4	LRI Report & Atlas at MES & SWS levels
5	Report on Soil Series
6	Benchmark Soils Report
7	LRI Cards
8	Package of Practices (POP) recommended for the crops
9	Digital Library at the institute level
10	Decision Support System
11	Agro-advisories developed
12	Models/Patents etc developed
13	Draft and validated DPR

Duration of the Assignment:

The services of the institute(s) are for the WDC-REWARD Program duration of about six years from 2021-22. However, the service period could be extended on mutual consent as per the progress and need of the program

Manpower Requirement and Qualification:

List of key personnel

List of key persons from NBSSLUP & OUAT with their field of specialization and years of experience to be provided as indicated below. In case required expertise is not available in the institute then how the planned work will be managed needs to be elaborated.

Sl No	Position	Qualification and Experience	Area of Specialisation (Work to be done)
1	Principal Investigator	PhD. (Agricultural Chemistry & Soil Science) with 15 years of experiences	Rapport building, imparting training, interaction meets, periodic monitoring of field work, overall monitoring & coordination, DPR preparation, developing DSS for LRI component.
2	NRM Specialist	PhD. (Agril. Chem. & Soil Sci.)/ Soil and Water Conservation with 10 years of experiences	Scientific inputs, value addition to LRI, facilitating knowledge based DSS development, fine tuning of DPR, improving scope and prospects of the project.
3	Land Resource Inventory (LRI) Specialist	PhD. (Agril. Chem. & Soil Sci.) with 10 years of experiences	Imparting training on contract persons, state level nodal agencies on soil survey, laboratory methods, etc., guidance in field work for soil profile examination, soil correlation, benchmark soils identification, soil data interpretation, finalization of soil series with phases, preparation of DPR.
4	GIS&RS Specialist	MSc/MTech/PhD in RS and GIS with minimum 5 years experience, preferably in Soil Sciences/ NRM/ Watershed/ Hydrology related activities	Acquiring base maps from respective SLNA/ stake-holders, image interpretation, value addition/ refinement of base maps (if required), soil and thematic and interpretative map preparation.
5	Soil and Water conservation Specialist	PhD. (Agril. Chem. & Soil Sci.)/ Soil and Water Conservation with 10 years of experiences	Developing Soil and Water conservationat micro-watershed level/ sub watershed level based on the need of the local situation.
6	Lab. Analysis (Team Lead)	PhD. (Agril. Chem. & Soil Sci.) with 10 years of experiences	Analysis and interpretation of soil data, interpretative grouping of soils, taxonomic classification (USDA), finalization of soil series with phases.
7	Land Evaluation & Land Use Plan (Team Lead)	PhD. (Agril. Chem. & Soil Sci.) with 10 years of experiences	Land capability, land irrigability, soil site suitability for crops, plants,etc., alternate land use options for agricultural and allied disciplines at MWS/ SWS level.

The organization have to submit detailed man power requirements as per assignments and the project area assigned to them.

Financial Support:

The required budget will be provided as per the program activities planned and executed by the Institute. The budget support will be towards the (1) Cost of Equipment and Goods (2) Cost of Manpower and (3) Operational costs (4) Institutional charges and any other contingency expenses likely to be incurred during the program period.

Support from the REWARD Project

The **DSC&WD** will support **ICAR-NBSS&LUP, Regional Centre, Kolkata** and **OUAT** by assisting in the following activities:

- It will share all the program documents, guidelines/specifications for procurement of equipment/instruments needed, and facilitate the effective implementation of REWARD-Program at all levels.
- It will provide Financial support as per the program needs.
- It will liaison with District JDAs, ZPs, PRIs, NGOs and communities for effective implementation of LRI base line data collection and for effective programme convergence.
- It will enable conducive working environment for collaboration between various stakeholders involving Line Departments and Project Partners and involve in State level workshops.
- It will undertake periodic review of Project Progress and consultation processes with various groups of Stakeholders and Project Partners for mid-course corrections and as and when the need arises.

Terms of Reference

Providing Information Technology, Remote Sensing & GIS solutions for science-based watershed planning and management

● Background of the project

The Department of Land Resources, Government of India has initiated a World Bank supported multi-State project namely *Rejuvenating Watershed for Agricultural Resilience through Innovative Development* (REWARD). REWARD is currently being implemented in Karnataka, and Odisha. It is proposed as a 6 years Project. It is expected to positively influence by promoting resource efficient growth in selected watersheds, investing in human capital at State and National levels, and developing networks of scientific and technical partners. The project will enhance productivity and net income of farmers and contribute significantly by implementing new science and data-driven approaches for climate resilient watershed management, land resource inventory, land use planning, and precision farming in a range of agro-ecological conditions in participating states. The project will directly address key strategic actions around agricultural and rural development, including doubling farmers' incomes, more crop per drop, water to every plot, soil health, and promotion of entrepreneurship through technical and financial support for better delivery and impacts through improved planning approaches, capacity building, coordination and convergence, and supportive research and development. The outcomes are prevention of soil run-off, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area

The REWARD project would be state-driven and a flexible approach to be adopted in participating states to select watersheds for developing improved data bases and watershed plans, as well as 10 – 20 Green field sites to establish model watersheds on saturation approach. The total allocation for the Project is approximately USD250 million of which USD178.5 million is International Bank for Reconstruction and Development (IBRD) loan from the World Bank and the balance is funded by the Government of India/ State Governments. Odisha is likely to get a credit of USD 70 million, based on a 70/30 World Bank-Gol/State cost sharing. The REWARD project will be designed following programme for results (PforR) framework and the fund release will be based on result indicators. The DoLR would also be an implementing partner through its own financing agreement with the Bank to implement a stand-alone national-level component. Technical guidance and support to other states would come through a Lighthouse approach with Sujala-III project from the Karnataka Watershed Development Department and its existing network technical partners.

● Project Development Objectives (PDO) & Results Area

The Project Development Objective (PDO) is to improve land and water conservation and climate resilience in selected watersheds, and strengthen capacities of national and state institutions to deliver more effective science-based watershed development programs.

Key Results

PDO Element	Potential PDO Indicator(s)
Improved Land conservation outcomes in demonstration sites	Percentage of targeted watershed area showing an increase in Normalized Difference Vegetation Index (NDVI) correcting for climate effects
Improved agricultural outcomes in demonstration sites	Incremental change in agriculture/horticulture productivity and income for selected crops
Improved water outcomes in demonstration sites	Percentage of targeted landscape area showing an increased in Land Surface Water Index (LSWI) correcting for climate effects
Improved climate resiliency outcomes in demonstration sites	Changes in resilience index composed of a set of variables covering exposure, sensitivity to climate events and adaptive

	capacity
Strengthened capacities of watershed development institutions	Functional networks of scientific partner in project states
Revised policies for watershed programmes	Revised national Watershed Guidelines informed by project experience and lessons learned that will guide new national watershed programmes

The activities under the REWARD Program are mapped for five key Results Areas.

Result Area 1: Strengthening institutional capacity for watershed development

- Enhancing human resources capacity at district and block levels – both skill sets and numbers
- Strengthening agriculture extension systems
- Enhancing systems and capacity of community institutions for effective governance
- Establishing a centre of excellence on science-based watershed management

Result Area 2: Building an enabling policy framework

- Development of guidelines for integrated science-based planning and resource deployment by state line departments in watershed areas
- Adoption of O&M policy guidelines to strengthen governance and sustainability of watersheds
- Creation of a multi-stakeholder platform for policy advocacy for management of rainfed areas and watersheds
- Piloting of policy innovation on the linking of fertilizer subsidy to soil health status

Result Area 3: Improving science based watershed management

- Partnerships between SWDs and technical and scientific institutions
- Creation of the digital library and portal with Land Resources Inventory (LRI) data, hydrology data and Decision Support Systems (DSS) for watersheds covering soil and water conservation planning, crop planning, land capability grouping, nutrient management, run-off, farm pond and check dam planning, crop water requirements, soil moisture and water balance, water budgeting among others.
- Planning and implementation of watershed development interventions in select sub-watersheds in a saturation mode
- Provision of weather-based agro-advisories for farmers

Result Area 4: Protecting and enhancing livelihoods in watershed areas

- Implementation of value chain development interventions through promotion of FPOs and PPPs in select watersheds
- Livelihood enhancement support for land-poor and land-less households

Result Area 5: Enhancing monitoring, evaluation, learning and knowledge sharing

- Strengthening the MIS on watershed management
- Developing a scientific assessment and impact evaluation system
- Organizing national and international peer learning events on watershed management

Objective(s) of the Assignment

1. This assignment is related to providing comprehensive Information technology, remote sensing and GIS inputs and solutions for science-based watershed planning and management in selected areas in Odisha.

2. Provide RS&GIS inputs in terms of cadastral maps, base maps, satellite imageries, image processing, thematic maps etc. as per the requirement of project partners for conducting field studies on LRI, hydrology and development of DDS(s).
3. To establish a centralised **LRI data centre** to host the hardware, software and application infrastructure and Portal
4. To develop **LRI digital library** to store both primary and secondary spatial (GIS remote sensing data, scanned copies) and non-spatial data (all formats of MIS data) electronically
5. To develop **LRI portal** as a centralised system for comprehensively organising, storing, and retrieving all GIS and MIS data and integrate the same with other data sources and systems
6. To act as a single window access mechanism to meta data/spatial data sources in the state – a one stop platform for assessing spatial and non spatial content.
7. The whole IT system, comprising of Digital library, Portal, Decision support system, and **mobile applications**, is housed in the data centre and connected to project partners, project monitoring units and help desks through dedicated lines.

Scope of the Assignment

8. The success of watershed development, agriculture, horticulture, and allied programmes depends on the availability of site-specific land resource information and advisories on real time basis to the planners, farmers, and other stakeholders in the state. Towards this endeavour, as a part of REWARD Project, parcel level land resource information on soil-site characteristics, surface and ground water, land use, weather and climate, socio-economic conditions, etc., are planned to be generated through Land Resource Inventorisation followed by the establishment of state of art **IT system, comprising Digital Library, Portal, Decision Support System and Mobile applications** to provide site-specific land resources information and advisories to the planners, farmers, and other stakeholders which will be of great help in managing the land resources in a sustainable manner.
9. The first component, namely the **Land Resource Inventory (LRI)** will be executed by partnering with state and national level institutions and the information generated (in the form of datasets, maps, thematic outputs, Reports, atlas, expert systems, etc) will be migrated to establish the state of art IT system in the state. The proposed IT system, comprising Digital Library, LRI Portal, Decision Support System and Mobile Applications, will be housed in an identified institute having some expertise and facilities in remote sensing, GIS, database management etc in the respective states. **(The Institute proposed in Odisha is ORSAC-Odisha Space Application Centre)**
10. The **Digital Library** will be developed by pooling and integrating all the spatial and non-spatial land resource information available from different institutes and agencies in the state and the cadastral level LRI information generated by the LRI Partners from micro and sub watersheds from the identified project districts. The **LRI Portal** will be developed to provide, as a one stop solution, not only the spatial and non-spatial data requirements of the line departments, but importantly, the critical advisories and inputs needed to the farmers and other stakeholders at the grassroots level in selecting the best suitable crop, conservation practices, nutrient and crop water requirement, water budgeting etc. on a real time basis. Apart from this, the user can be able to select an area of interest to get the map or attribute data, generate the required base map or thematic maps, upload or download maps and data or print, generate report and Detailed Project Reports. It is also expected to provide weather forecast, agro-advisories, Agricultural produce market committee (APMC) market prices for the commodities, Dashboards for different users and any other relevant information.
11. The Development of **Decision Support System** is critical for the successful implementation of various schemes and for empowering farmers and other stakeholders. It will be based on the integration of data generated by LRI

partners and data from external services with criteria, models, and algorithms already available, or if need be to be developed as per the requirement. The nine Decision Support Systems developed under Sujala III project in Karnataka can be used as a template, which can be improved or modified wherever necessary, apart from developing additional ones to meet the needs of line departments and other users in the state.

12. The **Mobile application**, as part of the Portal development, is expected to provide almost all the functionalities of the Portal like information on weather, agro-advisories, soils, nutrient status, crops, package of practices, agro-climatic features, seeds, soil health, fertilisers, pest and diseases in crops and their remedial measures, commodity prices, various departmental schemes, suitability of crops, nutrient management, water balance, water budget, departmental applications, expert advisory etc. to the users.
13. The **IT based Technology Platform** to be established under REWARD project for science based site-specific interventions is expected to change the way planning and implementation of watershed and other land-based programmes in the states. This is already proved in the World bank supported Sujala III project in Karnataka. For example, due to the availability of site-specific LRI database on real time basis, the interventions have become more focussed, site specific and farmer oriented rather than remaining as a blanket or general type as was the case in earlier programmes, the watershed cycle is reduced to 3 to 4 years which used to take about 6 to 7 years earlier, real time convergence of various programmes and budgetary allocations to line department have become more realistic, and the time, capital and manpower use efficiency has increased significantly. The applications, tools and advisories to be developed and making them available through web and mobile applications under REWARD project will go a long way in empowering the planners, farmers, and other stakeholders to move from subsistence farming to sustainable and climate smart agriculture in the states concerned.
14. Provide Remote sensing products as per proposal from partners such as cadastral maps, satellite imageries, thematic maps, base maps of selected micro/sub watersheds etc.
15. Provide technical inputs in development of an integrated information management system (MIS)

- **Outputs/Deliverables**

- Geo referenced Seamless Cadastral Maps at Taluk/Block level for the State
- Geo referenced satellite imageries for the project areas
- Base Maps for all the Microwatersheds (Administrative Boundary, Drainage, Water Bodies and Transport Network)
- Land use / Land cover maps at the Microwatershed level
- Data standards as per ORSAC/ National GIS (NGIS) Norms
- UIDs initially at Cadastral level and later at Land parcel level with inputs from project partners
- DEM for all the micro watersheds
- Watershed Management Portal with a centralized **Land Resource Inventory (LRI), Digital Library, LRI Portal, Decision Support System(s) and mobile applications** as part of the Portal development in association with other Project Partners
- Webhosting of Watershed management portal and DSS
- Development of web-mobile interface (Mobile app) app for the watershed management portal/DSS and farmers advisories
- Training Modules & Manuals related to RS & GIS
- Capacity building and handholding support to partners and DSCWD staff

Duration of the Assignment:

The services of the institute(s) are for the WDC-REWARD Program duration of about six years from 2021-22. However, the service period could be extended on mutual consent as per the progress and need of the program

Approach & Methodology

ORSAC has to provide inputs, activities, requirement of tools, equipments, software, methodologies as per the requirement of the assignments along with a budget and timelines for achieving key milestones and expected outputs/deliverables.

Financial Support:

- The required budget will be provided as per the program activities planned and executed by the Institute. The budget support will be towards the (1) Cost of Equipment and Goods (2) Cost of Manpower and (3) Operational costs (4) Institutional charges and any other contingency expenses likely to be incurred during the program period
- **Support from the REWARD Project**

The **DSC&WD** will support **ORSAC** by assisting in the following activities:

- It will share all the program documents, guidelines/specifications for procurement of equipment/instruments needed, and facilitate the effective implementation of REWARD-Program at all levels.
- It will provide Financial support as per the program needs.
- It will enable conducive working environment for collaboration between various stakeholders involving Line Departments and Project Partners and involve in State level workshops.
- It will undertake periodic review of Project Progress and consultation processes with various groups of Stakeholders and Project Partners for mid-course corrections and as and when the need arises.

ANNEXURE- II: Capacity building plan and skill training identified for different stakeholders

A. Skill Trainings

Stakeholders	Skill/Trade	Trainer/Institution	Stakeholders	Skill/Trade	Trainer/Institution
SHG	Tailoring	NGO/Skill institutes	Unemployed youths	Mobile repairing	NGO/Skill institutes
SHG	Embroidery	NGO/Skill institutes	Unemployed youths	Cycle repairing	NGO/Skill institutes
SHG	Dry food products	NGO/Skill institutes	Unemployed youths	Motor cycle repairing	NGO/Skill institutes
SHG	Agarbati production	NGO/Skill institutes	Unemployed youths	Basic computer	NGO/Skill institutes
SHG	Food processing	NGO/Skill institutes	Unemployed youths	DTP	NGO/Skill institutes
SHG	Candle making	NGO/Skill institutes	Unemployed youths	Computer repairing	NGO/Skill institutes
SHG	Broom stick making	NGO/Skill institutes	Unemployed youths	Electrical repairing	NGO/Skill institutes
SHG	Mushroom cultivation	NGO/Skill institutes	Unemployed youths	Electronics repairing	NGO/Skill institutes
SHG	Pottery and terracotta	NGO/Skill institutes	Unemployed youths	Brick making	NGO/Skill institutes
SHG	Beauty parlor	NGO/Skill institutes	Unemployed youths	Carpentry	NGO/Skill institutes
SHG	Coir products	NGO/Skill institutes	Unemployed youths	Masonry work	NGO/Skill institutes
SHG	Bag knitting	NGO/Skill institutes	Unemployed youths	Plumbing and sanitary	NGO/Skill institutes
SHG	Weaving	NGO/Skill institutes	Unemployed youths	Electrical wiring	NGO/Skill institutes
SHG	Paper plate making	NGO/Skill institutes	Unemployed youths	Blacksmith	NGO/Skill institutes
SHG	Leaf plate making	NGO/Skill institutes	Unemployed youths	Photography	NGO/Skill institutes
SHG	Diary unit	NGO/Skill institutes	Unemployed youths	Tractor/ Power tiller	NGO/Skill institutes
SHG	Poultry unit	NGO/Skill institutes	Unemployed youths	Steel fabrication	NGO/Skill institutes
SHG	Bee keeping	NGO/Skill institutes	Unemployed youths	Photo/document	NGO/Skill institutes
SHG	Pisciculture	NGO/Skill institutes	Unemployed youths	Driving	NGO/Skill institutes
			Unemployed youths	Welding	NGO/Skill institutes
			Unemployed youths	Catering	NGO/Skill institutes
			Unemployed youths	Repair of Agriculture	NGO/Skill institutes

B. Capacity Building Plan under REWARD programme

Module	Training title	Participants	No. of participants	By Whom	Duration	Location	Cost (in Lakhs)	Month	Remarks
Watershed Managers and Master Trainers (State)									
1	Orientation on Watershed programme and REWARD	PD,APD,PIA,KVK scientists, SPMU, NGO	100	DSC&WD/Partner Institutes	One day	IMAGE	0.5	Apr-21	500*100
2	Land resource Inventory (LRI) & DSS	PD,APD,PIA,SPMU,KVK scientists	80	OUAT/NBSS&LUP	2 days	OUAT	0.8	Apr-21	1000*80
3	Use of GIS in LRI and Watershed planning	PD,APD,PIA,SPMU,KVK scientists	80	ORSAC	2 days	ORSAC	0.8	Apr-21	1000*80
4	DPR preparation, validation and Implementation	PD,APD,PIA,SPMU,KVK scientists	80	OUAT	2 days	OUAT	0.8	May-21	1000*80
5	Social mobilisation, CBO formation and functioning, roles and responsibilities, book keeping and accountancy	PD,APD,PIA,SPMU,NGO	60	NGO	2 day	IMAGE	0.6	May-21	1000*60
6	Environmental and Social Assessment	PD,APD,PIA,SPMU,NGO	60	NGO	One day	IMAGE	0.3	May-21	500*60
7	Technical trainings on in-situ soil and water conservation structures	PD,APD,PIA,SPMU,KVK scientists	80	IIWM	2 days	IIWM	0.8	Jun-21	1000*80
8	Technical training on water harvesting structures and Quality control	PD,APD,PIA,SPMU,KVK scientists	80	IIWM	2 days	IIWM	0.8	Jun-21	1000*80
9	Technical training on crop planning and crop management	PD,APD,PIA,SPMU,KVK scientists	80	OUAT	2 days	OUAT	0.8	Jun-21	1000*80
10	Training on Income Generating and Livelihood Activities	PD,APD,PIA,SPMU,KVK scientists	60	OUAT	2 days	OUAT	0.8	Jul-21	1000*80
11	FPO and Value chain	PD,APD,PIA,SPMU,KVK scientists	80	OUAT	2 days	OUAT	0.8	Jul-21	1000*80
13	Reporting, MIS & Documentation	PIA,SPMU,KVK scientists	50	OUAT	One day	OUAT	0.25	Aug-21	500*50
14	Project withdrawal strategy and post project	PD,APD,SPMU,PIA	40	DSC&WD/OUAT	One day	IMAGE	0.2	Aug-21	500*40

	management								
15	Refresher course	PIA,KVK scientist	50	OUAT		OUAT	0.5		1000*50
16	Induction Course in case of new engagement		50			IMAGE	0.5		
Watershed Managers at District level									
1	Orientation on Watershed programme and REWARD	WMT, Cluster PST, TE,SCEW, SCO	150	PD,Watersheds/ KVK	One day	District	0.45	May-21	300*150
2	Land resource Inventory (LRI) & DSS	WMT, Cluster PST, TE,SCEW, SCO	100	KVK	2 days	KVK	0.6	May-21	600*100
3	Use of GIS in LRI and Watershed planning	WMT, Cluster PST, TE,SCEW, SCO	100	KVK	2 days	KVK	0.6	Jun-21	600*100
4	DPR preparation, validation and Implementation	WMT, Cluster PST ,TE,SCEW, SCO	100	KVK	2 days	KVK	0.6	Jun-21	600*100
5	Training on Social mobilisation, CBO formation and functioning, roles and responsibilities, book keeping and accountancy	WMT, Cluster PST ,TE,SCEW, SCO	100	NGO	2 days	NGO	0.6	Jul-21	600*100
6	Environmental and Social Assessment	WMT, Cluster PST, TE,SCEW, SCO	100	NGO	2 days	NGO	0.6	Jul-21	600*100
7	Technical trainings on insitu soil and water conservation structures	WMT, Cluster PST, TE,SCEW, SCO	80	KVK	2 days	KVK	0.48	Aug-21	600*80
8	Technical training on water harvesting structures and Quality control	WMT, Cluster PST, TE,SCEW, SCO	80	KVK	2 days	KVK	0.48	Aug-21	600*80
9	Technical training on crop planning and crop management	WMT, Cluster PST, TE,SCEW, SCO	80	KVK	2 days	KVK	0.48	Sep-21	600*80
10	Training on Income Generating and Livelihood Activities	WMT, Cluster PST, TE,SCEW, SCO	80	KVK	2 days	KVK	0.48	Sep-21	600*80

