



Program Manual
for
Centre of Excellence on Watershed Management
Under REWARD Program

December, 2022

Special Officer
Centre of Excellence on Watershed Management
University of Agricultural Sciences, Bangalore

Abbreviations

ADA	: Assistant Director of Agriculture
AO	: Agricultural Officer
CEO	: Chief Executive Officer
CoE	: Centre of Excellence
DATC	: District Agriculture Training Centre
DC	: Deputy Commissioner
DDA	: Deputy Director of Agriculture
DL	: Digital Library
DoA	: Department of Agriculture
DOAH	: Department of Animal Husbandry
DoF	: Department of Fisheries
DoH	: Department of Horticulture
DoLR	: Department of Land Resources
DoS	: Department of Sericulture
DPR	: Detailed Project Report
DSS	: Decision Support System
FNGO	: Field Level Non-Government Organization
GIS	: Geographic Information System
GKVK	: Gandhi Krishi Vignana Kendra
GoI	: Government of India
GoK	: Government of Karnataka
GPS	: Global Position System
iOS	: iPhone Operating System
ICRISAT	: International Crops Research Institute for the Semi-Arid Tropics
ICT	: Information Communication Technology
JDA	: Joint Director of Agriculture
KRSRAC	: Karnataka State Remote Sensing Application Centre
LRI	: Land Resource Inventory
MIS	: Management Information Systems
M&E	: Monitoring and Evaluation
NBSS&LUP	: National Bureau of Soil Survey and Land Use Planning
NGO	: Non-Governmental Organization
NLNA	: National Level Nodal Agency
NRAA	: National Rainfed Area Authority
NRM	: Natural Resource Management
ORP	: Operational Research Project
PEC	: Project Empowered Committee
PIA	: Project Implementation Agency
PMKSY	: Prime Minister Krishi Sinchayee Yojana
RDPR	: Rural Development and Panchayat Raj
REWARD	: Rejuvenating of Watersheds for Agricultural Resilience through Innovative Development
RS	: Remote Sensing
SAUs	: State Agricultural Universities
SC & WD	: Soil Conservation and Watershed Development

Draft Program manual for CoE

SIRD	:	State Institute for Rural Development
SLNA	:	State Level Nodal Agency
ToR	:	Terms of Reference
UAS	:	University of Agricultural Sciences
UHS	:	University of Horticultural Science
WB	:	World Bank
WC	:	Watershed Committee
WDD	:	Watershed Development Department
WM	:	Watershed Management

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Introduction

Out of the total geographic area of 328.73 m.ha, more than 30 per cent is affected by various forms of land degradation and out of this, rainfed areas account for more than 85 percent of degraded lands in the country, mostly occurring in Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha and Rajasthan. Since these rainfed areas contribute significantly to agricultural output (producing 44 percent of country's food grains, 80 percent of the pulses, 73 percent of oilseeds and 66 percent of livestock), conservation and sustainability of their natural capital becomes critical to ensure food security in the country. Karnataka has total 19.05 million ha. geographical area of which 12.97 million ha is the treatable area and in this 6.85 million ha area is already treated and 0.89 million ha is being treated under various watershed programs. Thus about 5.23 million ha (52.31 lakh ha) rainfed watershed area is yet to be treated on watershed approach.

Over the years, Integrated Watershed Management has emerged as an appropriate option to reduce the severity of land degradation in the rainfed areas and to improve the productivity on a sustainable basis. Accordingly, various watershed development programs have been designed and implemented in the past with huge financial outlay.

The experience of World Bank supported Sujala-3 Project in Karnataka has proved the importance of location specific recommendations based on site-specific land resource information and advisories. Land Resource Inventory (LRI) approach provides not only site-specific land resource information, but also thematic maps, advisories and tools (Digital Library, Portal, DSS & Mobile Apps) needed for the preparation of Detailed Project Report (DPR) and for implementation and monitoring of Watershed and other line department programs in the state and as well as in the country.

Emergence of REWARD Program

To upscale the above approach in order to generate farm level land resource information, and to develop decision support systems, advisories and ICT tools needed for taking up science based watershed planning and development in the country, the World Bank has come forward to support the program for Rejuvenating Watersheds for Agricultural Resilience through Innovative Development (REWARD Program) in Karnataka and Odisha. The REWARD program will be implemented in 21rainfed districts of Karnataka with a budget of Rs.600 crores. The budget will be co-shared by World Bank and Government of Karnataka (GoK) in the ratio of 70:30 and the program will be implemented by Watershed Development Department (WDD), Government of Karnataka. Area selected for the program implementation across 21Districts. The Program Development Objective (PDO) is to 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 state.

Karnataka Watershed Development Department is considered as a Lighthouse partner for the program to provide technical support to Odisha to implement watershed program using scientific approaches and also to sensitise the other States on this novel approach.

Centre of Excellence on Watershed Management

Centre of Excellence on Watershed Management established at UAS, GKVK, Bangalore, during 2022 to take science based tools to communities and stakeholders working towards agriculture resilience and to enhance the viability and quality of rural livelihood support systems. It is given to the UAS, Bangalore, considering its pioneering contributions through ORP implemented in Rajanukunte, Kabbalnala, Mittermari and Kalyankere–Mavathurkere watersheds, for which the University received National Productivity Council Award. Also, intensive involvement in Sujala-3 project to generate LRI and hydrology data.