11	FPO and Value chain	WMT, Cluster PST, TE,SCEW, SCO	100	KVK	2 days	KVK	0.6	Oct-21	600*100
12	Documentation of Success stories, Project Exit Strategy and post project maintainance	WMT, Cluster PST, TE,SCEW, SCO	100	PD,Watersheds/ KVK	2 days	District	0.6	Oct-21	600*100
13	Refresher course	WMT, Cluster PST, TE,SCEW, SCO	50	KVK		KVK	0.3		600*50
14	Induction Course in case of new engagement	WMT, Cluster PST, TE,SCEW, SCO	50	PD,Watersheds/ KVK		District	0.15		300*50

Module	Training title	Participants	No. of participants	By Whom	Duration	Location	Cost (in Lakhs)	Month	Remarks
Self Help Groups (SHGs)									
S-1	Orientation on Watershed programme and REWARD	SHG	500*20=10000	NGO	One day	Village	20	May-21	200*10000
S-2	Concept of SHG, Formation, Function, Roles & responsibilities, Accounting and book keeping	SHG	500*20=10000	NGO	One day	Village	20	Jul-21	200*10000
S-3	IGA, BDP and market linkage	SHG	300*20=6000	KVK	3 days	KVK	60	Aug-21	1000*6000
S-4	Project withdrawal strategy and post project management	SHG	500*20=10000	NGO	One day	Village	20	Nov-21	200*10000
S-5	Exposure visit to successful SHG federation	SHG	300*20=6000	NGO	3 days	Inside state	60	Sep-21	1000*6000
User Group (FIG/CIG)									
U-1	Orientation on Watershed programme and REWARD	UG	500*20=10000	NGO	One day	Village	20	Sep-21	200*10000

U-2	Formation and functioning of different groups and FPO	UG	500*20=10000	NGO	One day	Village	20	Oct-21	200*10000
U-3	Village level LRI training to farmers	UG	2000*20+1000*80=120000	KVK	One day	Village	240	Sep-21	200*120000
U-4	Preparation of DPR using LRI and DSS	UG	500*20=10000	KVK	2 days	KVK	60	Nov-21	600*10000
U-5	Crop planning and Crop management	UG	200*20=4000	KVK	3 days	KVK	40	Dec-21	1000*4000
U-6	Integrated Farming system	UG	200*20=4000	KVK	2 days	KVK	24	Jan-22	600*4000
U-7	Addressing environmental and social issues under REWARD	UG	500*20=10000	NGO	One day	Village	20	Dec-21	200*10000
U-8	Value chain development & FPO	UG	500*20=10000	NGO	One day	Village	20	Jan-22	200*10000
U-9	Project withdrawal strategy and post project management	UG	500*20=10000	NGO	One day	Village	20	Apr-22	200*10000
U-10	Exposure visits to successful FPO	UG	100*20=2000	NGO	3 days	Inside state	20	Oct-21	1000*2000
Watershed Committee (WC)									
W-1	Orientation on Watershed programme and REWARD	WC	100*20=2000	NGO	One day	Village	4	Feb-22	200*2000
W-2	Roles and responsibilities, guidelines and operational procedure	WC	100*20=2000	NGO	One day	Village	4	Mar-22	200*2000
W-3	Addressing environmental and social issues under REWARD (ESSA)	WC	100*20=2000	NGO	One day	Village	4	Apr-22	200*2000
W-4	Book Keeping, Accounting, Transparency, audit and reporting	WC	50*20=1000	NGO	One day	Village	2	Apr-22	200*1000

W-5	DPR preparation and Validation, Implementation and monitoring	WC	50*20=1000	KVK	2 days	KVK	6	Feb-22	600*1000
W-6	Project withdrawal strategy and post project management	WC	50*20=1000	NGO	One day	Village	2	Dec-22	200*1000
W-7	Exposure visits to successful Watershed project under IWMP	WC	50*20=1000	NGO	3 days	Inside state	10	Nov-21	1000*1000

W8	Land resource Inventory (LRI) & DSS	WC	50*20=1000	NGO	One day	Village	2	Dec-22	200*1000
Module	Training title	Participants	No. of participants	By Whom	Duration	Location	Cost (in Lakhs)	Month	Remarks
Farmers Producer Organisation (FPO)									
F-1	Fundamentals of FPO, Overview of	UG/FIG	20*20=400	NGO	2 days	District	2.4	May-22	600*400

	an FPO, Statutory Compliances	leaders							
F-2	Business planning for CEOs of FPO	CEO of FPO	1*20=20	NGO	2 days	District	0.12	Jun-22	600*20
F-3	Compliances of FPO, Roles and Responsibilities of BoD	FPO members	20*20=400	NGO	2 days	District	2.4	Jun-22	600*400
F-4	Accounts, book keeping for FPO and conflict management	CEO & Accounts asst.	2*20=40	NGO	One day	District	0.08	Jun-22	200*40

Annexure-III

DPR Template

Broad Outlines for Preparation of DPR
REWARD Watershed Projects

Prepared by
(Agency)

NB: The DPR templet will be standardised in consultation with technical partners.

Table of Content

Chapter	Content	Page
	Executive Summary	
1	Introduction and Background	
2	General Description of Project Area	
3	Baseline Survey	
4	Institution Building and Project Management	
5	Management/Action Plan	
6	Capacity Building Plan	
7	Phasing of Programme and Budgeting	
8	Consolidation Exit Strategy	
9	Expected Outcome	

Executive Summary

- *Brief about area*
- *Institutional arrangements*
- *Salient Project activities*
- *Physical target and financial outlays*
- *Treatment area and details*
- *Fact sheet about bench mark indicators and action plan at a glance*

Chapter - 1

Introduction and Background

- Project Background
- Need and Scope for Watershed Development
- Watershed Information
- Status of previous watershed programmes & other development project in the area

Chapter - 2

General Description of Project Area

- Location: longitude, latitude, state, District, Taluk, Block, Villages, Approach road, land mark (watershed location map), etc.
- Area: under major land uses, irrigated and rainfed area, etc.
- Physiography: Elevation range, Slope range, Order of watershed, Major stream, Toposequence.

- Climate: Average monthly rainfall, rainfall distribution, temperature, wind velocity, Open pan evaporation (mm per day), humidity, etc.
- Watershed characteristics: Shape index of watershed, Length of main stream, drainage density, average slope, watershed relief, perimeter of the watershed etc.

Chapter - 3

Baseline Survey

- Socio-Economic conditions
- Soil and Land Use
- Agriculture including area, productivity, cropping intensity, etc.
- Horticulture
- Livestock and Fisheries
- Forests and Grass land
- Livelihood Status
- Hydrology and Water Resources
- Soil and Moisture Conservation and Efficient use of Water
- Problems and Needs

Chapter - 4

Institution Building and Project Management

- PRA
- Social Mobilization and Community Organization by Constitution of -
 - Watershed Committee
 - Self Help Group
 - Users Group
 - Focused Group Discussion
- About PIA
- Project Implementation Strategy including coordination and monitoring of implementation process, DPCs and other coordination mechanism.
- Convergence of watershed Programmes.
 - Identify and list Central/State sponsored schemes being implemented and could be converged with watershed programmes together with their fund allocation during XI plan.
 - Prepare a matrix of major components of on-going and new schemes, which can be converged with watersheds.
 - Convergence mechanism at planning and implementation level to be discussed.

Chapter - 5

Management/Action Plan

- **Preparatory phase**
 - Entry point activity
 - Institution and capacity building
 - Detailed Project Report (DPR)
- **Works Phase**
 - Soil and moisture conservation/ catchment treatment
 - Rain water harvesting including drainage line treatment

- Agriculture land
- Waste/degraded land
- Forests lands including fringe forest areas
- Special problems (Landslide/slips etc.) if any
- Crop diversification and intensification of production / farming systems
- Water resources development and management
- Horticulture development plan including sericulture /aromatics etc
- Livelihood activities for Landless and Assetless both land and non-land based
- Livestock development including fodder development
- Fisheries development in watersheds
- Development of micro enterprises
- Marketing Linkages
- Convergence of programmes
- Crops / farming system demonstrations
- Other area specific interventions

➤ **Convergence Planning for various activities**

Chapter - 6

Capacity Building Plan

- Develop Action Plan for Capacity Building including Exposure visits, short courses, skill development, etc.
 - Phase wise key programmes, activities and contents
 - Actors, required skills
 - Type, level and nos of Capacity Building Programmes /exposure visits, etc
 - Budget
- Action Plan of Capacity Building with annual phasing
- Field level hand-holding support details
- Follow-up and monitoring of Capacity Building

Chapter - 7

Phasing of Programme and Budgeting

- Administrative cost
- Monitoring and Evaluation
- Physical and Financial - Targets & Out lays
- Year wise Plan/Activities for development of watersheds
- Year wise Financial requirements for developmental activities
- Details of convergence with other schemes – Physical & Financial
- Benefit cost Analysis

Chapter - 8

Consolidation / Exit Strategy

Consolidation and completion of various works, Building the capacity of the community-based organizations to carry out the new agenda items during post project period, Sustainable management of (developed) natural resources, up-scaling of successful experience regarding farm production systems/off-farm livelihoods, etc.

Chapter - 9

Expected Outcome

- Some quantifiable indicators for outcomes of the programme are:
- Areas brought under single/multiple cropping, productivity and production of crops, horticulture, livestock, fodder, agro-forestry, fisheries products, farming systems, land use and commodity /crop diversification, wasteland area brought under cultivation, etc.
- Changes in water availability (surface storage and ground water table), quality of water, irrigated area, per capita income, creation of livelihood opportunities, out migration, cropping intensity, feed and fodder availability, etc.
- Environmental impact: Change in soil loss, the perenniality of flow and reducing peak flows, recharge of ground water, drinking water availability, etc.
- Employment generation: casual and regular, SHGs constituted, types of livelihood activities generated.

List of Maps to be enclosed along with DPR

- I. Index Map of Watershed
- II. Watershed Map
- III. Relief / Drainage Map
- IV. Slope map
- V. Soils and land capability class maps
- VI. Land Use / Land cover map
- VII. Map showing existing conservation measures
- VIII. Proposed action Plan map
- IX. Any other maps

Note: Except index map all other maps should be of high resolution and/ or preferably in the village cadastral map in the scale of 1:4000 or 1: 10,000

ANNEXURE-IV: Format for Collecting Environmental Baseline Data

1. General Information				
Sl. No.	Criteria / Information to Check for		:	Details
1.1	Date of Site Visit		:	
1.2	Site information	Village	:	
		Micro Watershed	:	
		Sub-Watershed/ Cluster	:	
		Gram Panchayat	:	
		Taluk	:	
		District	:	
1.3	Name of site visit person		:	
1.4	Name and designation of information provider		:	
1.5	Visiting in presence of (Full name & Designation)		:	
1.6	Type of utilization (mention agriculture/wasteland/fallow)		:	
1.8	Land pattern of the area (Plain / Valley / Hilly / Plateau etc)		:	
1.9	Land Ownership		:	
1.10	Land pattern/type and utilization to adjacent upper ridge area		:	

Sl.No.	Criteria / Information to Check for	Details	Category/Type	Issues or Management Measure in brief
2. Resource				
2.1 Forest Land				
2.1.1	Nearest forest area (Reserve forests, Protected forest or Revenue Forest)			

Sl.No.	Criteria / Information to Check for	Details	Category/Type	Issues or Management Measure in brief
2.1.2	Distance from project Watershed			
2.1.3	Is the Project located in ecologically sensitive zones? Mention distance of nearest ecologically sensitive area with details			
2.1.4	Is there any Wildlife sanctuary, Bio-reserve, National Park or notified Eco Sensitive Zone in the area of influence?			
2.1.4	Important/ Sensitive animal (fauna)			
2.1.5	Important/Sensitive plant (flora)			
2.1.6	Current use of forest for any livelihood activity			
2.2	Grazing Land			
2.2.1	Area (indicate any encroached area separately)			
2.2.2	Fallow Land			
2.2.3	Pasture Land			
2.2.4	Culturable Waste Land			
2.2.5	Season of green fodder scarcity			
2.2.6	Season of green and dry fodder scarcity			
2.2.6	Major animals grazed in land			
2.2.7	Nearest grazing area from the watershed (km)			
2.2	Biodiversity			
2.3.1	Major type of animals in area			
2.3.2	Major type of plants in area			
2.3.3	Is there any migratory birds?			
2.3.4	Season of the migratory birds found			
2.3.5	Primary habitat of migratory birds			
2.3.6	Important/Sensitive animal (fauna) in			

Sl.No.	Criteria / Information to Check for	Details	Category/Type	Issues or Management Measure in brief
	locality			
2.3.7	Important/Sensitive plant (flora) locality			
2.3.8	Any meditational plants found in area			
2.3.9	Is there any diseases found in domestic animals			
2.3.10	Is there available any veterinary doctor/hospital?			
2.3 Agriculture Need to check if ground data is align to LRI and DSS data, if not then have to mention it clearly in Remark column				
2.4.1	Cropping pattern (mono-cropping/mixed cropping/crop rotation)			
2.4.2	Main crops grown (Rabi, Kharif, and horticultural crops)			
2.4.3	Details on soil cards			
2.4.4	Pesticides/ fertilizer usage			
2.4.5	Source of irrigation			
2.4.6	Frequency of irrigation in different seasons			
2.4.7	Extent of irrigation (% of sown area which is irrigated)			
2.4.8	Methods of ploughing			
2.4 Soil quality				
2.5.1	Any Soil Quality issue including salinity range of soil			
2.5.2	Major animals found in soil (invertebrates)			
2.5.3	Any heavy metal or pesticide reported in soil.			
2.5 Ground Water				
2.6.1	Nearest tube wells with no and distance			

Sl.No.	Criteria / Information to Check for	Details	Category/Type	Issues or Management Measure in brief
2.6.2	Total number of dried up tube wells			
2.6.3	Depth of Ground water of active and in use tubewell (indicate feet or meters)			
2.6.4	Mention Ground water quality issue (like salinity, nitrate, Fluoride, Heavy metals etc.,)			
2.6 Surface Water				
2.6.1	Nearest of ponds – if not within the watershed then mention distance			
2.6.2	Details of Wetland with its location with its watershed number			
2.6.3	Details of any canals, streams with location in respect to watershed			
2.6.4	If draining line treatment is done details need to be added about HFL vis a vis bund height and how inundation of agriculture field is been avoided			
2.6.5	Mention any surface water quality issue (pH, Biological Oxygen Demand, Chemical Oxygen Demand, Dissolved Oxygen, Heavy metals, pesticide, coliform etc.)			
2.6.6	Period of water availability in ponds			
2.6.7	Distance of Major river from the watershed			
2.7 Common Property Resources				
2.7.1	Is there any common property resource area located within the watershed			

ANNEX-V: Screening Format for Potential Environmental and Social Issues

The Screening checklist is applicable to any intervention on watershed treatment. This form is to be used by PIA/District Team to rule out any adverse environment and social impacts due to program intervention under the guidance of the Project Management Unit (PMU) to screen for the potential environmental and social risks and impacts of a proposed subproject.

Site information	Village	:	
	Micro Watershed	:	
	Sub-Watershed/ Cluster	:	
	Gram Panchayat	:	
	Taluk	:	
	District	:	

Sl. No.	Key Question	Answer		Risk Category	Due diligence/ Actions
		Yes	No		
1	Is there any risk/impact/ disturbance to forests and/or protected areas because of watershed intervention activities?			High	If yes, the intervention activities to be modified to avoid the risk? If not possible, such interventions should be avoided.
2	Is there any risk/impact/ disturbance to designated wetland because of watershed intervention activities?			High	If yes, the intervention activities to be modified to avoid the risk? If not possible, such interventions should be avoided.
3	Is the intervention work to be taken up 100 meters from any cultural, historic, religious site/buildings recognized/ designated by ASI?			High	If yes, any interventions should be avoided ³ .
4	Is the intervention work to be taken up between 100 -			Substantial	If yes, due permission to be taken from ASI for any construction.

³ Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 there is ban on construction within 100 metres of a centrally protected monument and regulated construction within 100-200 metres construction. Any construction activity within 100-200 meters of the monument requires ASI permission.

Sl. No.	Key Question	Answer		Risk Category	Due diligence/ Actions
		Yes	No		
	200 meters from any cultural, historic, religious site/buildings recognized/ designated by ASI?				Where there is no impact, chance finds procedures would be applicable and ASI norms would need to be followed.
5	Will planned physical infrastructure affect any physical and cultural resources e.g. any cultural, religious sites including sacred groves etc.?			Substantial	If yes, the intervention activities to be modified to avoid any risk? If not possible, such interventions should be avoided.
6	Does the intervention work involve requirement of additional land for upgradation/ expansion and/ or new construction through land acquisition or direct purchase and/or restrictions on land use?			High	If yes. It is not supported by the project and to be avoided. Alternate options to be explored.
7	Does the intervention work involve requirement of additional land for upgradation/ expansion through transfer from another government department like forest or even revenue forest?			High	If yes. It is not supported by the project and to be avoided. Alternate location to be identified.
8	Is there any chance of flooding of land beyond drainage line due to construction of check dams/ weirs?			High	If yes. It is not supported by the project. Alternate options to be explored.
9	Does the intervention work involve requirement of additional land for upgradation/ expansion through transfer from another government department for lands such as pasture/grazing land, natural habitats or other			High	If yes. It is not supported by the project. Alternate options to be explored.

Sl. No.	Key Question	Answer		Risk Category	Due diligence/ Actions
		Yes	No		
	common use land?				
10	Will any intervention work have chances of increase in salinity by inundating low lying areas?			High	If yes, alternate option need to be explored.
11	Will any intervention work use or generate any hazardous chemicals or waste beyond permissible levels specified in Schedule II of Hazardous Waste Handling and Management Rules, 2016?			High	If yes. It is not supported by the project. Its fall in excluded activity list
12	Any activity that would use most toxic pesticides classified as 'Class I' (based on acute toxicity of the active ingredient) by the World Health Organisation			High	If yes. It is not supported by the project. Its fall in excluded activity list
13	Does the project activities as per DPR involve recruitment and use of contract workers for watershed activities?			Moderate	If yes, provisions of Contract Labour Act to be followed.
14	Is the submergence affecting private lands?			Substantial	If yes. It shall not be supported by the project. Location or design specifications to be changed. If not possible, such interventions should be avoided.

In-charge of PIA

Name.....

Designation:

Phone No.

Signature

Date:

ANNEX-VI: Guidance to Environment & Social Management Plan (ESMP)

Activities	Risk	Suggested Enhancement/ Mitigation Measures
a. Ridge Area Treatment: All activities required to restore the health of the catchment area by reducing the volume and velocity of surface runoff, including regeneration of vegetative cover in forest and common land, afforestation, staggered trenching, contour and graded bunding, bench terracing etc.	▪ Mostly beneficial as it controls runoff and soil erosion, thereby reducing losses of water, soil material, organic matter and nutrients. ▪ Land degradation in rain fed areas due to soil erosion from runoff is one of the major problems. ▪ The area faces the acute problem of soil erosion due to unchecked flow of running water down the steep slopes. Agriculture and common land has been highly degraded due to the soil erosion and this has lead to the decrease in agriculture productivity.	▪ Creation of additional green cover in upper ridges ▪ Improvement in soil fertility through addition of litter and organic matter. ▪ The problem of the area demanded that measures for soil and water conservation to be taken on the priority basis. ▪ Avoid land use change; especially agricultural land ▪ Landscape and activity Planning and phasing prior to taking up ridge area treatment
b. Saturation Approach: Treatment of all the parcels of watershed area within the selected sub watershed as per the recommendations of LRI and Hydrological studies. In addition to the land based activities, livestock and livelihood promotion activities for the land-less and non-land holders in the sub watershed.	LRI based treatment would help to increase soil-moisture conservation and overall protection of hydrological regime. However, risks to watershed values associated with livestock and livelihood can arise from: ▪ Increases in fine and coarse sediment delivery to streams; ▪ changes in riparian vegetation that affect channel processes and quality of aquatic habitat; and ▪ changes in stream flow regime, including the frequency, magnitude, volume, and timing of flows; ▪ Livestock population may increase by assuring enhanced fodder availability, which may be a potential threat to natural areas	▪ Activity on plantation and fodder production to be taken up extensively. ▪ Planning of use of animal waste to agriculture as manure and pesticide and thus restricting to reach any water bodies downstream. ▪ Awareness training on conservation of forest land and other common property resource ▪ Planning and maintaining of grazing land by the community or in absence of that stall-feeding of live stocks.
c. Drainage line treatment with a combination of vegetative and engineering structures, such as earthen checks, brushwood checks, gully plugs, loose boulder checks, gabion structures,	This activity lead to certain risk: ▪ Reduction in water availability at down stream ▪ Siltation in water harvesting structure ▪ Pesticides & insecticides pollution in water	▪ Follow the screening procedures. ▪ LRI-DSS and input from technical partner to ensure water quality and availability to the community ▪ Vegetative measures may be combined with possible cut off drains to prevent rapid overland

Activities	Risk	Suggested Enhancement/ Mitigation Measures
underground dykes etc.	harvesting structure with consequent effect on water quality ▪ Check dam failures ▪ Soil erosion & siltation rates due to construction activities ▪ Mosquito breeding in village ponds/ farm pond ▪ Water borne diseases due to water contamination ▪ Algae growth and eutrophication due to increased levels of nutrients in surface water bodies ▪ Stagnation of water in surface streams resulting in change in taste & increase in odour ▪ Possibility of water logging	flow into roadsides ▪ Design of gully control structures are to be prepared specific to each work site ▪ The site for check dams shall be site specific, gully checks for low slope whereas silting basins shall be used for steep slopes ▪ Fencing of water impounding structures and other construction areas, especially those closer to habitation ▪ Sediment traps with stone pitching and turfing should be constructed ▪ Soil conservation measures around the structures (bio-engineering measures). ▪ Deep wells may not be dug to reduce drawing underground water. ▪ Stone rip-rap or pitching, wooden piles shall be provided under conditions of high soil erosion. ▪ Provision should be made to trap transported debris and bed load. Sediment traps should be located at the inlet and easily accessible for cleaning ▪ Grass clumps should be planted all along the boundaries ▪ PIA to take up measure for prevention of vector borne diseases and other communicable diseases; ▪ For side erosions stabilization of side slopes with vegetative cover coupled with retaining walls shall be provided
d. Development of water harvesting structures such as low-cost farm ponds, nalla bunds, check-dams, percolation tanks and ground water recharge through wells, bore wells and other measures.	▪ Although watershed development can and often does deliver significant beneficial impacts, it can also result in negative externalities that, in particular, can affect downstream water users ▪ Groundwater recharge is promoted within the catchment under watershed management as a 'positive value' on the assumption that it will increase base flows,	▪ The construction of rainwater harvesting structures, which catch rainfall and subsequent surface runoff, can enhance groundwater recharge and increase local water availability for irrigation and other uses. The increased water availability often encourages farmers to both expand the irrigated area and to use irrigation more intensively (e.g. for double or triple cropping). ▪ Mapping of all water harvesting

Activities	Risk	Suggested Enhancement/ Mitigation Measures
	thereby making streams flowing in the lower catchment perennial through base-flows during the lean season.	structures (with GPS coordinates) taken as part of LRI-DSS and to assess their impacts in terms of resource conservation and increased water availability will help in addressing the risk at planning level itself.
e. Nursery raising for fodder, fuel, timber and horticultural species. As far as possible local species may be given priority.	Some of the general constraints/limitations in fodder, fuel, timber and horticultural species improvement and production are as follows: • Use of chemical fertilizer, pesticide & insecticide pollution • Agriculture run-off • Increased use of water • Soil fertility depletion due to extensive farming • Drainage congestion	• Follow the screening procedure • Implement the IPNMP and making it more effective through Farmer advisories. Integrated management of key pests need to be practiced and documented. • Use of bio-compost, organic mulch/ Green Manure and vermin compost and Suitable organic / biotic control of insects and pests will result in lesser use of permissible chemical fertilizers and pesticides • Organic manure/fertilizer and bio-pesticide application to enhance yield • Selection of low water demanding crops and rain water harvesting, storage of surface water (of streams, nallah, etc.) through water storage ponds will help harvest more water for use in HYV cropping. • High water consumption crops should be discouraged • Selection of crops as part of LRI-DSS generated water budget and traditional practices • High nutritional value traditional crops should not be totally replaced by high yielding varieties. • Leveling of crop field and maintenance of terraces/ bund to check water runoff and soil loss • Genetically manipulated varieties should be avoided
f. Land development including in-situ soil and moisture conservation and drainage management measures like field bunds, contour and graded bunds fortified with plantation, bench terracing in hilly terrain etc.	Overall beneficial though some of the perceived risks are as follows: ▪ Removal of vegetation during construction activities ▪ Soil loss during the construction of structures and quarrying for stone and other materials	▪ Land not suitable for other productive purposes may be brought under infrastructure activities. ▪ The safety provisions related to construction activities to be followed. ▪ Proper upkeep and maintenance of facilities built. ▪ Quality of constructions should

Activities	Risk	Suggested Enhancement/ Mitigation Measures
	▪ Siltation of water bodies downstream during construction ▪ Low quality construction may lead to failure and more hazards in downstream ▪ Destabilization of the land and soil erosion/ landslips along the Foot bridges/ Ropeways ▪ Maintenance of the structures will require additional responsibilities to the stakeholders. ▪ Destruction of local flora during construction. ▪ Possibility of natural drainage pattern being disrupted During the implementation phase of the project, there is a likelihood that the construction activities cause temporary negative environmental impacts, which would need to be addressed. Some of the likely issues are the following: ▪ During the construction of project components significant earth work may be involved, which may cause erosion of land and cutting of trees. ▪ Possible damage to places of cultural, heritage and recreational importance. ▪ Impact on human health and safety due to dust and noise pollution, and inadequate safety measures.	be ensured to reduce the failure and more hazards downstream. ▪ Proper designing and planning for construction will stabilize the land and reduce soil erosion/ landslips. ▪ Bio-physical measures to rehabilitate disturbed land to check soil erosion. ▪ All project interventions will be appropriately designed to ensure that they do not impact the forest lands or wet lands. ▪ Suitable changes in location/ alignment shall be made in the schemes to avoid cutting of trees and also avoid erosion and ensure soil stabilization. ▪ PIU will implement Labour Management Procedures. ▪ PIU will institute a GRM for labour ▪ PIU to prevent general work site related hazards due to dust, sound and debris. <u>Chance Find Procedures</u> ▪ In case of some physical works associated with construction and maintenance there might be chance finds of objects of cultural/ archaeological importance. In such cases, the regional offices of the relevant agency (e.g. the Archaeological Survey of India) will be immediately notified. ▪ All the above will be addressed through screening done by LRI-DSS and also part of DPR preparation ▪ No activities to be taken up that would impact any physical cultural resources like religious structures, etc. ▪ As a precautionary measures avoid such sensitive sites where there are cultural heritage related issues ▪ No activity to be taken up in sensitive location or cultural heritage; those include the aesthetic, historic, scientific or

Activities	Risk	Suggested Enhancement/ Mitigation Measures
		research, social and economic values
g. Crop demonstrations for popularizing new crops/ varieties, water saving technologies such as drip irrigation or innovative management practices. As far as possible varieties based on the local germplasm may be promoted.	▪ This activity would conserve water and promote crop suitable as per climate and soil characteristics. But without proper training to community this may lead to following risks: ▪ Fruit crops may compete with food producing crops ▪ Reduced crop/ horticulture diversity; Mono-cropping in horticulture may cause disease & pest problems and disappearance of species ▪ Competition for water, nutrient level may increase ▪ Increase in use of chemical fertilizers and pesticides	▪ Follow the screening procedure ▪ Implement the IPNMP ▪ Lesser use of permissible chemical fertilizers/ pesticides reduce chances of soil contamination and water pollution ▪ Selection of crops with high efficiency in water utilization and high yield will reduce pressure on water use. ▪ Through water storage ponds supplement water needs of HYV crops ▪ Development of dry land orchards with suitable local fruit crops ▪ Monoculture should be avoided by using other species along with the main species ▪ Awareness generation among farmers on the ill effects of using the pesticides, fertilizers, etc. ▪ Skill training for farmers in proper use of pesticides, fertilizers, etc. ▪ Awareness generation for farmers on using bio/ organic pesticides/ fertilizers. ▪ Skill training to farmers in preparation and use of bio/ organic pesticides/ fertilizers.
h. Pasture development, sericulture, bee keeping, back yard poultry, small ruminant, other livestock and micro-enterprises. Veterinary services for livestock and Fisheries development in village ponds/tanks, farm ponds etc.	Overall most effective activity to protect forest and other natural habitat from risk of grazing. This may be effectively taken up for ▪ Protection of pasture lands from other land uses ▪ Introduction of rotational grazing, delineation of forest areas for the supply of fodder, and the introduction of voluntary systems to prevent livestock from grazing in young forest. ▪ Only perceived risk could be change in diversity of flora and fauna	▪ Follow the screening procedures. ▪ Sufficient area should be allowed within the plantation for growing intermediate products like shrubs and grasses. The Absolute tree density shall be followed as per MoEF&CC norms. ▪ Lower tree densities with a corresponding increase in the proportion of shrub and grass species should be planted to meet the fodder requirements. ▪ Commonly acceptable arrangements in conjunction with improved pasture species should be followed for protection and exploitation.

Activities	Risk	Suggested Enhancement/ Mitigation Measures
		▪ Bulk planting of fodder should be carried out mainly on common lands. ▪ Grass planting should be carried out in shallow trenches and ridges. ▪ Planting areas for fodder should also be developed close to homesteads to reduce time for collection

Annexure-VII: Preliminary list of products identified

SL No	Sector	Preliminary List of Products identified
1	Agriculture products	Paddy/Millet/Maize Pulses (Arhar, black gram, green gram and grass pea)
2	Horticulture Products	Mango/Onion/Potato/Vegetables
3	Livestock	Dairy/Poultry/Goatery
4	Fisheries	Fresh Water Aquaculture
5	NTFP	Honey/Mahua/Hill broom

Annexure-VIII: FPOs promoted under Odisha Millet Mission

Sl. No.	Promoted by	Promoted under Scheme	Name of FPO	District	Deals in	Status
1	Dept. Of Agriculture	Odisha Millet Mission	Sabujima producer company limited	Koraput	Millets	Active
2	Dept. Of Agriculture	Odisha Millet Mission	Nari Pragati Farmer Producer Company Ltd.	Koraput	Millets	Active
3	Dept. Of Agriculture	Odisha Millet Mission	Deomali Kalanjiam Mahasangha	Koraput	Millets	Active
4	Dept. Of Agriculture	Odisha Millet Mission	Kalanjiam Cluster Sangha	Koraput	Millets	Active
5	Dept. Of Agriculture	Odisha Millet Mission	Panchabatmali producer company limited	Koraput	Millets	Active
6	Dept. Of Agriculture	Odisha Millet Mission	Bamandei Farmer Producer Company Ltd.	Koraput	Millets	Active
7	Dept. Of Agriculture	Odisha Millet Mission	Nari Shakti Mahila Mahasangha	Koraput	Millets	Active
8	Dept. Of Agriculture	Odisha Millet Mission	Jagarana Farmer Producer Company Ltd.	Koraput	Millets	Active

Annexure-IX: Farmer Producer Organisations Present Status in the REWARD Districts

Sl. No.	Promoted by	Name of FPO	District	Deals in	Status
1	NABARD	Mandasuni onion agro producer company limited	Deogarh	Onion	
2	NABARD	Silipathar groundnut agro producer company limited	Deogarh	Groundnut	
3	NABARD	Kapilash farmers producer company limited	Dhenkanal	Vegetables	
4	NABARD	Shaurika farmers producer company limited	Dhenkanal	Vegetable & Mahua Seeds	
5	NABARD	Shyamsundar farmers producer company limited	Dhenkanal	Vegetable, Mango & Cashew	
6	NABARD	Dharitree agro plus farmers producer company limited	Dhenkanal	Watermelon & Cowpea	
7	NABARD	Mahima Alekh Farmers Producer Company limited	Dhenkanal	G. Nut, Tomato & Brinjal	
8	NABARD	Dasmantpur cashew development processing and marketing producer company limited	Koraput	Mango & Cashew	Active organization with 350 farmers spread in 50 villages (6 panchayat). Last year turn over 2 lacs. Activities - vegetable trading, millet & turmeric trading, vegetable seed trading and mango trading.
9	NABARD	Boriguma bijayini farmers producer company limited	Koraput	Turmeric & Tamarind	
10	NABARD	Kotpad narayani farmers producer company limited	Koraput	Turmeric & Tamarind	Inactive FPO, not running
11	NABARD	Patneswari agri producer company limited	Koraput	Vegetables, Millets, Turmeric, Chilli, Pulse & Aromatic Paddy	
12	NABARD	Swornajyoti producer company limited	Koraput	Poultry, Vegetable & Turmeric	Active organization with 705 farmers spread in 60 villages, last year turnover Rs.1.2 cr. Activities: Poultry and vegetable trading.
13	NABARD/ Dept. Of Agriculture	Jaivik sri farmers producer company limited	Koraput	Millets, Paddy & Fishery	Active

14	NABARD	Alek mahima producer company limited	Koraput	Vegetable, Ginger, Turmeric & Coffee	Active organization working on Lemon grass with 144 groups of farmers. Interested to meet and explore synergies
15	NABARD	Padua nanda producer company limited	Koraput	Vegetable, Ginger, Turmeric & Coffee	
16	NABARD/Dept. Of Agriculture	Gupteswar farmers producer company limited	Koraput	Millets, Vegetable, Pulse, Cotton & Maize	Active
17	NABARD	Jagruti farmers producer company limited	Koraput	Vegetable, Pulse, Cotton, Millets & Maize	
18	NABARD	Deomali farmers producer company limited	Koraput	Millets & Ginger	
19	NABARD	Nageswari farmers producer company limited	Koraput	Vegetable & Millets	
20	NABARD	Maa nisanimunda farmers producer company limited	Koraput	Vegetable	
21	NABARD	Dangar dei producer company limited	Koraput	Paddy & Vegetable	
22	NABARD	Chitri dora farmers producer company limited	Koraput	Traditional & Aromatic Paddy and Processing	
23	NABARD	Talagolaru mahila agro producer company limited	Koraput	Tamarind, Sial leaves, Apiary and Honey	
24	Dept. Of Agriculture	Sabujima producer company limited	Koraput	Millets	Active
25	Dept. Of Agriculture	Nari Pragati Farmer Producer Company Ltd.	Koraput	Millets	Active
26	Dept. Of Agriculture	Deomali Kalanjiam Mahasangha	Koraput	Millets	Active
27	Dept. Of Agriculture	Kalanjiam Cluster Sangha	Koraput	Millets	Active
28	Dept. Of Agriculture	Panchabatmali producer company limited	Koraput	Millets	Active
29	Dept. Of Agriculture	Bamandei Farmer Producer Company Ltd.	Koraput	Millets	Active
30	Dept. Of Agriculture	Nari Shakti Mahila Mahasangha	Koraput	Millets	Active
31	Dept. Of Agriculture	Jagarana Farmer Producer Company Ltd.	Koraput	Millets	Active
32	Orissa Rural Livelihoods Mission	Koraput agro products producer company limited	Koraput	Cashew , Mango, Ginger	
33	NABARD	Maabanashree producer company limited	Nayagarh	Vegetable, Sial Leaf Sticking, Pulse and its processing & NTFP	

34	NABARD	Baisipally farmers producer company limited	Nayagarh	Mango, Vegetable & NTFP	FPC undertaking Goatery. Not much scope for other Agribusiness activities.
35	NABARD	Daspalla farmers producer company limited	Nayagarh	Paddy & Vegetable	CEO has left the organization.
36	NABARD	Shri mahaveer adivashi producer company limited	Nayagarh	Mango, Vegetable & NTFP	
37	NABARD	Odagaon agro producer company limited	Nayagarh	Green Gram , Molases , Paddy , pulses & Pointedgourd	
38	NABARD	Chashimitra agro producer company limited	Nayagarh	Green Gram , Molases , Paddy , pulses & Pointedgourd	
39	NABARD	Gourangpur farmers producer company limited	Nayagarh	Vegetable and Pulse	
40	NABARD	Rankadeuli farmers producer company limited	Nayagarh	Vegetable and Oilseeds	
41	NABARD	Gopalpur farmers producer company limited	Nayagarh	Vegetable, Turmeric, Chilly & Vermicomposting	
42	Dept. Of Horticulture	Ladubaba farmers producer company limited	Nayagarh	Vegetable trading, Fertilisers, Pesticides	Active organization with 527 farmers spread in 7 villages, 3 panchyat. 2018-2019 turnover 18 lacs and 2019-20 turnover 25 lacs. Activities - fertilizer, pesticide, vegetable trading.
43	Dept. Of Horticulture	Maninaga farmers producer company limited	Nayagarh	Vegetable trading	350 farmer members, have done vegetable trading. Lack of capital, looking for support and association.
44	NABARD	Banadurga producer company limited	Sambalpur	Vegetable & Mahua Seeds	Active organization with 80 farmers spread in 7 villages. Activity-vegetable trading.
45	NABARD	Deodhar farmers producer company limited	Sambalpur	Mango, Cahsew & Vegetable	
46	NABARD	Sagadeswar agro producer company limited	Sambalpur	Vegetable, Maize, Paddy & NTFP	
47	NABARD	Ushakothi agro producer company limited	Sambalpur	Vegetable, Maize, Paddy & NTFP	
48	NABARD	Debeswar agro producer company limited	Sambalpur	Vegetable, Maize, Paddy & NTFP	
49	NABARD	Chigrita chilli producer	Sambalpur	Chilli & Vegetable	

		company limited			
50	NABARD	Dhanujatra vegetable producer company limited	Sambalpur	Vegetable , NTFP (Tamarind, Salseed , Mahua seed) & Vermi compost	
51	NABARD	Dharanidhar chilli producer company	Sambalpur	Chilli , NTFP (Tamarind, Salseed , Mahua seed) & Mango	
52	NABARD	Charmal vegetable producer company	Sambalpur	Chilli & Vegetable	
53	NABARD	Gadapati chilly producer company limited	Sambalpur	Vegetable and Chilly	
54	NABARD	Kechhupani vegetable producer company limited	Sambalpur	Vegetable	
55	Dept. Of Horticulture	Shyamala vegetable farmer producer company limited	Sambalpur	Vegetable trading	Inactive FPO
56	Dept. Of Horticulture	Ramachandi vegetable farmer producer company limited	Sambalpur	Vegetable trading	Inactive FPO
57	Dept. Of Horticulture	Kaustuv vegetable farmer producer company limited	Sambalpur	Pickles, Vegetable trading	Active FPO, doing good work in Pickle and vegetable trading
58	Dept. Of Horticulture	Niladree vegetable farmer producer company limited	Sambalpur	Vegetable trading	Inactive FPO
59	Dept. Of Horticulture	Susakti vegetable farmer producer company limited	Sambalpur	Vegetable trading	Inactive FPO

Terms of Reference Independent Verification Agency (IVA)

1. Purpose

1.1 This Terms of Reference (ToR) is for an Independent Verification Agency (IVA) to be appointed by the Government of Odisha (GoO) under the World Bank-assisted Rejuvenating Watersheds for Agriculture Resilience through Innovative Development (REWARD) Program (hereafter called REWARD). The International Bank for Reconstruction and Development (IBRD – also known as the World Bank) has agreed to support the REWARD Program through an instrument called Program for Results (PforR). The World Bank's loan to the GoO is released upon achievement of pre-agreed Results, defined under Disbursement Linked Indicators (DLIs). As per the IBRD's norms an Independent Verification Agency (IVA) shall verify claims made by the GoO under each DLI for triggering loan disbursements. Thus, GoO plans to hire services of a qualified and experienced IVA to independently verify achievement of results under the DLIs as per verification protocols agreed between GoO and the World Bank. The services of the IVA are required for a period of about five years from FY2021-22 to FY 2025-2026.