Vision: Designing and advocating science based approaches in comprehensive watershed management

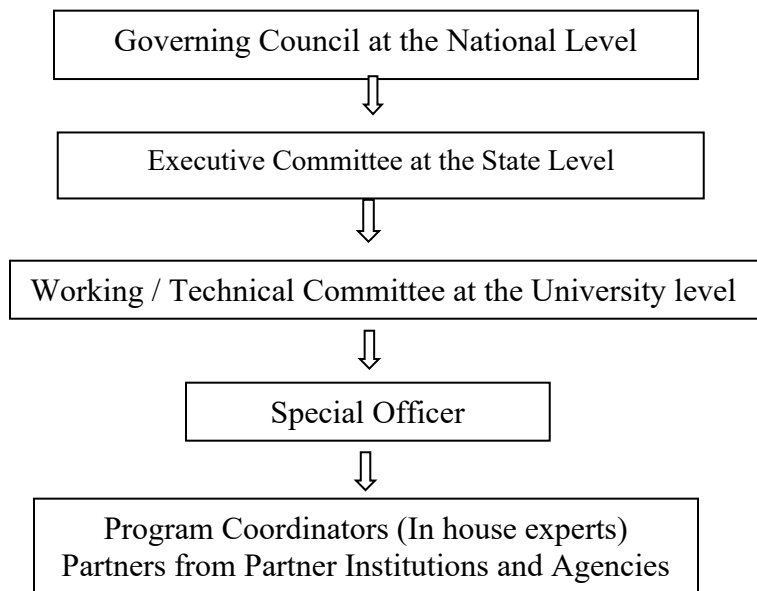
Mission: Facilitating the acquisition of advanced technical skills by the stakeholders of watershed management for agricultural resilience

Main Objective of CoE is to mainstream the LRI and hydrology technology and science based watershed development in the country

Major Responsibilities of CoE-WM

1. Demonstrating the application of science based approaches in watershed development
2. Impart training to the members of line departments of the State and beyond
3. Develop manuals
4. Refinement of Decision Support System, Digital Library and Portal
5. Exchange knowledge
6. Facilitating the development of dissemination tools and a host of other outputs needed for mainstreaming the LRI approach in the country

Organizational Structure of Centre of Excellence on Watershed Management



Manpower for CoE on WM

The Special Officer, nominated by the University, will function as Chief Executive in planning, implementation and monitoring of assigned activities to the centre. He will attend or nominate suitable person for the meetings convened by the Watershed Development Department and GoK. He will appraise to the committees and the World Bank as per the need. The Special Officer is supported by the Scientists nominated as in- house Coordinators for the CoE on WM by the University. Further, the Consultants in the areas of Remote Sensing and GIS, and Capacity Building as well as five Research Associates in the required disciplines will support the in house Coordinators and the Consultants. The secretarial and support staff up to ten persons are to be engaged by the Special Officer for office and activities management. The list of in-house coordinators nominated is given in Annexure-1.

Committees to Monitor the functioning of CoE on WM

As CoE is envisaged as national institute, a Governing council is proposed under the Chairmanship of Secretary DoLR, Chairman of NRAA as Vice Chairman, Chief Secretary, GoK as members and other members as proposed by Chairman.

At the state level, an Executive Committee has been constituted with Secretary to Government, Agriculture Department, GoK, as Chairperson, to guide, monitor and review the activities of CoE periodically for facilitating effective and speedy functioning of the centre. The committee is proposed to hold meetings once in a quarter.

The University of Agricultural Sciences, Bangalore has constituted a working (Technical) committee with the Vice-Chancellor of the University as Chairperson, to review, coordinate,

guide on technical aspects for effective implementation of assigned activities and to oversee the overall activities of the centre. The committee will meet once in a quarter.

The composition of proposed committee is given in Annexure-2

Major Activities of CoE-WM:

1. To support the mainstreaming of Land Resource Inventory (LRI) approach for watershed management in the country
2. Refinement of LRI methodology with the use of advanced tools and technologies as well as Decision Support Systems (DSS) developed
3. Development of new DSS to meet the needs of farmers, line departments and other stakeholders and mobile applications to reach the maximum beneficiaries in the shortest possible time on a regular basis
4. Development of teaching aids and e-products for dissemination of LRI information and advisories
5. Imparting training on LRI, hydrology, DSS, Digital Library (DL)/Portal and other applications
6. Participate in knowledge exchange programs within the country and outside
7. Developing guidelines/protocols/manuals needed for taking up impact evaluation (M&E)
8. Undertake review of the best practices in watershed management to provide inputs for improving watershed guidelines
9. Facilitate the identification of emerging areas/issues and pilot studies related to watershed management
10. To connect science and community needs in watershed management for post project sustainability

Description of Activities

For the assigned activities of Centre of Excellence on Watershed Management, a brief description of the activity along with procedures in carrying out the activity, protocols and time frame are indicated below.