2. Overview of REWARD Program

2.1 The Watershed Development Component of the Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY) is an ongoing national program for watershed management in India. The Department of Land Resources (DoLR) in the Ministry of Rural Development (MoRD), Government of India provides the national guidelines and funds to the states under the WDC-PMKSY for execution of watershed schemes at the micro-watershed level⁴.

2.2 The proposed REWARD Program is aimed to support the WDC-PMKSY in two States (Odisha, and Karnataka) as well as the central level. The overall financial allocation is about US\$ 636.42 million, out of which the World Bank's loan is about US\$ 134.60 million and GoO's share is US\$ 20 million. The duration of the REWARD Program is six years, from 2021-22 to 2026-27.

2.3 The Program Development Objective (PDO) of REWARD is to 'Strengthen capacities of national and state institutions to implement science-based watershed development for improving farmers' resilience and soil moisture outcomes in selected watersheds of participating states and to support mainstreaming across states' and has two key Result Areas;

(i) Strengthened Institutions and Supportive Policy for Watershed Development, and (ii) Scientific Watershed Development and Enhanced Livelihoods.

2.4 Activities under the two Results Areas are explained below.

2.4.1 **Activities under Result Area -1 (RA-1)** will support the strengthening of institutional capacity and policy environment for watershed development in the participating states. Activities under this Results Area include establishment of a Centre of Excellence (CoE) for Watershed Management that will train staff in the participating states on science-based approaches to watershed planning and implementation. These staff with help community driven agencies/NGOs to build their capacities in watershed management through learning resources, training and mentorship. RA-1 will also support pioneering pilot initiatives in areas such groundwater management, use of appropriate fertilizers and development of an O&M policy in watershed areas. Finally, RA-1 will support activities to execute an improved monitoring, evaluation and knowledge sharing system.

2.4.2 **Activities under RA-2** will support the scientific planning and implementation of watershed projects and livelihood activities.

Activities under this Results Area include:

Technical partnerships between the Directorate of Soil Conservation & Watershed Development (DSC&WD) or State Level Nodal Agencies (SLNAs) and the relevant scientific and technical institutions. Field work for the collection of Land Resource Inventory (LRI) and hydrology data and creation of LRI and hydrology data bases. This will require procurement of instruments and equipment by the partners⁵ for measuring soil, water,

⁴A micro-watershed covers about 500 hectares of area.

⁵For example, this could include groundwater quality monitoring systems, Digital Water Level Recorders, soil sensors, automatic weather stations, rain gauges, and computers, software, and so on so that various technical entities involved can fulfil their mandates.

weather etc. Develop Decision Support Systems (DSS) for soil and water conservation planning, crop planning, land capability grouping, nutrient management, run-off, farm pond and check dam planning, crop water requirements, soil moisture and water balance, water budgeting, among others; Develop a digital library and portal for storage and dissemination of the LRI and hydrology databases and DSS.

Develop detailed project reports (DPRs*6) for select micro-watersheds based on the scientific information and community participation and approval by the Gram Sabha. Further RA-2 will support dissemination of agro-advisories (on land resources, soil status, weather events, crop selection and management practices) to farmers through information and communication technology (ICT) channels and through the agriculture extension system. Finally, activities on developing value-chains (including pre-production, production, post-harvest infrastructure and management and market linkage) and livelihood enhancement for vulnerable populations will be supported.

2.5. Disbursement Linked Indicators (DLIs). REWRAD is designed under the Program for Results (PforR) financing instrument of the World Bank, wherein program finances are disbursed to the government upon achievement of pre-agreed key results. These results are picked up from the overall Results Framework and carry varying degrees of financial allocations. As the indicators for measuring these key results are linked to disbursement of World Bank financial support, they are called Disbursement Linked Indicators or DLIs, in short. There are six DLIs in the REWARD, out of which four are applicable to GoO (DLI#1, DLI#2, DLI#3,DLI#4)

Table : Disbursement Linked Indicators (DLIs) under REWARD, by Result Area

Sr no	DLI
DLI#1	Watershed Committees and Gram Panchayats demonstrate satisfactory watershed management as measured through a performance rating system
DLI#2	Land area treated with science-based watershed management technologies
DLI#3	Adoption of resilient agriculture technologies and practices by farmers
DLI#4	Farmer Producer Organizations with 25 percent increase in business turnover relative to baseline
DLI#5	Number of professionals who complete certified training on improved watershed management provided by national center for excellence on watershed development (GoK)
DLI#6	National technical standards for improved watershed management updated by the DoLR and directive issued to states (DoLR).

3. Project Area

REWARD is planned to develop 17 Green field sites to establish model watersheds on saturation. For this purpose, 152 micro watersheds have been identified in five pilot districts for taking up intended interventions, covering a total geographical area of 1.15 lakh ha. Land Resources Inventory (LRI) activities will also be taken up in 4.11 lakh ha in seven districts (including five pilot districts) to provide comprehensive site- specific cadastral level information useful for appropriate Natural Resources Management (NRM) planning at farm level and integrated development of the area. The details of the districts and areas for developing green field sites and Land Resource Inventory Activities are appended in Table-3.

⁶ The DPR is the detailed plan document of the proposed watershed sub-project. It is based on technical inputs as well as participatory community planning. It includes: basic information on the watershed, user groups, problem typology, proposed interventions, mapping exercises, institutional mechanisms, expected outcomes, etc.

4. Program Verification

4.1 As per the design of PforR programs, the achievement of DLIs have to be verified by a credible Independent Verification Agency (IVA), hired by the state government.

4.2 Hence, DSC&WD in the Department of Agriculture & FE, Government of Odisha, proposes to hire an IVA to verify the achievement of the results under assigned DLIs as defined under REWARD.

4.3 The IVA shall undertake verification of the program results in the state using the established verification system at the request of DSC&WD. It is expected that there will be multiple verification rounds each year starting from Financial Year 2021-22 for various DLIs. A web-based MIS for REWARD will be used to store data required for verification of DLIs. The IVA shall measure and provide credible estimates for progress made by State/Districts/Blocks/GPs against DLIs. Based on the above, the agency shall present verification reports to DSC&WD, that will form the basis for disbursement of loans by the World Bank.

4.4. This ToR provides the Results Framework Matrix (Annexure xv), which lists the results indicators for REWARD at all levels, that is, outcome/impact; intermediate results; and delivery linked. It also shows the baseline and target values of each of these indicators including a description of the indicators. Further, the frequency of data, data source and methodology of data collection is specified.

4.5. The DLI Verification Protocol Table (Annexure-xv) provides definitions and descriptions of achievements, along with summaries of the methods and protocols to evaluate achievement of DLIs. Checklists of sources of data to be used for verification of each DLI and sub- DLI are also given in the ToR. The verification methodology to be employed by the IVA is described in the subsequent section of this document.

5. Scope of Work

5.1 IVA will be responsible for the verification of the DLIs #1, #2, #3 and #4. The draft verification protocols are given in Annex-xv. The IVA shall review the same and suggest any modifications, as deemed fit, and finalize the same in consultation with DSC&WD and World Bank, immediately after the signing of the contract.

5.2 The key tasks of the IVA include but not limited to:

- 5.2.1 Sharpen and finalize the Verification Protocols for the disbursement-linked indicators and agree with the DSC&WD;
- 5.2.2 Carry out document reviews, physical verification in the field level and sample surveys to measure the results, as per finally agreed protocols;
- 5.2.3 Prepare verification reports with proof of progress of achievement of DLIs and sub-indicators, for each verification round; and
- 5.2.4 Submit verification reports for each verification round.

6. Methodology for Verification

6.1 Achievement level of DLIs will be assessed using the final Verification Protocols agreed between DSC&WD and the IVA.

7. Schedule and Deliverables

7.1 The IVA will be **contracted for five years covering the period FY 21-22 to FY 25-26**. All IVA deliverables (from inception report, detailed design etc) have to be done in consultation with DSC&WD and approved by the World Bank.

7.2 The deliverables under this consultancy for the IVA is shown in the following Table.

Table : Deliverables/Reports to be furnished by the IVA

Deliverable/ Report	Description	Time Frame	Frequency
Inception report	The inception report should provide the detailed methodology for verification of each of the DLIs, including methodology for establishing or verifying baselines, the IVA's work plan, staffing plan, detailed templates for verification of all DLIs, random sampling procedures where applicable	Within 3 months from signing of contract	1 in 1 st year
Verification Report for each verification round	The format of the Verification Report will be proposed by the IVA during inception stage and agreed with DSC&WD and WB	Starting three months from signing of contract and subsequently on a half yearly basis in a financial year based on requests by the DSC&WD	2 per year.
Other Reports	As per requirement of DSC&WD	Need-based.	-

8. Composition and Qualifications of IVA Team

8.1 The IVA will comprise a dedicated team of professionals led by the Team Leader who will assume overall responsibility of carrying out the functions of DLI verification, based on the DLI verification protocol.

8.2 Including the Team Leader, the IVA team shall have strong proven competency in areas related to watershed management, evaluations, social development, statistics and supported by research assistants, as required. A suggested team composition is shown table below.

Table :Suggested Composition of IVA Team

SN	Designation	No.
1.	Team Leader (Evaluation Specialist and Manager)	1
2.	Watershed Management Specialist	1
3.	Social development Specialist	1
4.	FPO Specialist	1
5.	Statistical Analyst	1
6.	Program Assistants – as required	

8.3 The required **qualifications and expertise of the IVA team** members are as follows:

8.3.1 Team Leader: i) Post Graduate in Statistics/Economics/Mathematics/Agriculture/Rural Development / Management or related disciplines; ii) at least 15 years of experience in conducting strong impact evaluations in water / agriculture / rural development or allied sectors; iii) working experience of managing large-scale, preferably multi-State surveys as Team Leader; iv) sound knowledge of Result Based Program Management.

8.3.2 Watershed Management Specialist: i) Post Graduate in Soil Science and or Hydrology, Hydrogeology or other Water Management related disciplines; ii) At least 15 years of experience in water and land resource sectors; iii) sound technical knowledge of hydrologic monitoring, land resource inventorization, water balance estimation and water budgeting; iv) understanding of multi-disciplinary context of the program; and v) sound knowledge of Result Based Program Management.

8.3.3 Social Development Specialist: i) Post graduate in relevant discipline; ii) At least 15 years' experience in capacity building and monitoring of community institutions and Gram Panchayats; iii) sound understanding of the functioning of Panchayati Raj Institutions and the legal framework

8.3.4 FPO specialist: i) Post graduate in Agriculture, Rural management, economics, business administration. ii) At least 10 years' experience in promoting agriculture based rural livelihoods iii) sound understanding of the functioning of FPO.

8.3.5 Statistical Analyst: i) Graduate in Statistics/Economics/Mathematics; ii) At least 8 years' experience in statistical analysis; iii) sound knowledge of all types of statistical analysis tools viz., conventional, software and web-based; iv) sound experience in designing of survey questionnaires, interview schedules and other statistical survey tools; v) at least 5 years' experience in data collection and 5 years in data analysis, using all types of statistical analysis tools; and vi) understanding of result based management (RBM).

8.4 Specific **tasks of the IVA team members** are as follows:

8.4.1 Team Leader is responsible for overseeing timely implementation of all tasks assigned to IVA. Working with team members, she/he will fulfil the following responsibilities/duties: i) lead the sharpening of the Verification Protocols for all DLIs with the focus on the methodology for verification (ii) calculate and propose the correct sample sizes for verification; iii) closely coordinate with the DSC&WD, GoO and World Bank team leader to execute a delivery linked assessment of REWARD; iv) monitor and supervise IVA team to ensure timely delivery of reports; and v) prepare and submit all the reports to the DSC&WD.

8.4.2 Watershed Management Specialist: i) lead the verification of all DLIs related to soil science and hydrology; ii) advise the Team Leader on methodology and related data collection and analysis; iii) liaise with the line departments and technical and scientific partners on technical issues; iv) train the Statistical Analyst (s) in data collection using verification checklists; and v) assist the Team Leader in compilation of Verification Reports and Annual Verification Reports.

8.4.3 Social Development Specialist: i) lead the verification of all DLIs related to GP/ watershed committees ii) advise the Team Leader on methodology and related data collection and analysis on participatory issues; iii) liaise with the line departments, capacity building organizations, any support organizations and local governments; iv) train the Statistical Analyst/ research associates in conducting quality FGDs/ community consultations; and v) assist the Team Leader in compilation of Verification Reports and Annual Verification Reports.

8.4.4 FPO Specialist: i) lead the verification of DLI related to FPO; ii) advise the Team Leader on methodology and related data collection and analysis; iii) train the Statistical Analyst (s) in data collection using verification checklists; and v) assist the Team Leader in compilation of Verification Reports and Annual Verification Reports

8.4.5 Statistical Analyst: i) carry out surveys, data collection and physical verification; ii) assist the Team Leader and the Specialists in data compilation and statistical analysis; and iii) generate and compile all the tables, maps and charts for inclusion in the Baseline, Final and Annual Verification Reports.

9. Reporting

9.1 The IVA shall carry out this assignment under the overall guidance of the DSC&WD. The DSC&WD will review and approve the protocols for verification of progress, including survey methodology, and the structure of verification reports for REWARD. The DSC&WD will also review each report and discuss discrepancies, if any, with the IVA and seek clarifications.

9.2 The IVA shall submit the verification reports, supported with credible state level data, to the DSC&WD.

10. Government support to IVA

10.1 DSC&WD will establish a review committee to assess the performance of the IVA on an annual basis. DSC&WD will be responsible for providing all the relevant documents required for verification and will also facilitate liaison and coordination of the IVA with the partners and with the district and block officials and community institutions. DSC&WD will review all draft reports submitted by the IVA and discuss any discrepancies noticed and assist in finalizing the reports in a timely manner. DSC&WD will also offer any other support required by the IVA to carry out this assignment in an effective and timely manner.

11. Ownership and Confidentiality of Data

11.1 All information, reports and plans, both print and electronic, as well as the system that may have been designed specifically for REWARD, in any format, will belong to DSC&WD and are strictly confidential. The IVA shall not use the data for their own research purposes, nor license/authorize the data to be used by others. Ethical considerations in research will be followed by the IVA, including non-disclosure of personal information of respondents, freedom to not participate in the survey, use of local language, and other considerations that protect the respondents.

12. Terms of Payment

1. 10 percent of the contract amount will be paid after development of methodology and verification system, and establishment of baseline, within 3 months of signing of the contract. The remaining 90 percent of the payment will be performance based.

Program Year	Expected Annual Payment Schedule
Year-1 FY 21-22	10 percent of the contract amount will be paid after development of methodology and verification system, and establishment of baseline, within first three months of the program. This amount also covers the verification of any request made by DSC&WD in the first year.
Year-2 FY 22-23	15 percent of the contract amount will be released after submission of each of the Verification Reports (VR) and its approval by the World Bank, for the second year of the program.
Year-3 FY 23-24	20 percent of the contract amount will be released after submission of each of the Verification Reports (VR) and its approval by the World Bank, for the third year of the program.
Year-4 FY 24-25	25 percent of the contract amount will be released after submission of each of the Verification Reports (VR) and its approval by the World Bank, for the fourth year of the program.
Year-5 FY 25-26	30 percent of the contract amount will be released after submission of each of the Verification Reports (VR) and its approval by the World Bank, for the fifth year of the program.

13. Other Contract Considerations

13.1 The IVA firm including its staff and consultant experts – who are responsible for verification of program results – should not have any conflict of interest from the perspective of project implementation arrangements. To this end, the IVA firm and its consultants would be ineligible to participate any tender / receive any other contract award/ engage in any other manner under the REWARD project.

13.2 The **contract** will be for 5 years (i.e. **60 months**). Continuation of the **contract each year** will be taken subject to employer's satisfaction of the performance of the Consultant. A review committee in the Department of Agriculture & FE will assess the performance of the IVA on an annual basis.

13.3 DSC&WD may extend the IVA contract at no additional cost if the REWARD Project is extended beyond its planned closing date. This extension would entail no change in the scope of services under this TOR.

13.4 **While** currently there are only four DLIs to be verified, the same could change due to any foreseen circumstances during the implementation period. In such circumstances the DSC&WD and the IVA shall discuss the revised scope and agree on revised terms and conditions, acceptable to both parties.

13.5 **Under** the circumstances where the IVA is not able to discharge its role, due to any unforeseen situation and opts out of the agreement, the IVA shall hand over all the project related materials collected (documents, electronic documents, films, data etc) and reports developed (draft/ completed) to DSC&WD without any failure.

Annexure- XI: Accounting and Financial Management

- **Guiding Principles:** The guiding principles for the design of the financial management arrangements for this project are two-fold-
 - Build upon the successful implementation of the REWARD project with the implementing agency (DSC&WD) and
 - Use of country fiduciary system to the extent feasible and considered satisfactory for meeting the essential fiduciary requirements.
- **Implementing entities for the project:** Directorate of Soil conservation & Watershed Development (DSC&WD) Government of Odisha (GoO) would be the implementing agencies for the project along with technical partners. Four technical partners (IIT-BBSR, OUAT, ICAR-IIWM, ICAR-IISWC) will provide technical services for Hydrology activities and data integration into hydrology Report. Three technical partners (OUAT, ORSAC, NBSSLUP) will provide technical services for LRI activities, hydrology data integration in LRI report.
- **Funds Flow Arrangements:** The State Government has designated DSC&WD as Single Nodal Agency (SNA) for implementing REWARD. The SNA will open a single nodal account at state level in a Scheduled Commercial Bank authorise to conduct government business by the state government. DSC&WD should use the SNA's account with clearly defined drawing limits set for that account. However, depending on operational requirements, zero balance subsidiary account may be opened in the same branch of the selected bank or in different branches. All zero-balance subsidiary account will have allocated drawing limits to be decided by the DSC&WD from time to time and will draw on real time basis from the Single Nodal Account of the REWARD Project. The available drawing limit will get reduced by the extent of utilisation. Funds will be released to the States strictly on the basis of balance funds of the REWARD available in the state treasury and bank account of the DSC&WD as per PFMS in consonance with rule 232 (V) of the General Financial Rules, 2017.
- **Budgeting:** DSC&WD: The proposed REWARD funds would flow through budget head 23- 2402-00-3441REWARD - Externally Aided Project (EAP) which has been created. To capture Project Director Watersheds (Deputy Director Soil conservations) at district level and scientific partner wise flows, the Directorate would work with State Treasury to create DDO wise codes which would help in providing funds through treasury to those offices directly as well as account for the expenditure based on bills submitted in the Treasury. Based on the estimated expenditure for each Financial Year Expenditure provision also needs to be created under this budget code.
- **Staffing:** The FM unit in DSC&WD would be headed by The AO who would be a senior Odisha State Accounts Department (OSAD) officer. The AO would be supported by accounts and audit officers from OSAD. Apart from them, the DSC&WD will engage two existing Assistants (with experience in computerized accounting) after effectiveness at Head Office (HO) level. In case of project head office and scientific partner one commerce graduate (with experience in computerized accounting) for each office would be appointed within three months of effectiveness. Besides this DSC&WD will procure experts from different field during the project period.
- **Accounting and Financial Reporting:** Accounting for project expenditure will be maintained on Cash basis of accounting and separate books of accounts will be maintained for the project. The project funds would be accounted by DSC&WD and scientific partner. Separate cashbook and ledger accounts would be maintained by the DSC&WD and scientific partner. The overall accounting for expenditure would be carried out by treasury while the details of the expenditure would be maintained by the HO and scientific partner. All the accounting locations would be having separate cashbook to record the program expenditure. The accounting would be carried out using a common chart of accounts. The program accounts would initially start with maintaining a manual cashbook and the need for computerized accounting will be assessed at the end of six months. If necessitated, MIS software for project accounting will be rolled out.

- **Internal Audit:** Internal audit would be an integral part of the project design and would cover all activities under project to be carried out by DSC&WD and scientific partner. The internal audit would be carried out by a Chartered Accountancy firm. The Terms of Reference (ToR) for the internal audit would cover review of aspects covering internal controls and contract management. The auditors would be appointed by DSC&WD. The auditor would be appointed within twelve months from effectiveness. The half yearly audit reports along with the compliance would be shared with the Bank.
- **Internal Control:** All financial controls applicable to routine GoO expenditures would also apply to the expenditures under the program. All payments would be approved/ vetted in accordance with the schedule of powers in place for DSC&WD and scientific partner. All program related receipts and payments/ withdrawals would be reconciled with periodic Treasury Statements. To ensure the integrity of Project Accounting and Financial Management System, each division and DSC&WD shall establish proper internal check and internal control mechanism. It includes establishment of procedures and systems for ensuring standard internal control such as checking of expenditures, appropriate documentation, levels of authorisation, periodic bank reconciliation and physical verification. The divisions and DSC&WD will develop a system to ensure that expenditures are incurred with due regard to economy, efficiency and propriety.
- **External Audit:** The annual audit of the Project Financial Statements (PFS) would be carried out by State office of the Comptroller and Auditor General of India (CAG). The PFS in an agreed format would be subject to audit by the CAG under Terms of Reference (TOR) already agreed between the Bank and CAG. All supporting records and documents under the project would be subject to this audit. The PFS would summarize all receipts and expenditures reported in the IUFRs. The annual audit report would consist of
 - annual audited project financial statements
 - audit opinion and
 - management letter highlighting weaknesses, if any, and identifying areas for improvement.