1. To Support the mainstreaming of LRI approach for watershed management in the country

The outcome of LRI and hydrology inventories and the decision support system evolved during Sujala-3 project and presently used in REWARD program in Karnataka and Odisha, for planning comprehensive watershed development, will be shared with the DoLR, Ministry of Rural Development, GoI, who are supporting all the States to implement watershed development through PMKSY 2.0 in the country as well as the State Level Nodal Agency implementing watershed development in the States. The approaches to share and to sensitize these new methodologies to the target agencies will be through print and electronic media as well as through online course. For initial stage of sensitization of the new approach, print and electronic media will be used effectively. For

internalization of skills in adoption of the novel approaches, the training will be conducted in three stages for different states (a) for project implementing agency (PIA) orientation on new approaches in watershed planning (b) for scientific partner institutes methodology in generation and interpretation of scientific data through LRI and hydrology inventories and (c) for PIA on preparation of tabletop / smart DPR integrating the LRI and Hydrology outputs with decision criteria by developing decision support system. Need based technical support will be provided while implementing the new approaches. An exclusive website of CoE on watershed management will provide updates on new developments, training schedule, manuals and other publications. Approach and time frame will be as follows:

#	<i>Approach</i>	<i>Time frame</i>
1.	Website on CoE-WM	January 2023
2.	Orientation training to technical experts of non-REWARD States	January 2023
3.	Supply of soft copy of the manuals on RS and GIS, LRI, Hydrology, DSS to DoLR and all SLNAs	February 2023
4.	Training to Scientists of partner institutes on methodologies in LRI and hydrology studies	To be decided in consultation with DoLR (may be from March 2023 onwards)
5.	Training to PIA of non-REWARD States on smart DPR preparation using LRI, Hydrology and DSS	To be decided in consultation with DoLR (may be from November, 2023 onwards)
6.	Online interactive teaching through programmed instruction on importance of LRI and hydrology in watershed planning for decision makers	May, 2023

2. Refinement of LRI methodology:

There is a scope for refinement of LRI to fast track the process of capturing the required data through use of advanced tools and technologies like fast changing approaches in remote sensing, GIS, GPS, drones, artificial intelligence, cloud sourcing etc. to meet the demand to treat larger area under watershed in the country. This will be attempted in consultation with relevant institutions within and outside the country. Also, the quality assurance system to be evolved to ensure precise data is available to the public and to plan activities to address real problem. If there are mistakes in capturing and interpreting the data, the whole purpose of scientific planning is defeated. Further, the data will be stored in the portal and accessed by the public. If some mistakes or erroneous data are noticed in the uploaded data, will call for criticism and the credibility will be questioned. This task can be accomplished by a team of experts in the domain areas by studying the existing approaches/ protocols and methodology followed in generation and interpretation of output. Also, the same team can provide a system/ mechanism for assuring the quality of inventories and output. In this regard, the CoE- WM will technically assist Watershed Development Department, GoK, in identification of a

competent technical committee with suitable terms of reference for the committee. Approach and time frame are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	Facilitation in identifying a technical committee by WDD, prepare ToR for the committee	May, 2023
2.	Technical committee output on quality assurance system	January, 2024
3.	Technical committee output on refinements in the LRI and hydrology approaches to improve the quality and to save time	April, 2024
4.	Preparation of manuals on refined approaches by CoE- WM	May, 2024
5.	Training on refined LRI and hydrology approaches to the scientific partner institutes by CoE- WM	May, 2024 onwards

3. Refinement of the Decision Support Systems developed and Development of new Decision Support System

Under Sujala-3 project, nine DSS are developed and used for the preparation soil and water conservation plan, land capability, crop plan, nutrient management plan, runoff estimation, soil moisture, crop water requirement, water balance and water budget. Though these DSS were tested to some extent, still there is a need to cross check for their applicability in the field situations and to get feedback from domain experts and field functionaries. The Centre will attempt to refine, improve, or modify the DSSs developed by studying existing nine DSS developed, decision criteria tables, flow charts and algorithms, design criteria of various conservation structures and to develop DSS for additional areas. After through testing and feedback from the users, share the same with other participating States in a ready to use framework. This is a dynamic activity throughout the project cycle and beyond.

Taking advantage of availability of huge repository of LRI and hydrology information from REWARD program, the CoE will facilitate to develop appropriate DSS for their mainstreaming in the watershed areas and provide necessary support to develop new models/algorithms, and DSS by involving domain experts, technology institutions, policy makers and based on a multi stakeholder need assessment exercise. Some of the new areas to be considered for the development are (a) identifying methods and models for estimation and monitoring of evapotranspiration, runoff, soil moisture, ground water recharge at different scales and develop appropriate DSS for their mainstreaming in the watershed areas, (b) DSS for the preparation of DPR for flagship programs of Department of Agriculture, Department of Horticulture, Department of Sericulture, Animal Husbandry, Irrigation, Rural Development, and other line departments, (c) suitability criteria development and assessment for crops/varieties/other land uses not done earlier, (d) convergence of all programs at watershed level, (e) pest management, (f) water balance and water budget at village/MWS and other levels, (g) value chain management and logistical support, and (h) other areas as per the need of line departments. This task to be entrusted to an expert team/ committee in addition to the scientific staff of CoE-WM and consortium partner institutions. In this regard, the CoE-WM will technically assist Watershed Development Department, GoK, in identification

of a competent technical team including scientists from consortium partner institutes with suitable terms of reference for the committee. Approach and time frame for achieving the activity are as follows:

#	<i>Approach</i>	<i>Time frame</i>
1.	Facilitation in identifying a technical committee by WDD, prepare ToR for the committee	May, 2023
2.	Provide technical support to WDD for calling tenders/ to identify competent agency to refine/ develop DSS	May, 2023
3.	Refinements in nine DSS already developed under Sujala-3 project	November, 2023
4.	Preparation of DSS for additional areas	From March, 2024 onwards

4. Development of Mobile applications

Mobile applications offer huge potential to reach the maximum number of beneficiaries spread over geographically in the shortest possible time. Some efforts were made under Sujala-3 project to take LRI advisories to different stakeholders but, still there is a huge scope to develop wide range of mobile applications in android and iOS versions to access advisories not only on LRI, but also on crop, pest, weather, market, government policies and programmes, subsidies, facilities available in different sectors etc. The CoE on WM will facilitate to develop mobile application as per the emerging needs. Approach and time frame to complete task are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	Facilitation to WDD to identify a technical committee. Preparation of ToR for the committee	March, 2023
2.	Technical support to the identified committee for developing mobile applications along with consortia partner institute scientists	November, 2023 onwards or after identifying the agency

5. Developing guidelines/protocols/manuals needed for selection and establishment of Bench-Mark sites and impact evaluation (M&E)

The CoE on watershed management will organize consultations among watershed departments, project partners, M&E specialists and others to evolve a suitable design, sample size, selection of watersheds and benchmark sites, instrumentations needed, mode of data collection (ground, sensor and RS based), indicators to be used and protocols and guidelines to be followed in carrying out M&E in control and treatment areas and before and after situations to assess the impact of the interventions carried out by the departments. Further, CoE will support to develop a state of art MIS system by linking with the repository of LRI data available in the DL and Portal. The Centre will act as a platform to the flow of information on real time basis to the Portal. The approach and time frame to accomplish the task are as follows:

#	<i>Approach</i>	<i>Time frame</i>
1.	Organizing a workshop involving consortium partners, domain experts / technical experts and Officers of WDD to develop protocols, indicators and procedures in assessment, needed equipment, time line for assessments, responsible institutions etc. for selection and establishment of bench mark sites/ impact evaluation	March, 2023
2.	Preparing of manual indicating protocols, indicators, quantification techniques etc.	April, 2023
3.	Technical support to PIA to prepare a detailed plan to develop micro-watersheds selected for intensive monitoring as per LRI approach	April, 2023
4.	Training / Workshop for the PIA staff involved in implementation of watershed development activities as per LRI approach	April, 2023
5.	Identification of bench mark sites for comparison with the developed micro-watersheds based on LRI approach	May, 2023
6.	Technical support to the consortia partners/ concerned staff to assess the changes as per the identified indicators	Throughout the implementing period
7.	Presentation of indicator wise assessments in a workshop to finalize the impact of LRI approach versus conventional approach and finalizing the indicators for monitoring and evaluation of watershed developed	Two months after the phasing out from the developed watershed

6. Development of teaching aids and e-products for dissemination of LRI information and advisories:

With the support of project partners and by using the state of art ICT platform available (Digital Library, Portal, DSS & Mobile Apps) videos, audio-visuals, manuals, brochures, leaflets, guides, display boards, e-books and other online learning aids, and other dissemination products will be generated for imparting training to the stakeholders of REWARD program and also will be delivered through multimedia/social media and other communication channels on regular basis for wider dissemination. The repository of LRI information available from the Portal to be linked with various Remote Sensing products, weather, crop, and hydrological advisories on real time basis to generate various visualization products that can aid in the effective delivery of classroom lectures, online learning, webinars and exchange programs. The approach and time frame are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	Brochures on Centre of Excellence on Watershed management describing the activities of the centre	March, 2023
2.	Leaflets/ folders on LRI and hydrology approaches in scientific planning of watershed development	March, 2023
3.	Preparation of manual on LRI and hydrology inventories. For the use by scientific partners of non-REWARD	June,2023

	States	
4.	Preparation of manual on smart/ table top DPR preparation by integrating LRI and hydrology outputs with DSS for the implementing agencies of both REWARD and non-REWARD States	August, 2023
5.	Preparation of manual on the refined areas of LRI methodology for its use by scientific partners of both REWARD and non-REWARD States	After the refinement
6.	Preparation of manual on the refined DSS for the benefit of the implementing agencies of both REWARD and non-REWARD States	After the refinement
7.	Preparation of manual on selection and monitoring of benchmark sites and impact evaluation process	April, 2023
8.	Audio- visual aids on different thematic areas for understanding and implementation of LRI and hydrology based watershed management	Periodically from November, 2023
9.	Publishing the best practices adopted in development of watersheds in various parts of the country in both print and electronic formats	Annually from April, 2024
10.	e-books on all the thematic areas of scientific watershed management	Periodically from January 2024