Timeline for conduct of audit- The DSC&WD shall be responsible to get the audit completed for their operations and submit the audit report on or before 30 September each year after the end of financial year of project. Any difference between the expenditure reported in the IUFRs and those reported in the annual project audit reports would be analysed and those expenditures which are confirmed by the Bank as being not eligible for funding would be adjusted in the subsequent disbursements.

Responsibility for conducting the audit- Timely completion of audit at DSC&WD and submission of audit certificate along with project financial statements shall be the responsibility of the Head of Finance. The Head of Finance shall oversee and monitor that the necessary arrangements have been made well in time for conduct and reporting of the audit.
- **Disbursement Arrangements:** Applicable disbursement methods include: Advance, Reimbursement and Direct payment. A Designated Account (DA) would be maintained in the RBI for the project. The ceiling of advance into the Designated Account would be \$ 3 million. The project would submit withdrawal applications supported by DLI duly vetted by IVA to the Controller Aid, Accounts and Audit in DEA for onward submission to Bank for replenishment of the DA or reimbursement. The Bank would replenish DA equivalent to the amount claimed on eligible expenditure by the project. Disbursements would be made based on DLI submitted by the project. These DLI would reflect the actual outcome for the project components.

All expenditures reported would be subject to confirmation/certification by the annual audit reports and report of IVA. Any difference between the expenditure reported and those reported in the annual audit reports would be analysed and those expenditures which are confirmed by the Bank as being not eligible for funding (refundable to IDA), would be adjusted in the subsequent disbursements. The reporting formats would be agreed by negotiations.

Terms of Reference

External Audit

Introduction

The Governments of Odisha and Karnataka in partnership with Government of India are preparing a program for 'Rejuvenating Watersheds for Agricultural Resilience through Innovative Development' [REWARD] and have sought a Program for Results [PforR] IBRD Loan of USD 134.6 million from the World Bank.

The Program Development Objective is to 'Strengthen capacities of national and state institutions to implement science-based watershed development for improving farmers' resilience and soil moisture outcomes in selected watersheds of participating states and to support mainstreaming across states'. Achievement of the PDO will be measured in terms of:

- National Centre for Excellence (CoE) in Watershed Development is established and functional;
- Area on which science-based watershed development has been implemented (hectares);
- Farmers adopt a core set of resilient agriculture technologies and practices (number, disaggregated by gender and social group);
- Targeted watershed area showing an increase in rain adjusted soil moisture (percentage); and
- Direct Program beneficiaries (number, disaggregated by gender and social group).

The projected expenditure plan for DoLR and the two states has been assessed based on current expenditure patterns and the budget approved by the Ministry of Finance, GoI in the EFC meeting held on August 6, 2021 for the new generation WDC-PMKSY program. Under the expected expenditure from the DoLR for the REWARD Program, only 0.5 percent of the national expected outlay is considered (budget head 2501- 11&12 in the Demand for Grants made annually by the DoLR), which is used for project management and guidance activities – the envisaged role of DoLR in the REWARD Program. The share of IBRD loan in the total program budget of USD 410.96 million is 28 percent; with 34 percent, 26 percent and 31 percent respectively for DoLR, Karnataka, and Odisha.

Table 1: REWARD: Program Budget (USD million)

	A	B	C	D	E	F
	Projected government share (under WDC-PMKSY)	Additional government share (DEA requirement)	Total government share (A+B)	IBRD share	Total program budget (C+D)	IBRD percent contribution to total program budget
DoLR	5.41	6.00	11.41	6	17.41	34%
Karnataka	148.65	25.71	174.36	60	234.36	26%
Odisha	89.19	21.00	110.19	49	159.19	31%
TOTAL	243.25	52.71	295.96	115	410.96	28%

Program Scope & Components

The REWARD Program is divided into two Results Areas (RAs). The RAs outline the broad interface between Bank contributions to the national watershed program at the central and state levels, and the following two key results areas that the Program will incentivize:

Result Area 1: Strengthened Institutions and Supportive Policy for Watershed Development

Result Area 2: Science-based Watershed Development and Enhanced Livelihoods

Implementation Arrangements

The State Watershed Department¹ (SWD), also known State Level Nodal Agency (SLNA), is housed within the Department of Agriculture & Farmers' Empowerment in Odisha and will be the key state level implementing agency. The SWD is headed by a Commissioner and reports to the Secretary of the parent department. The Commissioner is supported by senior technical officers drawn from relevant sectors such as agriculture, horticulture, and forestry. The SWD is responsible for overall program development, budget allocations, technical sanctions, support to districts in implementation, coordination with GoI, World Bank and other organizations and monitoring. Experienced Non-Governmental Organizations (NGOs) are also contracted periodically to deliver trainings. All the institutions follow the National Watershed Guidelines for developing training modules. Under the REWARD Program, the SWD will work with these institutions to strengthen the training content, develop standard modules, and deliver the trainings in a cascade mode, starting with Training of Trainers. The scientific and technical partners will also be used to develop trainings related to science-based planning and train officers from the SWD.

At the district level, a District Office² is responsible for overseeing the implementation of watershed programs. The district office is headed by a Joint Director - Agriculture (or an officer of that rank) and supported by a multi-disciplinary technical team of about 10 people. A district level watershed committee, headed by the District Collector/CEO, approves the DPRs and monitors progress. The district office is responsible for technical guidance to Project Implementing Agencies (PIAs), review and approval of DPRs and annual action plans, organizing necessary capacity building, and financial management. The actual planning, DPR preparation and implementation is carried out by the PIA located either at the block level or sub-block level, based on the program guidelines. A PIA is set up for a project period (5-7 years) and gets dismantled after handing over the completed project to GPs and hence, is called a 'temporary arrangement'. The PIAs are headed by an Agriculture Officer (or an officer of that rank) and supported by a Watershed Development Team (WDT) of 4-5 junior officers, some of them on contract.

GP Level. The Watershed Committee [WC] is the main local institution responsible for implementing micro-watershed projects. In Odisha, the WC is an independent registered organization. The PIA facilitates formation of User Groups and Self-Help Groups (SHGs), in the initial stages. As second step, the PIA facilitates creation of a WC with representatives of these groups and the Gram Panchayat. The WC is approved by the Gram Sabha. Once formed and approved, the WC is responsible for assisting the PIA in developing plans, facilitating its ratification in Gram Sabha, implementing the watershed works, and maintaining accounts³ and other records. The WC is supported by a Watershed Assistant and the PIA team members. Once the watershed works are completed, they are handed over to the GPs along with the Watershed Development Fund (WDF), to be used for O&M. Discussions with stakeholders reveal that the capacities of the GPs are weak and they do not always have appropriate incentives for owning the projects and maintaining them. The WDF is also insufficient to maintain the watersheds assets. There is also a need for convergence of other schemes at GP levels, such as between WDC-PMKSY and MNREGA. The O&M policy

¹ These units are designated as State Level Nodal Agency (SLNA), as per GoI guidelines

² The District offices and PIAs in Odisha are dedicated for watershed works, In Odisha they are called Watershed Cell cum Data Center (WCDC).

³ A separate bank account is opened for each watershed project and project funds are deposited into this account, based on annual plans. The signatories for the account are President and Secretary of WC and the PIA head.

guidelines are not detailed enough and there is inadequate support from block/ district levels during the maintenance phase. The Program will support the two states in strengthening capacity of GPs to undertake improved maintenance of soil and water conservation assets, establish better systems to monitor maintenance, and incentivize their performance and also develop appropriate O&M policies.

Financial Management Arrangements

The design of the financial management arrangements for the Program is largely predicated on the findings of the Integrated Fiduciary Assessment report (IFSA) and the GoO's existing Acts, guidelines, rules on public financial management.

The State Watershed Departments i.e. the nodal implementing agency for the REWARD Program will be responsible for the accounting and reporting for all state and district level expenditures and consolidating the expenditures incurred under the Program.

Financial management arrangements for REWARD will by and large, be predicated on the lines of IWMP/PMKSY. REWARD will be budgeted for as a separate line under the implementing Departments/Ministry and be approved annually by the respective legislative processes. In Odisha, the budgets will be drawn and transferred into the bank account/s of SLNA and thereon into bank accounts at district/block and Watershed Committee levels. As mandated by GoI, Odisha uses Project Financial Management System [PFMS⁴] for fund management and expenditure processing using the Expenditure, Advance and Transfer [EAT] module. Expenditure reports for IWMP/PMKSY are also uploaded for each district [WCDC] on the web-based MIS portal of DoLR. For the purpose, it has been agreed that:

- REWARD will be set up as new scheme in PFMS platform – single state level bank account [with linked zero balance accounts at district and WDC levels] will be set up and EAT module will be used for all payments under the program;
- The same financial management architecture will be applied for the new phase of PMKSY scheme [starting 01-Apr-2021]; this will delink the new phase from the earlier phases of PMKSY;
- Legacy issues in PFMS with respect to the earlier phases will be separately reviewed and corrective measures agreed and implemented by Fiduciary Management Committee [proposed] comprising the Accounts Officer (State PMU), Finance Department Representative, A & FE Department representative and State PFMS representative.
- For the purpose, the TORs of private CA firms for conduct of annual internal audit will be strengthened, with special focus on reconciliation of expenditures posted on PFMS/DoLR MIS with the manual records;

Audit Standards to be followed for audit of the Program

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 program funds for purposes other than as defined in the legal agreement remains with the Government of Odisha, the audit should be planned so as to have a reasonable expectation of detecting material mis-statements in the program financial statements.

An audit report on the program financial statements should be prepared in accordance with the common practice of government accounting system of Government of Odisha. Formats for expressing the Management Letter,

4 Public Financial Management System [PFMS] developed by the Planning Commission and the Office of the Controller of Accounts, Ministry of Finance, GoI the objective of establishing a financial management platform for all plan schemes, a database of all recipient agencies, integration with core banking solution of banks handling plan funds, integration with State Treasuries and efficient and effective tracking of fund flow to the lowest level of implementation for plan scheme of the Government.

Management Assertion Letter and Model Audit Report have been suggested from ICAI standards. ICAI 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 Program [and the relevant loan or credit agreement and, where applicable].

Audit Scope

SLNA will engage a firm of chartered accountants to audit and certify the consolidated program annual financial statements of the Program [IWMP (New) and REWARD]. The scope of the audit will extend to the Program and will be additional to any institutional statutory audit processes that may already be in place. The TORs for the audit has been agreed with the World Bank. The audits would be conducted on an annual basis and the audit reports would be submitted to DoLR and the World Bank within six months of the close of each financial year.

In conducting the audit, special attention should be paid to the following:

- All Program funds have been used in accordance with the guidelines of the Program [and 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 Program Agreement, and the Minutes of Negotiations
- It is the responsibility of the auditor to study and evaluate the prevailing system of internal control and assessment of risk relating to the receipt, utilization and recording of program funds.
- Effective program financial management systems⁵, 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 procedures⁶; 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.
- All necessary supporting documents, records, and accounts have been kept in respect of all program transactions. Clear linkages should exist between the books of account and Annual Program Financial Statements [PFS].
- The Program accounts have been prepared in accordance with accepted accounting principles and give a true and fair view of the financial position of the program at the year end and of resources and expenditures for the year ended on that date.
- Presentation and disclosure of the financial statements should be as required by the applicable financial reporting framework;
- Audit report should comply with the requirements of the relevant statutes, the applicable Standards on Auditing and the other relevant pronouncements issued by ICAI.
- The auditor has to carry out the audit work and the work in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India.
- The auditor has to report any departure from applicable financial reporting framework or significant observations that are relevant to their responsibilities noticed in the course of the audit.
- The auditor should report all statutory non-compliances noticed during the course of audit.

⁵ The financial management system would include methods and records established to identify, assemble, analyze, classify, record and report on transactions and to maintain accountability for the related assets and liabilities.

⁶ These include the Financial Management Manual and Memorandum of Understandings between OPRM and other implementing agencies.

- The auditor has to confirm that there are no independence issues as regards their appointment/ functioning as the statutory auditor.
- Before finalizing their audit report, the auditor shall discuss and communicate with those concerned with governance his conclusions that would form the content of the audit report.

Coverage for the External Audit

The audit would cover the entire program i.e., covering the implementing units at the Program level (State, district and GP) and will cover REWARD and IWMP [New]. The audit would also cover all consultancies or other contracts that may be entered into by the implementing agencies. The audit will extend to the Watershed Development Committees at Gram Panchayat level. Specific areas of coverage of the audit will include the following:

- a) An assessment of the adequacy of the program financial management systems, including internal controls. 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 controls in areas where they are lacking; verification of assets and liabilities.
- b) Efficiency and timeliness of the funds flow mechanism at the State and district units of the Program.
- c) Whether the accounting for the advances and fund releases are properly recorded in the accounting books and systems in place for monitoring the receipt of periodic financial reports and follow up on outstanding advances are adequate.
- d) Whether the accounts of the District level expenditures are incorporated in a timely manner at the State level.
- e) An assessment of compliance with provisions of financing agreements (IBRD Program Agreement), especially those relating to procurement, accounting and financial matters.
- f) All necessary supporting documents, records, and accounts have been kept in respect of all program activities and that clear linkages exist between accounting records, accounts books and the periodic financial reports.
- g) Adequate records are maintained regarding the assets created and assets acquired by the Program, including details of cost, identification and location of assets and ensuring that there is a system of physical verifications of assets.
- h) The auditor is expected to obtain and satisfactorily document sufficient audit evidence to support audit conclusions.
- o) Bank reconciliations have been carried out on a monthly basis.
- p) An assessment based on list of awarded contracts to;
 - Confirm that none of contracts were awarded above high value threshold for individual contract (i.e. USD 115M for Works, USD 75M for Goods, Information Technology & Non-consultancy services and USD 30M for Consultancy Firms)
 - Confirm, on basis of a sample check, that none of the contracts were awarded to any firm/individual debarred by the World Bank. Latest list of debarred firms/ individuals is updated at <https://www.worldbank.org/en/projects-operations/procurement/debarred-firms>

Content of Audit Report:

Financial Statements-

Consolidated Program Financial Statements will be prepared, with separate appendices for REWARD and IWMP [New] schemes and should include:

- (A) Receipts & Payments Account, Income & Expenditure Accounts and Balance Sheet.
- (B) Management Assertion: Program Management should sign the program financial statements and provide a written acknowledgement of its responsibility for the preparation and fair presentation of the financial statements and an assertion that program funds have been expended in accordance with the intended purposes as reflected in the financial statements.

The auditor should apply such tests as the auditor considers necessary under the circumstances to satisfy the audit objective. These expenditures should be carefully examined for program eligibility by reference to the Program Guidelines and the relevant financing agreements. Where ineligible expenditures are identified, these should be separately noted by the auditor.

The program financial statements and the audit report should be received by SLNA not later than six 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 SLNA.

Special emphasis may be laid on items like:

- Timely and accurate preparation of Bank Reconciliation Statements
- Timely and accurate preparation of financial reporting statements
- Surplus funds lying unutilized for long
- Financial records and registers being maintained
- Disbursement of funds to the third parties
- Understand the process of tagging and maintenance of assets acquired under the Program.
- The auditors may perform physical verification of assets (if considered necessary)
- Whether capacities for financial management as indicated in the operations manual have been created

Others

- Whether appropriate internal controls are operating satisfactorily.
- The auditor should suggest methods for improving weak controls or creating them where need be.
- Verifying compliance with recommendations of the earlier audit reports and commenting thereon
- Whether statutory compliance has been made in a timely manner

Period, Timing of External Audit

The External Audit will be carried out on a yearly basis. The selected firm(s) will submit in advance and agree on a 'schedule of audit'. This will facilitate smooth and timely conduct of External audit and submission of reports for closing the opinions expressed by the professional firm.

Reporting

The professional firm conducting the External audit shall provide the reports with the following frequency:

- Audit report within 45 days of the end of completing External audit.
- Summary of audit findings and recommendations
- Support/Inputs to be provided by SLNA.

External audit report containing the following elements should be shared with the Program Director/Finance Team of SLNA:

- a) The objective and scope of the External audit
- b) A summary of the External auditing procedures performed
- c) The External auditor's opinion as to the overall adequacy of the systems of internal management control, indicating unambiguously whether that opinion is unqualified, qualified, or adverse
- d) Key management issues
- e) Detailed External audit findings, with adequate descriptions of weaknesses identified and the associated business impact and risk
- f) procurement processes for both Goods & Services procured as per the approved procurement plan
- g) Appropriate and reasonable recommendations to address the identified weaknesses; and
- h) Responses to findings and recommendations by authorized persons stating the timeline for remediation and the person responsible

The report should be discussed and agreed with the auditable units and should be structured to list 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.

Management Letter

In addition to the audit report on the program financial statements, the auditor may prepare a management letter 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:

- a) observations on the accounting records, systems, and controls that were examined during the course of the audit;
- b) deficiencies or weakness in systems and controls, together with specific recommendations for improvement;
- c) compliance with financial covenants in the financing agreements;
- d) matters that might have a significant impact on the implementation of the Program;
- e) the status of recommendations from previous management letters, including any issues which remain to be addressed and any issues which recurred; and
- f) any other matters that the auditor considers pertinent.
- g) The auditor should supply the Bank through the SLNA with a copy of the management letter together with the audit report on the program 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 Program financial statements.

General

The professional firm would be given access to all documents, correspondence, and any other information relating to the Program and deemed necessary by the auditor. The auditor should become familiar with the Program, and with the relevant policies and guidelines of the Program. The auditor would be provided copies of the Program Operations Manual, Program Appraisal Document, Technical and Fiduciary Assessment Documents of the World Bank, Loan Agreement and Program Agreement with IBRD (including agreed Minutes of negotiations). It is also mandatory that the auditor must be acquainted with the state government rules and procedures for financial management, procurement etc. that will also be relevant to the Program implementation.

DRAFT PROUREMENT PLAN FOR GOODS

Project Name: REWARD,
ODISHA Project Identification
No./Credit No.: -

Sl. No.	Procurement Plan for	Name of the component as per cost table	Cost LD No	Description	Quantity (No.s/LS)	Estimated cost per unit (Rs.Lakhs)	Total Estimated Cost (Rs.Lakhs)	Procurement to be done by	Number of Contracts	Commercial Bid Type (Lumpsum/Item wise)	Tender Evaluation Type(One/Two Cover)	Tendor Method (Limited/Advertised)	Tender Type (Open or Pre-Qualified)	Preparation of Specifications/BD date	Bid Invitation date	Pre-bid Meeting date	Last date for submission of bids	Date of opening of bids	Preparation Evaluation Report	Issue of Notification of Award date	Date of Signing Contract	Awarded Vendor's Name	Contract Amount (Rs. Lakhs)	Quantity Awarded	Completion Date	Procurement Status(Completed/Ongoing/Dropped)	Remarks
1	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
				Online power backup with accessories	1	10.00	10.00	Procurement to be done by Technical Partner																			
				Printers and scanners	LS	LS	2.50	Procurement to be done by Technical Partner																			
				Multifunction Photocopier	LS	LS	1.00	Procurement to be done by Technical Partner																			
				Lab working table	LS	LS	1.50	Procurement to be done by Technical Partner																			
				Split AC's in PMU	4	0.60	2.40	Procurement to be done by Technical Partner																			
				Furniture & furnishing at PMU and site office	L.S.	10.00	10.00	Procurement to be done by Technical Partner																			
				Record and files storage units/Furniture	L.S.	5.00	5.00	Procurement to be done by Technical Partner																			
				Portable data storage devices etc	LS	LS	1.00	Procurement to be done by Technical Partner																			
				Laptops with accessories	6	1.00	6.00	Procurement to be done by Technical Partner																			
				Desktop PC's + software + Inverter+Printer	5	1.00	5.00	Procurement to be done by Technical Partner																			
				Computer assisted field data collection device	LS	LS	1.50	Procurement to be done by Technical Partner																			
				Utility software for data processing	LS	5.00	5.00	Procurement to be done by Technical Partner																			
				Strengthening of soil & GIS lab (Civil & Electrical Works, Flooring, Partition/POP/window mess/lighting/biometric lock/switches/MCB/AC/Earthing etc.)	LS		30.00	Procurement to be done by Technical Partner																			
				Audiovisual aids including interactive panel, digital podium, outdoor arrangement unit, kiosk etc. for training/ workshop/ seminar	LS		10.00	Procurement to be done by Technical Partner																			
				ArcSWAT compatible ArcGIS software, Image processing software, Hydrological models including any hardware	LS		30.00	Procurement to be done by Technical Partner																			
				Guelph permeameter	1	3.00	3.00	Procurement to be done by Technical Partner																			
				Leaf area meter/ Plant canopy analyser	1	5.00	5.00	Procurement to be done by Technical Partner																			

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	Miscellaneous equipments as per need (water meter, tension meter, core cutter, penetrometer etc.)	2	5.00	10.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Repair and maintenance including AMC as per need	0	LS	32.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Telemetric Rain Gauges (TRG)	12	0.80	9.60	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Automatic stage level recorder cum sediment sampler (Thalimide) (Telemetric stream flow and stage recorder) at outlet	12	10.00	120.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Check dam with Housing for instrumentation	12	7.00	84.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Theta probe with data logger	12	2.00	24.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Piezometers/ Observation wells @ 3 per MWS	36	0.50	18.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						
	Groundwater level recorder @ 3 per partners	3	0.50	1.50	Procurement to be done by DSC&WD	1	Item-wise	Two	Limited Tender Enquiry	Open	17 August 2021	22 August 2021	01 September 2021	23 September 2021	27 September 2021	08 October 2021	16 October 2021	23 October 2021						
	Telemetric Current meter etc.@ 3 per partners	3	1.00	3.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Limited Tender Enquiry	Open	17 August 2021	22 August 2021	01 September 2021	23 September 2021	27 September 2021	08 October 2021	16 October 2021	23 October 2021						
	Total	-	-	571.90																				
Operational Expenses	Strengthening of Internet connectivity	L.S.	0	3.50	Procurement to be done by Technical Partner																			
	Office Consumables	L.S.	0	10.00	Procurement to be done by Technical Partner																			
	Renewal of software license and website	L.S.	0	6.50	Procurement to be done by Technical Partner																			
	Vehicle hiring for field visit, surveying, data monitoring etc	L.S.	0	30.00	Procurement to be done by Technical Partner																			
	Establishing site office (One) At Nabaragpur	L.S.	0	9.00	Procurement to be done by Technical Partner																			
	Strengthening of dedicated project management unit	L.S.	0	2.50	Procurement to be done by Technical Partner																			
	Chemical and glassware	L.S.	0	2.50	Procurement to be done by Technical Partner																			
	Other Miscellaneous items + insurance charges for the project officers & staff	L.S.	0	12.50	Procurement to be done by Technical Partner																			
	Total	-	-	76.5																				
	GRAND TOTAL	-	-	648.40																				
2	Cost of computational facility(PCs: 7; Laptop: 2; Server: 1; Work station: 2), software +AMC, equipment for field experiment and data monitoring and laboratory experiments (GPS, Hyprop, K-Sat, Tension disk infiltrometer, Guelph Perceameter, High definition camera, core samplers, hot air oven, hydrometer set, Atterberg limit apparatus, chemicals for soil and water sample processing, Furniture etc.)	-	-	94.50	Procurement to be done by Technical Partner																			
	Telemetric AWS with the sensors for rainfall, temperature, wind direction, wind speed, soil moisture, soil temperature, sunshine hour and RH	1 nos.	-	5.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Limited Tender Enquiry	Open	17 August 2021	22 August 2021	01 September 2021	23 September 2021	27 September 2021	08 October 2021	16 October 2021	23 October 2021						
	Telemetric rain gauge	1 nos.	-	1.00	Procurement to be done by DSC&WD	1	Item-wise	Local Purchase Committee																
	Telemetric stream flow and stage recorder + Suspended sediment sampler	3 nos.	-	30.00	Procurement to be done by DSC&WD	1	Item-wise	Two	Advertised Tender Enquiry	Open	19 August 2021	24 August 2021	03 September 2021	25 September 2021	30 September 2021	11 October 2021	20 October 2021	28 October 2021						

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DRAFT PROUREMENT PLAN FOR NON-CONSULTANCY

Project Name: REWARD, ODISHA

Project Identification No./Credit No.:-

Sl. No.	Procurement Plan for	Name of the component as per cost table	Cost LD No	Description	Quantity (Nos./LS)	Estimated cost per unit (Rs. Lakhs)	Total Estimated Cost (Rs. Lakhs)	Number of Contracts	Commercial Bid Type (Lumpsum/Item wise)	Tender Evaluation Type (One/Two Cover)	Tender Method (Limited/Advertised/Expression of Interest)	Tender Type (Open or Pre-Qualified)	Preparation of Specifications/BID date	Bid Invitation date	Pre-bid Meeting date	Last date for submission of bids	Date of opening of bids	Preparation Evaluation Report date	Issue of Notification of Award date	Date of Signing Contract	Awarded Vendor's Name	Contract Amount (Rs. Lakhs)	Quantity Awarded	Completion Date	Procurement Status (Completed/ Ongoing/ Dropped)	Remarks
1	ISWC	Contractual Manpower		Hiring of specific consultants for resistivity mapping Aquifer characteristics	-	LS	10.00																			
				Research Associate	1	0.65	44.00																			
				SRF/YP	2	0.36	48.70																			
				Field Assistant (YP)	4	0.15	36.00																			
				Computer application and programmer	1	0.35	21.00																			
				GIS analyst (YP)	1	0.36	21.60																			
				Office accountant (YP)	1	0.15	9.00																			
				Multitasking staff	2	0.15	18.00																			
				Job contract for specified data monitoring	4	0.05	1.00																			
				EPP@13%, ESI@3.25% and Service tax@1.75% on salary of contractual staff excluding item 1 if applicable as per the labour laws	-	-	35.90																			
		HRD/Capacity Building		Total	-	-	245.20																			
				Training on data monitoring, compilation etc	-	-	4.00																			
				No. of model watershed visit in National Level	-	-	2.00																			
				No. of model watershed visit in International Level	-	-	30.00																			
				Training on design of soil and water conservation structures, improved irrigation methods and management. Preparation of DPR for MWS.	-	-	13.50																			
				Training on use of DSS for selection and design of SWC structures. Preparation of DPR for MWS.	-	-	12.00																			
				Attending Short term courses/conferences in National and International level for updating knowledge	-	-	8.00																			
				Skill development training -GIS/RS, Modeling, Data Analysis etc	-	-	4.00																			
				Workshops/review meetings to be organized	-	-	14.00																			
				Total	-	-	87.50																			
		TA & DA		TA/DA	-	-	70.00																			
		Institutional Charges		Institutional charges @ 15%	-	-	95.20																			
		GRAND TOTAL			-	-	497.90																			
2	IIT-BBSR	Man power (Consultancy)		Project Management Consultants (PI & Co-PIs)	-	-	90.00																			
				Overhead (25%)	-	-	22.50																			
				GST (18%)	-	-	20.25																			
				Total	-	-	132.75																			
		Contractual Man power (Research)		Project Manager	01 nos.	-	52.20																			
				Research Associate	01 nos.	-	37.58																			
				JRF/SRF	02 nos.	-	48.72																			
				Multi-task Office Executive	01 nos.	-	32.02																			
				Project Associate	02 nos.	-	41.76																			
				Field Assistants	02 nos.	-	18.00																			
				Data collector	03 nos.	-	9.00																			
				Total	-	-	239.28																			
		Field Experiments		Expenses towards installation & maintainace of testbeds, sensors and equipments, field experiments like Vertical Electrical Sounding, Pumping test, River crossection, Soil moisture, Tension disk infloimeter test, Guelph pereameter test, disturb & undisturb soil sampling, Test drilling & Installation of observation wells & need based hiring agency for field experiments and DSS development	-	-	40.00																			
		Social Sesity and Outreach Activities		Social sensitivity & outreach activities, and demonstration of the technology & protocols	-	-	12.00																			
		TA & DA		Site visits for field experiments& data monitoring to attend project meetings at partner Institutes, national & international conferences, travel related to social sensitivity & outreach activitiesand other project execution related activities	-	-	58.40																			
		Institutional Overhead		Institute Overhead on Recurring Expenses [10% on Manpower Research], Field Experiments, Social Sensitivity & Outreach, Consumable & Contingency, Travel]	-	-	38.37																			
		GRAND TOTAL			-	-	520.80																			

DRAFT PROUREMENT PLAN FOR SERVICES 'CONSULTANCY'																									
Project Name: REWARD, ODISHA Project Identification No./Credit No.:																									
Sl. No.	Name of the component as per cost table	Cost ID No.	Description of the Consultancy	Quantity (No.)	Responsibilities	Total Estimated Cost (Rs. Lakhs)	Number of Contracts	Commercial Bid Type (Lumpsum/Time Based)	Tender Evaluation Type (One/Two/Three Cover)	Tender Type (Open or Pre-Qualified)	Method of Procurement (Expression of Interest/Single Source/Selection)	Preparation of ToR	Expression of Interest (EOI) Date	Request for Proposal (RFP) Date	Pre-bid Meeting date	Last date for submission of bids	Date of opening of Proposals	Preparation Evaluation Report date	Issue of Letter of Acceptance Date	Date of Signing Contract	Awarded Vendor's Name	Contract Amount (Rs. Lakhs)	Completion Date	Procurement Status Completed/On going/Dropped	Remarks
1	Technical Partners	1	IIT-BBSR	1	Comprehensive hydrologic assessment and monitoring for science-based watershed planning and management in two selected MWS in Dhenkanal by IIT-BBS	727.40	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
2		2	OUAT	1	Comprehensive hydrologic assessment and monitoring for science-based watershed planning and management in 27 selected MWS in Deogarh, Sambalpur and Sundergarh districts of Odisha by OUAT	1,716.88	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
3		3	ICAR-IIWM	1	Comprehensive hydrologic assessment and monitoring for science-based watershed planning and management in two selected MWS in Nayagarh district by ICAR-IIWM	799.93	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
4		4	ICAR-IISWC	1	Comprehensive hydrologic assessment and monitoring for science-based watershed planning and management in four selected MWS in Koraput and Nowrangpur districts by ICAR-IISWC, Sunabeda	1,146.30	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
5		5	ICAR-NBSS & LUP	1	Land Resources Inventory for 124572 hectares in Koraput and Sambalpur districts by ICAR-NBSS&LUP, Kolkota	494.26	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
6		6	OUAT-LRI	1	Land Resources Inventory for XXXX hectares in XXXXX districts by OUAT	2,629.16	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
7		7	ORSAC	1	Supply of Rs and GIS products by ORSAC	1,276.68	1	Lumpsum	Two	Pre-Qualified	Single Source Selection	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
8	Consulting Agencies	1	Selection of Independent verification agency (IVA)	1	1. IVA will be responsible for the verification of the Program DLIs as per pre-defined Protocols. 2. Carry out document reviews, physical verification in the field level and sample surveys to measure the results. 3. Prepare verification reports with proof of progress of achievement of DLIs and sub-indicators, for each verification round as determined using Verification Protocols in annexures. 4. Submit verification reports for each verification round and Annual Verification Reports (AVR) and Final Report (FR).	600.00	1	Lumpsum	Two	Pre-Qualified	Single Source Selection (XIMB)	05 August 2021	NA	NA	NA	NA	NA	NA	NA	NA			05 August 2026		
9		1	Hiring of Monitoring and Evaluation Agency (M&E)	1	1. Responsible to carry out program impact evaluation through a Base line study, midterm evaluation and end term evaluation using KPI and other defined indicators. 2. Conduct process monitoring to answer specific area of investigation related to implementation activities. 3. Generate input-output monitoring reports annually with analysis of MIS data. 4. Carry out certain thematic studies on key issues. 5. Prepare the documents on important learnings, success stories and case studies.	2,500.00	1	Lumpsum	Two	Open	QCBS	15 August 2021	18 August 2021	25 August 2021	12 September 2021	14 September 2021	18 September 2021	24 September 2021	29 September 2021	03 October 2021			15 August 2026		
12		1	Selection of Capacity Building Support Agency	1	1. A comprehensive assessment of the systemic and specific CB-related challenges. 2. A broad-based needs assessment of various stakeholders, both individuals and institutions. 3. Development of training material including online courses/learning material with special focus on watershed activities. Review of all training material/ resources available within the state. 4. Identification of different training institutes as per need and coordinate different training programme.	300.00	1	Lumpsum	Two	Open	Expression of Interest	15 September 2021	18 September 2021	25 September 2021	13 October 2021	15 October 2021	19 October 2021	25 October 2021	30 October 2021	03 November 2021			15 September 2026		
13		1	Hiring of Internal Auditor	1	The objective of the internal audit is to determine whether the financial management/arrangements including internal control mechanism as developed are working effectively and to identify areas for improvement and enhancing efficiency.	60.00	1	Lumpsum	Two	Open	Expression of Interest	02 November 2021	05 November 2021	12 November 2021	30 November 2021	02 December 2021	06 December 2021	12 December 2021	17 December 2021	21 December 2021			02 December 2026		
14		1	Hiring of External Auditor	1	The audit would cover the entire program i.e., covering the implementing units at the Program level (State, district and GP) and will cover REWARD and IWMP (New). The audit would also cover all consultancies or other contracts that may be entered into by the implementing agencies. The audit will extend to the Watershed Development Committees at Gram Panchayat level.	30.00	1	Lumpsum	Two	Open	Expression of Interest	02 March 2022	05 March 2022	12 March 2022	30 March 2022	01 April 2022	05 April 2022	11 April 2022	16 April 2022	20 April 2022			02 March 2027		

ANNEX XIV. RESULTS FRAMEWORK MATRIX

Results Framework

COUNTRY: India

Rejuvenating Watersheds for Agricultural Resilience through Innovative Development

Program Development Objective(s)

Strengthen capacities of national and state institutions to adopt improved watershed management for increasing farmers' resilience and support value chains in selected watersheds of participating states.

Program Development Objective Indicators by Objectives/Outcomes

Indicator Name	DLI	Baseline	End Target
Outcomes			
WCs and GPs demonstrate satisfactory WM as measured through a performance rating system. (Percentage)	DLI 1	0.00	30.00
Women headed WCs and GPs demonstrate satisfactory WM as measured through a performance rating system. (Percentage)		0.00	30.00
Land area treated with science-based watershed management technologies. (Hectare(Ha))	DLI 2	0.00	200,000.00
Of which, area in Karnataka (Hectare(Ha))		0.00	100,000.00
Of which, area in Odisha (Hectare(Ha))		0.00	100,000.00
Adoption of resilient agriculture technologies and practices by (number of farmers). (Number)	DLI 3	0.00	43,200.00
Of which, female farmers. (Number)		0.00	12,960.00
Of which, SC and ST farmers. (Number)		0.00	8,640.00
Of which, farmers in Karnataka. (Number)		0.00	27,000.00
Of which, farmers in Odisha. (Number)		0.00	16,200.00

Indicator Name	DLI	Baseline	End Target
Increase in climate-adjusted soil moisture in targeted watershed areas. (Percentage)		0.00	20.00
Farmer Producer Organizations with 25% increase in business turnover relative to baseline. (Number)	DLI 4	0.00	30.00
Of which, FPOs in Karnataka (Number)		0.00	15.00
Of which, FPOs in Odisha (Number)		0.00	15.00
Direct Program Beneficiaries. (Number)		0.00	308,000.00
Of which, female beneficiaries. (Number)		0.00	92,400.00
Of which, SC and ST beneficiaries. (Number)		0.00	61,600.00
Of which, beneficiaries in Karnataka. (Number)		0.00	190,000.00
Of which, beneficiaries in Odisha. (Number)		0.00	118,000.00

Intermediate Results Indicator by Results Areas

Indicator Name	DLI	Baseline	End Target
Results area 1: Strengthened Institutions and Supportive Policy for Watershed Development			
Number of professionals who complete certified training on improved watershed management provided by national center for excellence on watershed management. (Number)	DLI 5	0.00	1,125.00
National technical standards for improved watershed management updated by DoLR and directive issued to states. (Text)	DLI 6	Nil	Yes
Adoption of strengthened watershed O&M policy by number of states. (Number)		0.00	2.00
Results from pilots on science-based fertilizer application captured and disseminated. (Number)		0.00	2.00
Results area 2: Science-based Watershed Development for Climate Resilience and Enhanced Livelihoods			
Land area for which watershed plans are available and approved. (Hectare(Ha))		0.00	800,000.00
Of which, area in Karnataka. (Hectare(Ha))		0.00	500,000.00
Of Which, area in Odisha. (Hectare(Ha))		0.00	300,000.00
Farmers accessing agro-advisory information. (Number)		0.00	115,200.00
Of which, female farmers. (Number)		0.00	34,560.00
Of which, SC and ST farmers. (Number)		0.00	23,040.00
Of which, farmers in Karnataka. (Number)		0.00	72,000.00
Of which, farmers in Odisha. (Number)		0.00	43,200.00
Increase in farmers adopting value chain services of targeted Farmer Producer Organizations. (Percentage)		0.00	25.00
Of which, farmers in Karnataka. (Percentage)		0.00	25.00
Of which, farmers in Odisha (Percentage)		0.00	25.00

Monitoring & Evaluation Plan: PDO Indicators					
Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
WCs and GPs demonstrate satisfactory WM as measured through a performance rating system.	This indicator measures the percentage of Watershed Committees and/or Gram Panchayats (WCs and/or GPs) in the REWARD Program's science-based micro-watersheds, covering 0.25 million hectares areas, that achieve a score above 50% (considered as satisfactory) on the 'Performance Assessment Tool' that is developed specifically for the purpose. The Performance Assessment Tool (PAT) will contain indicators covering each phase of the watershed sub-project (preparatory phase, execution phase, and O&M phase). All participating states shall develop an appropriate PAT with key performance indicators for all three stages and a rating system and reflect the same in the Program Manual. The performance assessment ratings will be captured in the state MIS systems. This indicator will capture information on women's participation and engagement in leadership positions in WCs. It will capture information separately on WCs and GPs led by women (as Chairpersons of WCs and as elected members of Gram Panchayat).	Annual	MIS	Review of MIS data	SWDs
Women headed WCs and GPs demonstrate satisfactory WM as measured through a performance rating system.		Annual	MIS	Review of MIS data	SWDs
Land area treated with science-based watershed management technologies.	This indicator measures the area (in hectares) of watersheds where science-based watershed development has been implemented in a saturation mode. To be considered as 'science-based watershed management', all of the following criteria are to be met: 1. DPRs have been prepared utilizing LRI outputs and approved by Gram Sabha. 2. Implementation of watershed development works	Annual	MIS, Process Monitoring Agency	Review of MIS data; Sample survey of micro-watersheds	SWDs, Process Monitoring Agency

	has been undertaken in saturation mode. 'Saturation' refers to treatment of at least 70% of all parcel of land that has been recommended for treatment in DPR. 3. Science-based watershed development will include measures related to restoration of degraded land and rainwater harvesting to address drought vulnerability.				
Of which, area in Karnataka		Annual	MIS, Process Monitoring Agency	Review of MIS data, Sample survey of micro-watersheds	SWDs and Process Monitoring Agency
Of which, area in Odisha		Annual	MIS, Process Monitoring Agency	Review of MIS data, Sample survey of micro-watersheds	SWDs, Process Monitoring Agency
Adoption of resilient agriculture technologies and practices by (number of farmers).	This indicator measures the number of farmers who adopt at least one technology/practice from a core set of resilient agriculture technologies and practices recommended through agro-advisory. The agro-advisory may be provided through multiple channels including: LRI cards, weather based agro-advisories over mobile, bulletins, communication from extension workers, farmer training programs, etc. The core set of resilient agriculture technologies and practices will be as defined by the Government of India / respective state governments and include measures but not limited to crop diversification, water use efficiency, and other package of appropriate practices that strengthen resilience to climate change impact for the given agro-climatic zone. An identified list of resilient technologies will be reflected in the Program Manual.	Annual	MIS, Process Monitoring Agency	Review of MIS data, Field survey sample farmers	SWDs, Process Monitoring Agency

	Adoption of one or more technologies or practices will be considered as adequate for meeting this indicator. The indicator will separately track the number of farmers by their gender and by their social group (SC/ST). Women engaged in farming will be considered as 'female farmers' irrespective of whether or not they are the legal title holders to the land.				
Of which, female farmers.		Annual	MIS, Process Monitoring Agency	Review of MIS data, Field survey of sample farmers	SWDs, Process Monitoring Agency
Of which, SC and ST farmers.		Annual	MIS, Process Monitoring Agency	Review of MIS data, Field survey of sample farmers	SWDs, Process Monitoring Agency
Of which, farmers in Karnataka.		Annual	MIS, Process Monitoring Agency	Review of MIS data, Field survey of sample farmers	SWD, Process Monitoring Agency
Of which, farmers in Odisha.		Annual	MIS, Process Monitoring Agency	Review of MIS data, Field survey of sample farmers	SWDs, Process Monitoring Agency
Increase in climate-adjusted soil moisture in targeted watershed areas.	This indicator measures soil moisture improvement, correcting for short term weather effects in a sample of the science-based watersheds, as per established scientific processes.	Base-line, End-term	Impact evaluation study	Field study (using sensors and probes) and analysis of RS data of sample of treatment and control sites.	Impact evaluation agency
Farmer Producer Organizations with 25% increase in business	This indicator measures the number of Farmer Producer Organizations (FPOs) supported under the REWARD Program, that achieve an annual sales turnover that is at	Baseline, year 3, 4, 5	MIS, FPOs' annual audited	Review of MIS data; Review of FPOs' accounts	SWDs

turnover relative to baseline.	least 25% higher than their baseline levels. The average sales turnover will be calculated based on annual sales reported by the FPOs in their annual audited financial statements during the reporting period. All states shall develop appropriate criteria to shortlist FPOs eligible to be supported under this program and use the same to select target number of FPOs. The criterial for shortlisting FPOs shall be reflected in the Program Manual.		account statements		
Of which, FPOs in Karnataka					
Of which, FPOs in Odisha					
Direct Program Beneficiaries.	This indicator measures the number of individuals receiving outputs from the Program. Outputs include watershed structures and assets located on private land/ common lands, training programs, crop advisory services, value chain services, wage employment, financial support, etc. The indicator will separately track the number of beneficiaries by their gender and by their social group (SC/ST).	Annual	MIS	Review of MIS data	SWDs
Of which, female beneficiaries.		Annual	MIS	Review of MIS data	SWDs
Of which, SC and ST beneficiaries.		Annual	MIS	Review of MIS data	SWDs
Of which, beneficiaries in Karnataka.		Annual	MIS	Review of MIS data	SWDs
Of which, beneficiaries in Odisha.		Annual	MIS	Review of MIS data	SWDs