7. Imparting Training on LRI, DSS, DL/Portal and other applications:

The CoE on WM will organize certified training programmes on LRI, hydrology, digital library, portal, decision support system, mobile applications, DPR preparation etc. to a wide range of participants. It is one of the most effective methods to reach large number of persons. Therefore, training is conceived as a specialized education, which is skill oriented. The concern here is to enhance the ability of an individual to accomplish a set of tasks. This requires the knowledge and skills to perform the tasks, and acceptable standards at which the tasks are performed. Thus, training begins with a set of pre-determined tasks and proceeds to design an educational process, which ensures that the individual acquire the needed competence in terms of knowledge, skills, attitudes and standards. The emphasis is on providing the educational opportunities, which result in the acquisition of new or upgraded abilities in performing the tasks.

Certified Training is a systematically structured and competency-oriented capacity development program that is formally conceptualized, implemented, evaluated, and accredited by the Centre of Excellence on Watershed Management (CoE-WM). Such training programs are designed with clearly defined learning objectives, standardized curriculum content, specified instructional duration, practical and field-based learning components, and competency-based evaluation mechanisms to ensure measurable enhancement of participant knowledge and skills. Certification is awarded only to

participants who fulfill the mandatory attendance requirements and successfully demonstrate acquisition of knowledge and practical competencies through established assessment procedures.

To maintain the quality, transparency, and credibility of certified training programs, the Centre of Excellence on Watershed Management (CoE-WM) shall undertake specific institutional responsibilities. These include developing structured training modules for each session with clearly defined objectives, content, duration, methodology, and expected learning outcomes; providing participants with relevant literature, training manuals, and supporting materials including a training kit; and implementing an objective and unbiased evaluation system to measure improvements in cognitive and technical skills through pre- and post-training assessments. For a trainee to qualify as a certified participant, he or she must attend at least 95 percent of the training sessions and demonstrate a minimum 25 percent improvement in cognitive skills based on the evaluation results. The Centre shall also maintain comprehensive documentation of the training process, including attendance records and photographic evidence, collect structured feedback from participants to improve subsequent training programs, and issue certificates to eligible participants at the conclusion of the training upon successful fulfillment of the prescribed requirements.

Since CoE on WM deal with adults, the training approach will be participatory in nature and involve direct participation of the participants and creates an atmosphere for sharing experience. It involves adults practicing new skills and applying new knowledge and attitudes during activities. Thus, systematic approach in imparting training will be followed. The centre will frame, schedule and conduct certified training programs on LRI methodology, use of remote sensing, GIS, GPS and other technologies for field mapping and data collection, development of decision support systems, preparation of DPR for various schemes, development and maintenance of DL and Portal, monitoring and impact evaluation, social and environmental impact assessment etc. Further, the Centre will facilitate the preparation of training materials, video, and audio visuals, and establish ICT platform for the effective delivery of the training and e-learning programs. The training calendar is given below.

Sl. No	Theme	Participants		Duration (Days)	No. of Training programs	Tentative time
		Category	Number			
REWARD Program implementing State-Karnataka						
1	An overview of REWARD program and scientific approaches in watershed management and agricultural productivity enhancement	PEC members	30	1	2	June-2023
2	Emerging approaches in generation of LRI, hydrology,	Scientific partners	30	3	4	March-2023

Sl. No	Theme	Participants		Duration (Days)	No. of Training programs	Tentative time
		Category	Number			
	socio-economic survey data and other inputs and their effective integration for development of DSS					
REWARD Program implementing Districts						
3	Effective use of scientific data in watershed management and convergence of programmes of development departments	DCs & CEOs	40	1	1	March, 2023
4	Application of scientific data in preparation of DPR on watershed management	JDA	40	2	2	February, 2023
5	Application of scientific data in preparation of DPR on watershed management	DDAs	60	2	3	February, 2023
6	Application of scientific data in preparation of comprehensive watershed management plan	ADAs	30	3	3	February, 2023
7	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management	District level line department officers DoA, DoH, DoAH, DoF, DoS, RDPR,	100	2	2	March, 2023
8	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management	Master Trainers (FNGO, DATC, SIRD)	60	3	3	Dec-2023 Dec-2024
Non REWARD Program implementing Districts						
9	Application of scientific data in preparation of DPR on watershed management	JDA & DDA	30	2	1	November, 2023
10	Application of scientific data in preparation of comprehensive watershed management plan	ADA/AO	250	2	12	June-2023/24 July-2023/24 Aug-2023/24 Sept-2023/24
11	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management	Line Departments Officers	200	2	2	July-2023/24 Sept-2023/24