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Number of professionals who complete certified training on improved watershed management provided by national center for excellence on watershed management.	This indicator measures the number of professionals who complete certified training on improved watershed management provided by National Center for Excellence on Watershed Management (CoE). The indicator is considered as met if minimum targets for number of trainees who successfully complete the training and are certified are met. The certification will be based on successful completion of a learning assessment, designed and used by CoE. A robust definition and process for certification shall be finalized GoK and reflected in the Program Manual.	Annual	MIS, CoE training reports	Review of MIS data; Review of CoE training reports	GOK, COE
National technical standards for improved watershed management updated by DoLR and directive issued to states.	This indicator checks if a government directive on national technical standards, including specifications and procedures, for improved	One time	DoLR	Communication on government directives from DoLR to states	DoLR

	watershed development has been prepared in a participatory manner and formally disseminated to states by the DoLR.				
Adoption of strengthened watershed O&M policy by number of states.	This indicator measures the number of states that have formally issued a government directive on operation and maintenance of structures and assets of completed watershed projects that have been handed over to Gram Panchayats.	One-time	SWDs	Review of issued state government directives	SWDs
Results from pilots on science-based fertilizer application captured and disseminated.	This indicator checks that results note/s have been developed, capturing results and lessons from pilots and disseminated.	One time	SWD reports; Results note/s	Review of SWD reports and results note/s	SWDs
Land area for which watershed plans are available and approved.	This indicator measures the area in hectares for which watershed plans are available. The watershed plans are developed as per national/ state guidelines, issued from time to time.	Annual	MIS digital Portal	Review of MIS data and review of Digital Portal	SWDs
Of which, area in Karnataka.		Annual	MIS; Digital Portal	Review of MIS data and Digital Portal	SWDs

Of Which, area in Odisha.		Annual	MIS; Digital Portal	Review of MIS data and Digital Portal	SWDs
Farmers accessing agro-advisory information.	This indicator measures the number of farmers who received science / weather based agro-advisory information that will strengthen farmers' preparedness and resilience to climate change impacts, at least once in the Program duration through various channels such as LRI cards, mobile messaging, mobile apps, bulletins, communication from extension workers, training programs. All the states will develop a short list of approved resilient technologies and reflect the same in the Programme Manual.	Annual	MIS, Process Monitoring Study	Review of MIS data, Field survey of sample farmers	SWDs, Process Monitoring Agency
Of which, female farmers.		Annual	MIS, Process Monitoring Study	Review of MIS data, Field survey of sample farmers	SWDs, Process Monitoring Agency
Of which, SC and ST farmers.		Annual	MIS, Process Monitoring Study	Review of MIS Data; Field survey of sample farmers	SWDs, Process Monitoring Agency

Of which, farmers in Karnataka.		Annual	MIS, Process Monitoring Study	Review of MIS data; Field survey of sample farmers	SWDs, Process Monitoring Agency
Of which, farmers in Odisha.		Annual	MIS, Process Monitoring Study	Review of MIS data; Field survey of sample farmers	SWDs, Process Monitoring Agency
Increase in farmers adopting value chain services of targeted Farmer Producer Organizations.	This indicator measures the increase in percentage of farmers (over baseline) using value chain services of FPOs supported under the Program.	Annual	MIS, FPO records	Review of MIS data, Review of FPO records	SWDs, FPOs
Of which, farmers in Karnataka.		Annual	MIS, FPO records	Review of MIS data, Review of FPO records	SWDs, FPOs
Of which, farmers in Odisha		Annual	MIS, FPO records	Review of MIS data, Review of FPO records	SWDs, FPOs

DISBURSEMENT LINKED INDICATORS, DISBURSEMENT ARRANGEMENTS AND VERIFICATION PROTOCOLS

Disbursement Linked Indicators Matrix				
DLI 1	WCs and GPs demonstrate satisfactory WM as measured through a performance rating system.			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Intermediate Outcome	Yes	Text	21,593,400.00	19.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	
2022	0.00		0.00	None
2023	30% of the WCs/GPs in the science-based MWS, that are in or have completed the Preparatory Phase, score more than 50% on the indicators pertaining to Preparatory Phase on the Performance Assessment Tool. A total of 227 WCs are estimated under the Program - 75 WCs in Karnataka, and 152 WCs in Odisha.		7,197,800.00	Karnataka -USD 1,34,450 per WC (up to 23 WCs) Odisha – USD 89,248 per WC (upto 46 WCs)
2024	30% of the WCs/GPs in the science-based MWS, that are in or have completed the Preparatory Phase, score more than 50% on the indicators pertaining to Consolidation and O&M Phase on the Performance Assessment Tool. A total of 227 WCs are estimated under the Program - 75 WCs in Karnataka, and 152 WCs in Odisha.		7,197,800.00	Karnataka -USD 1,34,450 per WC (up to 23 WCs) Odisha – USD 89,248 per WC (upto 46 WCs)
2025	0.00		0.00	None

2026	30% of the WCs/GPs in the science-based MWS, where watershed sub-projects are in O&M Phase, score more than 50% on the indicators pertaining to Consolidation and O&M Phase on the Performance Assessment Tool. A total of 227 WCs are estimated under the Program - 75 WCs in Karnataka, and 152 WCs in Odisha.	7,197,800.00	Karnataka -USD 1,34,450 per WC (up to 23 WCs) Odisha – USD 89,248 per WC (upto 46 WCs)
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DLI 2	Land area treated with science-based watershed management technologies			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Outcome	Yes	Text	40,127,300.00	35.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	
2022	Partnerships have been formally established between the SWD and technical partners for LRI, Hydrology and RS/GIS (through signed MoUs)		11,727,300.00	Prior Result. Karnataka USD 5,850,000. Odisha USD 5,877,300.
2023	Detailed Project Reports developed for Micro Watersheds covering an area upto 100,000 ha in Karnataka, and 100,000 ha in Odisha		14,200,000.00	USD 71 per hectare.
2024	0.00		0.00	None
2025	Project Completion Reports prepared for Micro Watersheds covering an area of 50,000 ha in Karnataka, and 50,000 ha in Odisha		7,100,000.00	USD 71 per hectare.
2026	Project Completion Reports prepared for Micro Watersheds covering an additional area of 50,000 ha in Karnataka, and 50,000 ha in Odisha.		7,100,000.00	USD 71 per hectare.

DLI 3	Adoption of resilient agriculture technologies and practices by farmers.			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Intermediate Outcome	Yes	Text	16,156,800.00	14.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	
2022	0.00		0.00	none
2023	0.00		0.00	none
2024	10,800 farmers (Karnataka 8100 farmers, and Odisha 2700 farmers)		4,039,200.00	USD 374 per farmer
2025	16,200 additional farmers (in addition to preceding years) (Karnataka 9450 farmers and Odisha 6750 farmers)		6,058,800.00	USD 374 per farmer
2026	16,200 additional farmers (compared to preceding years) (Karnataka 9450 farmers and Odisha 6750 farmers)		6,058,800.00	USD 374 per farmer

DLI 4	Farmer Producer Organizations with 25% increase in business turnover relative to baseline.			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Intermediate Outcome	Yes	Text	20,850,000.00	18.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	
2022	0.00		0.00	none
2023	0.00		0.00	none
2024	11 FPOs (Karnataka 6; Odisha 5)		7,645,000.00	USD 695,000 per FPO
2025	11 additional FPOs (compared to preceding year) (Karnataka 6; Odisha 5)		7,645,000.00	USD 695,000 per FPO
2026	8 additional FPOs (compared to preceding years) (Karnataka 3; Odisha 5)		5,560,000.00	USD 695,000 per FPO

DLI 5	Number of professionals who complete certified training on improved watershed management provided by National Center for Excellence on Watershed Management. (Karnataka)			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Outcome	Yes	Text	10,000,000.00	9.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	
2022	0.00		0.00	none
2023	150 trainees complete certified training on improved watershed management		2,500,000.00	\$16,666.667 per trained person
2024	325 additional trainees (compared to preceding years) complete certified training on improved watershed management		2,500,000.00	\$7692.308 per trained person
2025	325 additional trainees (compared to preceding years) complete certified training on improved watershed management		2,500,000.00	\$7692.308 per trained person
2026	325 additional trainees (compared to preceding years) complete certified training on improved watershed management		2,500,000.00	\$7692.308 per trained person

DLI 6	National technical standards for improved watershed management updated by DoLR and directive issued to states.			
Type of DLI	Scalability	Unit of Measure	Total Allocated Amount (USD)	As % of Total Financing Amount
Process	No	Text	5,985,000.00	5.00
Period	Value		Allocated Amount (USD)	Formula
Baseline	0.00			
Prior Results			0.00	

2022	Program Management Unit (PMU) established.	1,485,000.00	Prior Result. Achieved/Not Achieved
2023	0.00	0.00	none
2024	Draft standards prepared based on implementation experience of participating states.	2,000,000.00	Achieved/Not Achieved
2025	Consultation meetings organized on draft standards.	2,000,000.00	Achieved/Not Achieved
2026	National technical standards for improved watershed management finalized and Government directive on national technical standards for improved watershed management formally disseminated to states.	500,000.00	Achieved/Not Achieved

Verification Protocol Table: Disbursement Linked Indicators

DLI 1	WCs and GPs demonstrate satisfactory WM as measured through a performance rating system.
Description	This DLI is defined as the percentage of Watershed Committees and/or Gram Panchayats (WCs and/or GPs) in the REWARD Program's science-based micro-watersheds, covering 0.25 million hectares areas, that achieve score above 50% (considered as satisfactory) on the 'Performance Assessment Tool' (PAT) that is developed specifically for the purpose. The PAT will contain indicators covering each phase of the watershed sub-project (preparatory phase, execution phase and O&M phase). It is measured in Year 2, 3 and 5. The DLI comprises the following Disbursement Linked Results: • DLR 1.1: In Year 2, score on the indicators pertaining to Preparatory Phase in the Performance Assessment Tool is considered. The indicators will include improved representation of women in the WCs and greater weightage for women in leadership positions in the WCs. • DLR 1.2: In Year 3, score on the indicators pertaining to Execution Phase in the Performance Assessment Tool is considered. • DLR 1.3: In Year 5, score on the indicators pertaining to O&M Phase in the Performance Assessment Tool is considered. In each year, at least 30% of the WCs and/or GPs in the science-based MWS need to achieve score of more than 50% on the PAT. All participating states shall develop an appropriate PAT with key performance indicators for all three phases and reflect the same in the Program Manual. The performance assessment scores will be captured in the state MIS systems.
Data source/ Agency	MIS/SWDs
Verification Entity	IVA
Procedure	Procedure for DLRs 1.1, 1.2 and 1.3: - The IVA will undertake desk verification of the MIS data to determine the number of WCs/GPs that scored more than 50% on the Performance Assessment Tool. - The IVA will conduct field verification in a representative sample of WCs/GPs. The field verification will involve checking records of WCs/ GPs for information on all the indicators pertaining to the phase being considered and confirming the scores reported in the MIS.
DLI 2	Land area treated with science-based watershed management technologies
Description	This DLI is defined as the area (in hectares) of watersheds where science-based watershed development has been implemented in a saturation mode. This is measured in Year 2, 4, 5. The DLI comprises 3 Disbursement Linked Results, including a Prior Result: • DLR 2.1 (Prior Result): Memoranda of Understanding (MoU) are signed with Technical Partners for

	LRI, Hydrology and RS/GIS. This is verified in year 1. • DLR 2.2: DPRs have been prepared utilizing LRI outputs with key environmental and social data/information, and are approved by Gram Sabha. This is measured in year 2. • DLR 2.3: Watershed works have been implemented in a saturation mode. This is measured in years 4 and 5.
Data source/ Agency	MIS/SWDs
Verification Entity	World Bank will carry out the due diligence for prior results; and IVA for all other results
Procedure	Procedure for DLR 2.1 (Prior Result): The Bank will carry out the due diligence of the MoU documents signed with Technical Partners for LRI, Hydrology and RS/GIS. The due diligence procedure will involve reviewing the hard copies or softcopies of the signed MoU documents. Procedure for DLR 2.2: The IVA will verify the DPRs through desk review, and check that the DPR is generated by utilizing the LRI outputs with key environmental and social data/information and is approved by the Gram Sabha. This will involve confirming that all of the following are part of the DPR: • Soil and water conservation plans and drainage line treatment plans covering each land management unit in the micro-watershed with supporting GIS maps. • Productivity improvement plans for major agriculture and horticulture crops with supporting GIS maps. • Nutrient management plan. • Record of community consultations. • Record of Gram Sabha approval. • Maps and data on environmentally sensitive areas, common properties including physical and cultural resources. Procedure for DLR 2.3: The verification by IVA will involve both desk review and field verification, as detailed below: Desk review: The IVA will undertake desk review of the Project Completion Reports (PCRs) of the micro-watershed sub-projects. The purpose of the review is to check if the watershed development works have been implemented in a 'saturation' mode. 'Saturation' refers to soil and water conservation and drainage line treatment of every parcel of land that has been recommended for soil and water conservation and drainage line treatment on the basis of LRI as specified in DPR. This will be verified through a comparison of the total number of parcels recommended for soil and water conservation and drainage line treatment in the micro-watershed and the number of treated parcels as reported in the PCRs. This criteria will be considered as met if at least 70% of the total parcels recommended for soil and water conservation and drainage line

	treatment are listed as treated in the PCRs. Field verification: The IVA will undertake field verification of a representative sample of soil and water conservation and drainage line works in a representative sample of the micro-watershed sub-projects. The purpose of the field verification is to check if the soil and water conservation and drainage line works have been implemented. Compliance with Environmental and Social guidance, including the Excluded Activities List, will also be verified. This will be verified through a comparison of the works as listed in the PCRs and the completed soil and water conservation and drainage line works noted during the field verification. This criteria will be considered as met if 90% of the sampled soil and water conservation and drainage line works are found to be completed during the field verification. Double counting of micro-watersheds for disbursements in years 4 and 5 will be avoided (that is, the micro-watersheds that have been verified as suitable for disbursements in a year will not be considered for verification in the subsequent years) .
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DLI 3	Adoption of resilient agriculture technologies and practices by farmers.
Description	This DLI is defined as the number of farmers who adopt at least one technology/practice from a core set of resilient agriculture technologies and practices recommended through agro-advisory (delivered through LRI cards, weather based agro-advisories over mobile, bulletins, communication from extension workers, farmer training programs, etc.). The core set of resilient agriculture technologies and practices will be as defined by Government of India / respective state governments and include measures related to crop diversification, water use efficiency, and other package of appropriate practices that strengthen resilience to climate change impact for the given agro-climatic zone. Such a short list of approved resilient technologies will be reflected in the Program Manual. This DLI is measured in Year 3, 4 and 5.
Data source/ Agency	MIS/SWDs
Verification Entity	IVA
Procedure	The verification by IVA will involve both desk review and field verification, as detailed below: Desk review: The IVA will undertake desk review of the MIS data on farmer adoption. Field verification: The IVA will undertake field verification of a representative sample of farmers in the program areas and verify if the farmers have adopted at least one of the recommended technologies/practices. This criterion will be considered as met if 90% of the sampled farmers are found to have adopted the recommended technologies/practices. Double counting of farmers for

	disbursements will be avoided (that is, farmers verified as suitable for disbursement in a year will not be considered for verification in the subsequent years).
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DLI 4	Farmer Producer Organizations with 25% increase in business turnover relative to baseline.
Description	This DLI is defined as the number of Farmer Producer Organizations (FPOs) supported under the REWARD Program, that achieve an average annual sales turnover that is at least 25% higher than their baseline levels. The average sales turnover will be calculated based on the annual sales reported by the FPOs in their annual audited financial statements during the reporting period (the average of all years in the reporting period will be considered). This DLI is measured in Year 3, 4, 5. Each year a fresh set of FPOs will be considered for this DLI. The baseline will be the year preceding the FPOs entry into the Program (for existing FPOs) All states shall develop appropriate criteria to shortlist FPOs eligible to be supported under this program and use the same to select target number of FPOs. The criteria for shortlisting FPOs shall be reflected in the Program Manual.
Data source/ Agency	MIS/SWDs; Annual audited accounts
Verification Entity	IVA
Procedure	The verification by IVA will involve desk review of the MIS data and on-site (at FPO offices) review of the annual audited accounts statements of the FPOs.

DLI 5	Number of professionals who complete certified training on improved watershed management provided by National Center for Excellence on Watershed Management.
Description	This DLI is defined as the number of trainees who complete certified training on improved watershed management provided by the National Centre of Excellence on Watershed Management (CoE). A robust definition and process for certification shall be finalized GoK and reflected in the Program Manual. This is measured in Years 2, 3, 4, 5.

Data source/ Agency	GoK
Verification Entity	IVA
Procedure	The IVA will verify that the targets of number of trainees for the year under assessment to receive a disbursement are met. The targets for number of trainees who successfully complete the training and are certified are: 150 trainees in year 2; 325 additional trainees in year 3; 325 additional trainees in year 4; 325 additional trainees in year 5. The IVA will verify that certification has been provided to trainees based on achievement at or above a minimum score on a end-of-training test. The IVA will verify test papers, trainee scores and training reports for the purpose. Double counting of certified trainees for disbursements will be avoided (that is, the trainees verified as suitable for disbursement in a year will not be considered for verification in the subsequent years)

DLI 6	National technical standards for improved watershed management updated by DoLR and directive issued to states.
Description	This indicator checks if a government directive on national technical standards on improved watershed management has been prepared in a participatory manner and formally disseminated to states by the DoLR. This is measured in Year 3, 4 and 5. The DLI comprises 4 Disbursement Linked Results, including a Prior Result: • DLR 6.1 (Prior Result): Program Management Unit (PMU) is established and functional. This is verified in year 1. • DLR 6.2: Draft standards are prepared based on implementation experience of participating states. This is measured in Year 3. • DLR 6.3: Consultation meetings are organized on draft standards. This is measured in Year 4. • DLR 6.4: National technical standards for improved watershed management are finalized. Government directive on national technical standards for improved watershed development are formally disseminated to states. This is measured in Year 5.
Data source/ Agency	DoLR
Verification Entity	World Bank will carry out the due diligence for prior results; and IVA for all other results
Procedure	Procedure for DLR 6.1 (Prior Result): The Bank will carry out the due diligence to ensure that the PMU has been staffed with the following 6 key recruitments: Financial Expert, Procurement Expert, Institution & Capacity Building Expert, Hydrology & Water Resources Expert, Monitoring & Evaluation Expert, and National Watershed Management Expert. The

	due diligence procedure will involve reviewing the hardcopies or softcopies of the joining reports of the appointed staff. Procedure for DLR 6.2: The IVA will verify that a draft document on national technical standards on improved watershed management is available on the DoLR's website. Procedure for DLR 6.3: The IVA will verify that a report of at least 3 consultation meetings on the draft document is available, and, that it includes details on the revisions suggested and action plan on finalization. Procedure for DLR 6.4: The IVA will verify that all of the following criteria are met: Official final version of the document on the 'national technical standards on improved watershed management' is available on the DoLR's website. Official government directive on 'national technical standards on improved watershed development' has been sent to states by DoLR and is also available on the website of the DoLR. Report of a national level dissemination workshop of the 'national technical standards on improved watershed management' is available and contains the list of participants with details of the states they represent.
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ANNEXURE-XV

Performance Rating System for Watershed Committees/ GPs

Background

While technical assessments and DPR development for a watershed development project are undertaken by the 'technical teams' of DSC & WD, the local Watershed Committees (WCs) play a leading role in the execution of the plans and maintenance of the treated watersheds. Hence their active participation is sought from the planning phase till the maintenance phase. Guidelines for watershed development also emphasize this aspect.