Sl. No	Theme	Participants		Duration (Days)	No. of Training programs	Tentative time
		Category	Number			
REWARD Program implementing State- Odisha						
12	Emerging approaches in generation of LRI, hydrology, socio-economic survey data and other inputs and their effective integration for development of DSS	Scientific officers	30	2	1	August, 2023
13	Effective use of scientific data for DPR preparation for watersheds	Scientific partners and Officers of SC & WD	20	2	2	December, 2022
Non REWARD States as per the requirement of DoLR						
14	Orientation training on LRI	Technical experts of WSD in non-REWARD states	60	5	2	January, 2023
15	Training to Scientists of partner institutes on methodologies in LRI and hydrology studies	Scientists of partner institutes of non-REWARD States	60	5	2	As indicated by DoLR
16	Training to PIA of non-REWARD States on smart DPR preparation using LRI, Hydrology and DSS	PIA staff of non-REWARD States	60	5	2	As indicated by DoLR

8. Participate in Knowledge exchange program:

As part of knowledge exchange programme, CoE WM will organize three broad types of activities namely (a) need based on-line interaction sessions with scientific partner institutes and SLNA/ PIA across the country for integration of science based approaches in planning and implementation of watershed interventions, (b) organizing national and international workshops/ seminars for sharing the innovative approaches followed in generation data through RS and GIS, LRI and hydrology inventories, DSS, implantation approaches etc. for consolidation, documentation and refinement of existing approaches and sharing with all the concerned, (c) visits to the NRM projects operated by the World Bank or other donors outside the country to the staff working in REWARD program. The approach and time frame are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	On-line interaction sessions	Once in a quarter from July,2023
2.	National workshop/ seminar	May, 2024
3.	International workshop/ seminar	June,2025
4.	Visit to outside the country in two batches	August, 2024 August, 2025

9. Review of the best practices in watershed management to provide inputs for improving watershed guidelines:

The CoE- WM with multidisciplinary team and domain expertise, will act as a think tank in improving/modifying the existing watershed guidelines or help in bringing out new generation guidelines as and when necessary based on the field experience and feedback from the operationalization of multi state REWARD project and by distilling the experiences of partners associated with similar projects in the country and elsewhere. For this, the Centre work in tandem with National Level Nodal Agency, ICRISAT and World Bank in refining/evolving new guidelines for watershed development in the country.

The approach and time frame to complete the task are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	Refinement of existing guidelines for implementation of Watershed Development after discussion in a workshop involving representatives of NLNA, ICRISAT, SLNA, World Bank and prominent NGOs etc.	December, 2026

10. Facilitate the identification of emerging areas/issues and pilot studies related to watershed management:

The Centre will facilitate to take up pilot studies related to watershed in association with project partners, research institutions, development departments, advisory bodies, and other stakeholders. Some of the areas are (a) best management practices to enhance soil organic carbon content, carbon sequestration processes and their implications on soil health and livelihood under rainfed situations, (b) dynamic contingent crop plan for climatic distress towards economic sustainability and livelihood of rainfed areas, (c) crop and land management practices for sustainable soil health, economic viability and livelihood of small holder farms, (d) LRI based fertilizer recommendation, (e) market driven production practices for livelihood enhancement of rainfed farmers,(f) rapid techniques for dynamic nutrient management and soil properties and (g) participatory ground water management. These studies will be conducted after consultation with partner institutes. The methodology will be finalized in the thematic wise workshops. The approach and time frame are given below:

#	<i>Approach</i>	<i>Time frame</i>
1.	Best management practices to enhance soil organic carbon content, carbon sequestration processes and their implications on soil health and livelihood under rainfed situations,	Continuously for 3years from July, 2023
2.	Dynamic contingent crop plan for climatic distress towards economic sustainability and livelihood of rainfed areas	Continuously for 3years from July, 2023
3.	Crop and land management practices for sustainable soil health, economic viability and livelihood of small holder farm	Continuously for 3years from July, 2023
4.	LRI based fertilizer recommendation	Continuously for 3years from July, 2023
5.	Market driven production practices for livelihood enhancement of rainfed farmers,	December, 2023
6.	Rapid techniques for dynamic nutrient management and soil properties	Continuously for 3years from July, 2023
7.	Participatory ground water management	Continuously for 3years from July, 2023

11. Connecting science and community needs in watershed management for post project sustainability.

The CoE-WM in collaboration with NGOs working in the field of watershed management will experiment and also document the best practices in sustainable watershed management through institutional approach. Organize activities in such a way that the communities realize the importance of science based approaches in sustainable development of watersheds.

#	<i>Approach</i>	<i>Time frame</i>
1.	Documentation of best practices in the micro-watersheds where LRI based watershed development approach made visible impact of sustainability	October, 2024
2.	Establishing cause and effect relationship between the identified practices and sustainable watershed management	December, 2024
3.	Production of appropriate teaching / audio-visual aids to disseminate the resultant effect of scientific approaches in sustainable watershed management	January, 2025
4.	Educating PIA, NGOs, selected community level organizations on practices leading to sustainable watershed management	March, 2025 onwards

Activity Wise Timeline for Completion

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. To Support the mainstreaming of LRI approach for watershed management in the country																									
1.1	Website on CoE-WM					√																			
1.2	Interactive teaching/ training through Programmed Instruction on LRI for watershed management for decision makers					√																			
1.3	Supply of soft copy of the manuals on RS and GIS, LRI, Hydrology, DSS to DoLR and all SLNAs					√																			
1.4	Training to Scientists of partner institutes on methodologies in LRI and hydrology studies					T																			
1.5	Training to PIA of non-REWARD States on smart DPR preparation using LRI, Hydrology and DSS					T																			
1.6	Online interactive teaching through programmed instruction on importance of LRI and hydrology in watershed planning for decision makers						√																		
2. Refinement of LRI methodology:																									
2.1	Facilitation in identifying a technical committee by WDD,						√																		

¹ 1,2,3,4 are the Quarters of a year

² To be decided in consultation with DoLR, New Delhi

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	prepare ToR for the committee																								
2.2	Technical committee output on quality assurance system									√															
2.3	Technical committee output on refinements in the LRI and hydrology approaches to improve the quality and to save time										√														
2.4	Preparation of manuals on refined approaches by CoE- WM										√														
2.5	Training on refined LRI and hydrology approaches to the scientific partner institutes by CoE- WM										√														
3. Refinement of the Decision Support Systems developed and Development of new Decision Support System																									
3.1	Facilitation to WDD in identifying a technical committee to develop new DSSs and refine the existing ones. Preparation of ToR for the committee					√																			
3.2	Provide technical support to WDD for calling tenders/ to identify competent agency to refine/ develop DSS						√																		
3.3	Refinements in nine DSS already developed under Sujala-3 project								√																
3.4	Preparation of DSS for additional areas									√															
4. Development of Mobile applications																									
4.1	Facilitation to WDD to identify a					√																			

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	technical committee and preparation of ToR for the committee																								
4.2	Technical support to the identified committee for developing mobile applications along with consortia partner institute scientists								√																
5. Developing guidelines/protocols/manuals needed for selection and establishment of Bench-Mark sites and impact evaluation (M&E)																									
5.1	Identification of bench mark sites and impact evaluation-organizing workshop to develop protocols, indicators and procedures in assessment, needed equipment, time line for assessments, responsible institutions etc.					√																			
5.2	Preparing of manual indicating protocols, indicators, quantification techniques etc.						√																		
5.3	Technical support to PIA to prepare a detailed plan to develop micro-watersheds selected for intensive monitoring as per LRI approach						√																		
5.4	Training / Workshop for the PIA staff involved in implementation of watershed development activities as per LRI approach						√																		
5.5	Identification of bench mark sites for comparison with the						√																		

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	developed micro-watersheds based on LRI approach																								
5.6	Technical support to the consortia partners/ concerned staff to assess the changes as per the identified indicators									√	√	√	√												
5.7	Presentation of indicator wise assessments in a workshop to finalize the impact of LRI approach versus conventional approach and finalizing the indicators for monitoring and evaluation of watershed developed														√	√									
6. Development of teaching aids and e-products for dissemination of LRI information and advisories																									
6.1	Brochures on Centre of Excellence on Watershed management describing the activities of the centre					√																			
6.2	Leaflets/ folders on LRI and hydrology approaches in scientific planning of watershed development					√																			
6.3	Preparation of manual on LRI and hydrology inventories. For the use by scientific partners of non-REWARD States						√																		
6.4	Preparation of manual on smart/ table top DPR preparation by							√																	

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	integrating LRI and hydrology outputs with DSS for the implementing agencies of both REWARD and non-REWARD States																								
6.5	Preparation of manual on the refined areas of LRI methodology for its use by scientific partners of both REWARD and non-REWARD States											√	√												
6.6	Preparation of manual on the refined DSS for the benefit of the implementing agencies of both REWARD and non-REWARD States										√	√													
6.7	Preparation of manual on selection and monitoring of benchmark sites and impact evaluation process						√																		
6.8	Audio- visual aids on different thematic areas for understanding and implementation of LRI and hydrology based watershed management							√		√		√		√		√		√		√		√		√	
6.9	Publishing the best practices adopted in development of watersheds in various parts of the country in both print and electronic media										√				√			√				√			

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
6.10	e-books on all the thematic areas of scientific watershed management									√		√		√		√		√		√		√		√	
7. Imparting Training on LRI, DSS, DL/Portal and other applications																									
REWARD Program implementing State-Karnataka																									
7.1	An overview of REWARD program and scientific approaches in watershed management and agricultural productivity enhancement						√																		
7.2	Emerging approaches in generation of LRI, hydrology, socio-economic survey data and other inputs and their effective integration for development of DSS					√																			
REWARD Program implementing Districts																									
7.3	Effective use of scientific data in watershed management and convergence of programmes of development departments					√																			
7.4	Application of scientific data in preparation of DPR on watershed management					√																			
7.5	Application of scientific data in preparation of DPR on watershed management					√																			
7.6	Application of scientific data in preparation of comprehensive watershed management plan					√																			