Systemic monitoring of performance of the WCs, in each phase, is important to understand their performance and undertake course correction measures to address the same. Further, as experienced in other sectors, rewarding better performing WCs could enthuse others and lead to a healthy competition for improved performance.

This understanding among the stakeholders under the REWARD project resulted in adoption of this as a PDO indicator and a DLI within the project, as shown below.

- a) **WCs and GPs demonstrate satisfactory WM as measured through a performance rating system:** This indicator measures the percentage of Watershed Committees and/or Gram Panchayats (WCs and/or GPs) in the REWARD Program's 500 science-based micro-watersheds that achieve score above 50% (considered as satisfactory) on the 'Performance Assessment Tool' that is developed specifically for the purpose. The Performance Assessment Tool will include indicators covering each phase of the watershed sub-project (preparatory phase, works phase, consolidation and O&M phase). The state MIS system will capture information on WCs and GPs performance on the Performance Assessment Tool.
This is also a DLI and carries an allocation of about 18% of the total IBRD assistance under REWARD. The DLI will be achieved when at least 30% of WCs in the science-based MWS, that have completed the Preparatory Phase/ executing phase/maintenance phase activities, score more than 50% on the indicators pertaining to the respective phases on the Performance Assessment Tool (PAT)
- b) **Women headed WCs and GPs demonstrate satisfactory WM as measured through a performance rating system:** This indicator will capture information on women's participation and engagement in leadership positions in WCs. It will capture information separately on WCs and GPs led by women (as Chairpersons of WCs and as elected members of Gram Panchayat).

Performance Assessment Tool (PAT)

The main aim of the PAT is to capture the performance of the WCs on critical aspects – inclusion, equity, community participation, transparency, timeliness of execution, fund management, quality of works, maintenance - within the three phases of watershed management i.e. Preparation, Execution and Maintenance, as shown below.

Tentative list of Performance Indicators, score and measurement means are given below. Each phase will have a score of 100 marks and is further divided into 20 indicators (6 indicators in preparatory, 9 indicators in execution phase and 5 indicators in O&M phase). A minimum of 30% of WCs/GPs have to score more than 50% in each phase for the achievement of DLI-1.

PREPARATORY PHASE

Performance Indicator		Weightage	Means of Verification	Remarks
Committee Formation Process	Representation of UGs / SHGs / Women / Landless / SC & ST as per PMKSY:WDC Guidelines	10	General Body Meeting resolution	The PIA of respective watersheds will collect this information and report on MIS
	Representation of SC & ST, Women and BPL households in the General Body Meeting for constitution of the Committee (At least 20 % from each category)	10		
	Participation of Sarpanch/s of the GP or his / their representative in the general body meeting	10		
<u>Capacity Building events</u> 1. Vision building with reference to PDO / Intermediary result indicators / Envisaged impacts of REWARD 2. Institution Building for effective watershed management 3. Team Building & Leadership development 4. Land Resource Inventory of respective watersheds 5. DPR preparation with reference to LRI based watershed planning, community consultation processes & convergence planning 6. Screening of social & environmental risks, gender / equity / inclusiveness,	> 60 % of the WC members have attended 80 % training days	20	Training Records	The PIA of respective watersheds will collect this information and report on MIS
	40% to 60% of the WC members have attended 80 % training days	10		

7. Exposure visit to a successful watershed 8. Participatory monitoring & evaluation 9. Record keeping	< 40 % of the WC members have attended 80 % training days	0		
<u>Community Consultation</u> (Community consultation is an ongoing process. For the purpose, we shall take following 12 Focussed Group Discussions (FGDs) during the DPR preparation process as an indicator of community consultation). The focussed group discussions will primarily focus on the issues and their possible solutions as perceived by respective groups. 1. 3 FGDs on LRI recommendations, one each with farmers on upper ridge, middle ridge and lower ridge 2. 1 FGD with land less households 3. 1 FGD with SC & ST households 4. 1 FGD with women SHGs 5. 1 FGD with small & marginal farmers 6. 1 FGD with FPOs 7. 1 FGD with people depending on CPRs 8. 3 FGDs, one each for very poor, poor and manageable households	> 9 FGDs conducted	20	Meeting register	The PIA of respective watersheds will collect this information and report on MIS
	5-8 FGDs conducted	10		
	< 5 FGDs conducted	0		
<u>Ownership of the DPR</u> DPR approved in the general body meeting of WA	YES	10	General Body Meeting Resolution	PIA of respective watersheds
	NO	0		
At least One Wall Painting on key interventions / community responsibilities / community awareness in a prominent place of the watershed village.	YES	10	Geo Tagged Photograph	PIA of respective watersheds
	No	0		
Entry Point Activities	> 80 % of the fund utilised	10	Financial	The PIA of respective

	< 80 % of the fund utilised	0	Progress Report	watersheds will collect this information and report on MIS
A : TOTAL of Preparatory Phase		100		
WATERSHED WORKS PHASE				
Performance Indicator		Weightage	Means of Verification	Remarks
<u>Record keeping</u> WA Meeting register Project Cash book WDF Register Stock Book Asset register Money Receipt Case record of 60 % of the NRM interventions	Good (> 80% registers updated)	10	WC level records	A four member inter block committee comprising of one Project Implementing Agency, WMT (Social), WMT (Engineering) and the Secretary of respective WC <u>to be notified by the Project Director, Watersheds of respective districts.</u>
	Satisfactory (50%-80% registers maintained and / or updated)	10		
	Poor (< 50 % registers maintained and / or updated)	0		
Fund Utilisation	>80 % of the fund allocated	10	Financial Progress	The PIA of respective watersheds will collect this information and report on MIS
	60%-79% of the fund allocated	5		
	< 60% of the fund allocated	0		
Transparency	> 80 % of the worksites (NRM works) have transparency boards	5	Geo-Coded Photographs	The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the
	Expenditure discussed in the WA and approved	5	Meeting Resolution	
	Watershed Committee meet at least once a month	5		

				neighbouring clusters. This team will verify & report this.
Grievance Redressal at community level	No grievance registered offline (either at district or at state level) or Online E-ABHIYOG Portal	10	Records at District / State and e-Abhiyoga portal	The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the neighbouring clusters. This team will verify & report this on MIS.
	1 to 5 grievances registered offline (either at district or at state level) or Online E-ABHIYOG Portal	5		
	> 5 grievances registered offline (either at district or at state level) or Online E-ABHIYOG Portal	0		
Convergence	An amount > 20 % of the reported expenditure mobilised from ongoing schemes.	10	Financial Progress Report	The PIA of respective watersheds will collect this information and report on MIS
	An amount equal to 10% to 20% of the reported expenditure mobilised from ongoing schemes	5		
	An amount < 10 % of the expenditure are mobilised from ongoing schemes.	0		
Saturation of watersheds	60% of all parcel of land that has been recommended for treatment in DPR.	10	Physical Progress Report vis-à-vis LRI recommendation	The PIA of respective watersheds will collect this information and report on MIS
	< 30% -60 % of all parcel of land that has been recommended for treatment in DPR.	5		
	< 30% of all parcel of land that has been recommended for treatment in DPR.	0		
Agro-advisory	> 100 farmers have access to agro-advisory service such as trainings / LRI card / Mobile based advisory service	5	Training record, Registration details of Mobile based advisory	The PIA of respective watersheds will collect this information and report on MIS

	<100 farmers have access to agroadvisory service such as trainings / LRI card / Mobile based advisory service	0	service & Database of LRI card beneficiaries	
Quality of Works	Good	10	Evidence of records of the field visit, PRA outputs, geo-tagged photographs etc	The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the neighbouring clusters. This team will be responsible to certify quality of works in the assigned watersheds as detailed in APPENDIX-I.
	Satisfactory	5		
	Poor	0		
Innovations adopted	Upscaling of at least one innovation out of the agreed list of best practices (Annexure II)	10	Evidence of upscaling at the WC level based on Ground verification of appropriate records, field verification and statement of community members	The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the neighbouring clusters. This team will be responsible to comment if any innovation has been adopted in the assigned watersheds following the broad principles suggested at APPENDIX-II
	No innovation demonstrated	0		
		100		

CONSOLIDATION & WITHDRAWAL PHASE

Performance Indicator		Weightage	Means of Verification	Remarks
WDF mobilised	> 10 % of the Expenditure reported for NRM & PSME	20	MIS	The PIA of respective watersheds will collect this information and report on MIS
	5% to 10 % of the expenditure reported for NRM & PSME	10		
	< 5 % of the Expenditure reported for NRM & PSME	0		
Revolving of Livelihood Fund	> 25 % of the outstanding loan is repaid	20	MIS	The PIA of respective watersheds will collect this information and report on MIS
	10% to 25 % of the outstanding loan is repaid	10		
	<10 % of the outstanding loan is repaid	0		
Data base of Assets created and handed over to GPs	YES	30	Letter Addressed to GP	PIA of respective watersheds
	NO	0		
WC has pursued G.P for issue of use-fruct right in respect of at least one CPR	YES	10	Letter Addressed to GP	PIA of respective watersheds
	NO	0		
WC prepares AAP for O & M with projected support from WDF / GP / MGNREGA	YES	20	AAP dully approved by WA	PIA of respective watersheds
	NO	0		
		100		

Appendix-I

The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the neighbouring clusters. This team will be responsible to visit a 25 % sample of works, interact with beneficiaries / WC members and use appropriate participatory appraisal tools in the assigned watersheds and certify quality. This is a dynamic process and will facilitate learning across the watersheds.

The check lists for the team is as follows;

I. Whether the workmanship is good?

II. Whether the cost of execution is competitive?

Based on the observation, the team will give a relative grading to the quality of works such as **Good, Satisfactory and Poor**. Evidence of records of the field visit, PRA outputs, geo-tagged photographs etc may be made available for reference.

Appendix-II

The Project Director, Watersheds will constitute a four member team for each watershed cluster comprising of one Project Implementing Agency, one WMT (Social) member, one WMT (Engineering) member and one WC Secretary of the neighbouring clusters. This team will be responsible to comment if any innovation has been adopted in the assigned watersheds following the broad principles suggested below;

Following best practices will be considered as an innovation. The indicative list can be communicated to the committees upfront, so that they can plan and work on at least one of their chosen idea / ideas.

1. **Transparency:** Proceedings of all WA and WC meetings video-graphed.
2. **Communication:** Use of social media to disseminate WC decisions, progress and events within the community.
3. **Gender:** All the WC members are women.
4. **Drudgery Reduction:** A business model established to equip farm women laborers with appropriate skill & gender friendly mechanical tools for critical agricultural operations (such as application of fertilisers /pesticides /herbicides, irrigation, transplanting, harvesting etc) who in turn provide services to the community on cost basis.
5. **Linkage with external agencies:** Establishment of one stop resource centre for information on going schemes of the Govt. and Non-Govt agencies and related services such as online application etc.

6. **Farmers' Empowerment:** Collectivisation of small & marginal farmers for production, processing and marketing of at least agricultural product.
7. **CPR Management:** Agreed benefit sharing mechanism and issue of usufruct right in respect of at least one user group.
8. **Scaling up resilient crop practices:** A model established for scaling up at least one resilient crop practices and has produced significant outcomes as detailed below.
 - i. Community level seed production and distribution of a drought / water logging tolerant paddy variety
 - ii. Use of community managed solar energised irrigation system
 - iii. 25 % of the farmers have adopted organic farming in respect of at least one crop.
 - iv. 25 % of the rice fallow covered with improved variety of green gram / grass pea
 - v. 25 % of the farmers use micro irrigation system
 - vi. 25 % of the upland farmers have adopted agroforestry.
 - vii. 25% of the farmers have adopted water saving practices such as alternate wetting & drying / Direct seeded rice / SRI method of paddy cultivation
 - viii. Integrated Farming System (with at least 3 components i.e. Fisheries – crop – Agroforestry) adopted in 25 % of the farm ponds created

ANNEXURE-XVI

Core set of Climate Resilient Practices

Significant negative impacts have been implied with medium-term (2010-2039) climate change, predicted to reduce yields by 4.5 to 9 %, depending on the magnitude and distribution of warming. In the context of climate change and variability, farmers need to adapt quickly to enhance their resilience to increasing threats of climatic variability such as droughts, floods and other extreme climatic events. Concentrated efforts are required for mitigation and adaptation to reduce the vulnerability of agriculture to the adverse impacts of climate change and making it more resilient. As most of our farmers are marginal, their adaptive capacity is limited, and hence, economically viable and culturally acceptable adaptation techniques need to be developed and implemented. Over the years, an array of practices and technologies have been developed by researchers towards fostering stability in agricultural production against the onslaught of seasonal variations. Adoption of such resilient practices and technologies by farmers appears to be more a necessity than an option.

This understanding among the stakeholders under the REWARD project resulted in adoption of this as a PDO indicator and a DLI within the project, as shown below.

Adoption of resilient agriculture technologies and practices by farmers

This indicator measures the number of farmers who adopt at least one technology/practice from a core set of resilient agriculture technologies and practices recommended through agro-advisory. The agro-advisory may be provided through multiple channels including: LRI cards, weather based agro-advisories over mobile, bulletins, communication from extension workers, farmer training programs, etc. The core set of resilient agriculture technologies and practices will be as defined by DAFE and include measures related to crop diversification, water use efficiency, and other package of appropriate practices that strengthen resilience to climate change impact for the given agro-climatic zone.

Adoption of one or more technologies or practices will be considered as adequate for meeting this indicator. The indicator will separately track the number of farmers by their gender and by their social group (SC/ST). Women engaged in farming will be considered as 'female farmers' irrespective of whether or not they are the legal title holders to the land.

This is also a DLI (# DLI 3) and carries an allocation of about 15% of the total IBRD assistance under REWARD. The DLI will be achieved when 18900 farmers (5400 in Programme Year III and 6750 each in Programme Year IV & V) adopt one or more technologies or resilient practices as enlisted below. The list may be refined in consultation with the line departments and technical partners in due course of time.

Indicative Core List of Resilient Practices

Sl No	Area of Intervention	Resilient practices	Reference / Source of information
1	Build resilience in soil.	Nutrition management	Advisories based on LRI card. Improved method of fertilizer application (Slow release fertilizer (coated urea) Deep placement of urea, Bio-fertilised seeds)
		Building soil carbon	Organic manure addition, green manuring, crop rotation or intercropping with legume
		Tillage management	Reduced tillage, Zero tillage
		Crop rotation or intercropping with legume	Training Contents
		Soil residue management	Residue incorporation/ mulching
2	Resilience to farmers in flood-prone / water logging and drought prone environments	Adoption of Stress tolerant varieties of principal crops	As recommended by respective KVKs and disseminated through agro advisory
3	Crop diversification / systems for resource conservation	Introduction of recommended varieties of Grass pea / green gram in rice fallow areas	As recommended by respective KVKs and disseminated through agro advisory
		Diversification with recommended varieties of green gram and / or groundnut replacing rabi rice crop.	As recommended by respective KVKs and disseminated through agro advisory
		Replacing paddy with recommended millet cultivars	As recommended by respective KVKs and disseminated through agro- advisory
		Adoption of agroforestry on farm lands	Training Contents
		Farm ponds integrated with fisheries, crop and bund plantation	Training Contents
4	Crop husbandry for better resource management	SRI method in rice & millet / Direct Seeded Rice (DSR) / Alternate Drying & Wetting (ADW) / Non puddled transplanting of paddy	Training Contents
5	Irrigation Management for saving water & energy	Adoption of micro irrigation system	Training Contents
		Use of solar energized lifting devices	Training Contents

		Use of sub surface irrigation system	Training Contents
		Application of hydrogel	Training Contents
6	Production of commercial maize under best bet agronomic practices	Cultivation of hybrids of long maturity class (120 days)	Training Contents
		Planting by seed-cum-fertilizer drill	Training Contents
		Weeding by power weeder	Training Contents
		Threshing by maize sheller.	Training Contents
7	Integrating weed management (IWM) technology	Integrating the manual, mechanical and chemical means of weed control	As disseminated through agro advisory
8	Farm mechanisation	Adoption of location specific / crop specific farm machineries	As disseminated through agro advisory
9	Contingent plans	Adoption of location specific / crop specific weather based recommended practices	As disseminated through agro advisory

ANNEXURE-XVII-GANTT CHART

REWARD - Odisha: Gantt Chart			YEAR-0	YEAR -1				YEAR-2				YEAR-3				YEAR-4				YEAR-5			
Result Area	Activities	Responsibility	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preparatory activities																							
	Cabinet Approval for REWARD-Odisha Program	SWD																					
	Creation of Budget Head	SWD																					
	World Bank Board approval for REWARD Program	SWB																					
	Government Order for constituting State Level & District Level Committee	SWD																					
	Preparation of Draft ToRs for technical Partners	SWD																					
	Preparation of Draft MoUs for technical partners	SWD																					
	MOU signed with Technical Partners	SWD																					
	Preparation of Procurement Plan	SWD																					
	Preparation of Cost tables	SWD																					
	Preparation of Program Manual	SWD																					
	Update of Program Manual	SWD																					
	State Level Workshop-lunch of Programme	SWD																					
Result Area 1: Strengthened Institutions and Supportive Policy for Watershed Development																							
Enhancing capacity for watershed management																							
	Development of human resources policy	SWD																					
	Establishment of PMU at State, District and Block Level	SWD																					
	Recruitment of critical HR at state, district, sub-district levels	SWD																					
	Development of training modules for state, district, sub-district functionaries based on Program Manual	SWDs, Technical Partners/CBSA																					
	Training of state, district, sub-district level functionaries	Technical Partners/CBSA / SWDs																					
	Provision of equipment to support state, district, sub-district offices	SWD																					
Leveraging agriculture extension systems																							
	Development of extension modules on core set of agronomic practices based on scientific data and DSS	SWDs/Technical Partners																					
	Delivery of extension modules by agri extension institutions	Extension Institutions																					
Enhancing systems and capacity of community institutions and local government bodies for watershed management																							
	Development of guidelines for WCs and GPs for each phase of watershed development	SWD																					
	Development of training modules for WCs, GPs, user/common interest groups	SWDs, CBSA																					
	Delivery of training modules for WCs, GPs, user/common interest groups	SWDs/Training Institutes																					
	Preparation of O&M policy guidelines	SWD																					
	Roll out of performance based grading and incentive system for WCs & GPs	SWD																					
Strengthening monitoring and evaluation systems																							
	Hiring of MEL Agency	SWD																					
	Establishment of an M&E system	SWD/M&E Agency																					
	Strengthening MIS	M&E Agency																					
	Process Monitoring	M&E Agency																					
	Impact evaluation study (baseline, Mid term, endline)	M&E Agency																					
	Thematic studies	M&E Agency																					
Result Area 2: Scientific Watershed Development and Enhanced Livelihoods																							
Development and dissemination of scientific information for watershed planning																							
	Partnerships of SWDs with scientific and technical institutions initiated	SWDs																					
	Development of LRI & hydrology database on basis of field studies and RS data	Technical Partners																					
	Development & Use of DSS	SWDs, Technical Partners																					
	Digital library developed and populated	SWDs, Technical Partners																					
	Digital portal developed and populated	SWDs																					
Planning and implementation of watershed development in selected sub-watersheds in saturation mode																							
	Prep phase: Entry point activities in selected sub-watersheds	SWD																					
	Prep phase: Participatory planning and preparation of DPRs	SWD																					
	Prep phase: Approval of DPRs by Gram Sabha	SWD																					
	Approval of DPR at District and State Level	SWD																					
	Works phase: Implementation of watershed treatment works	SWD																					
	Preparation of Project Completion Report	SWD																					
	Consolidation phase: Preparation of Project Completion Reports	SWD																					
	Post-project O&M by GPs	SWD																					
Provision of LRI and weather-based agro-advisories for farmers																							
	LRI cards, awareness sessions, etc., to farmers	SWD																					
	Partnerships with weather advisory service providers	SWD																					
	Development of weather advisory system	Service Provider																					
	Dissemination of weather advisory to farmers	Service Provider																					
Implementation of value chain development interventions																							
	Establishment of sub-PMU for FPO promotion	SWDs, Agri/Horti Dept																					
	Identification of existing Farmer Producer Collectives (FPCs)	SWDs, Agri/Horti Dept																					
	Establishment of new FPCs	SWDs, Agri/Horti Dept																					
	Development of FPC value-chain investment plans	SWDs, Agri/Horti Dept																					
	Support to FPCs for working capital on basis of investment plans	SWD																					
	Implementation of investment plans (infrastructure, input support, market linkages, PPPs, etc.)	SWDs, Agri/Horti Dept																					
Livelihood protection and enhancement support for poor and landless households																							
	Identification of existing SHGs	SWDs																					
	Formation of new SHGs and CIGs	SWDs																					
	Development of Livelihood Enhancement Plans (LEPs) by SHGs, CIGs	SWDs																					
	Approval of LEPs and release of financial support to SHGs, CIGs	SWDs																					
	Implementation of LEPs by SHGs, CIGs	SWDs																					
	Wage employment for vulnerable households in watershed works	SWDs																					