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
7.7	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management					√																			
7.8	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management								√				√												
Non REWARD Program implementing Districts																									
7.9	Application of scientific data in preparation of DPR on watershed management								√																
7.10	Application of scientific data in preparation of comprehensive watershed management plan						√	√			√	√													
7.11	Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management							√				√													
REWARD Program implementing State- Odisha																									
7.12	Emerging approaches in generation of LRI, hydrology, socio-economic survey data and other inputs and their effective integration for development of DSS							√																	
7.13	Effective use of scientific data for DPR preparation for watersheds				√																				

Sl. No	Activity	2022				2023				2024				2025				2026				2027							
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Non REWARD States as per the requirement of DoLR																													
7.14	Orientation training on LRI					√																							
7.15	Training to Scientists of partner institutes on methodologies in LRI and hydrology studies					As indicated by DoLR																							
7.16	Training to PIA of non-REWARD States on smart DPR preparation using LRI, Hydrology and DSS					As indicated by DoLR																							
8. Participate in Knowledge exchange program:																													
8.1	On-line interaction sessions							√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8.2	National workshop/ seminar									√																			
8.3	International workshop/ seminar															√													
8.4	Visit to outside the country in two batches											√					√												
9. Review of the best practices in watershed management to provide inputs for improving watershed guidelines:																													
9.1	Refinement of existing guidelines for implementation of Watershed Development after discussion in a workshop involving representatives of NLNA, ICRISAT, SLNA, World Bank and prominent NGOs etc.																											√	
10. Facilitate the identification of emerging areas/issues and pilot studies related to watershed management:																													
10.1	Best management practices to enhance soil organic carbon content, carbon sequestration processes and their implications							√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						

Sl. No	Activity	2022				2023				2024				2025				2026				2027			
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	on soil health and livelihood under rainfed situations,																								
10.2	Dynamic contingent crop plan for climatic distress towards economic sustainability and livelihood of rainfed areas							√	√	√	√	√	√	√	√	√	√	√							
10.3	Crop and land management practices for sustainable soil health, economic viability and livelihood of small holder farm							√	√	√	√	√	√	√	√	√	√	√							
10.4	LRI based fertilizer recommendation							√	√	√	√	√	√	√	√	√	√	√							
10.5	Market driven production practices for livelihood enhancement of rainfed farmers,							√	√	√	√	√	√	√	√	√	√	√							
10.6	Rapid techniques for dynamic nutrient management and soil properties							√	√	√	√	√	√	√	√	√	√	√							
10.7	Participatory ground water management							√	√	√	√	√	√	√	√	√	√	√							
11. Connecting science and community needs in watershed management for post project sustainability																									
11.1	Documentation of best practices in the micro-watersheds where LRI based watershed development approach made visible impact of sustainability														√										
11.2	Establishing cause and effect relationship between the identified practices and sustainable watershed													√											

Sl. No	Activity	2022				2023				2024				2025				2026				2027							
		1 ¹	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
	management																												
11.3	Production of appropriate teaching / audio-visual aids to disseminate the resultant effect of scientific approaches in sustainable watershed management													√															
11.4	Educating PIA, NGOs, selected community level organizations on practices leading to sustainable watershed management													√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Month wise Abstract of Activities

#	<i>Activity</i>	<i>Time frame</i>
<i>During 2023</i>		
1.	Website on CoE-WM	January 2023
2.	Orientation training to technical experts of non-REWARD States	January 2023
3.	Orientation training on LRI (Non REWARD States as per the requirement of DoLR)	January 2023
4.	Supply of soft copy of the manuals on RS and GIS, LRI, Hydrology, DSS to DoLR and all SLNAs	February 2023
5.	Training - Application of scientific data in preparation of DPR on watershed management (REWARD Program implementing Districts)	February 2023
6.	Training - Application of scientific data in preparation of DPR on watershed management (REWARD Program implementing Districts)	February 2023
7.	Training - Application of scientific data in preparation of comprehensive watershed management plan (REWARD Program implementing Districts)	February 2023
8.	Refinement of LRI Approach: Facilitation in identifying a technical committee by WDD, prepare ToR for the committee	May, 2023
9.	Training - Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management (REWARD Program implementing Districts)	March, 2023
10.	Training - Emerging approaches in generation of LRI, hydrology, socio-economic survey data and other inputs and their effective integration for development of DSS (REWARD Program implementing State-Karnataka)	March-2023
11.	Training - Effective use of scientific data in watershed management and convergence of programmes of development departments (REWARD Program implementing Districts)	March, 2023
12.	Brochures on Centre of Excellence on Watershed management describing the activities of the centre	March, 2023
13.	Leaflets/ folders on LRI and hydrology approaches in scientific planning of watershed development	March, 2023
14.	Identification of bench mark sites and impact evaluation-organizing workshop to develop protocols, indicators and procedures in assessment, needed equipment, time line for assessments, responsible institutions etc.	March, 2023
15.	Training to Scientists of partner institutes on methodologies in LRI and hydrology studies	To be decided in consultation with DoLR (may be from March 2023 onwards)
16.	Bench mark sites/ impact evaluation: preparing of manual	April, 2023

#	<i>Activity</i>	<i>Time frame</i>
	indicating protocols, indicators, quantification techniques etc. based on workshop output	
17.	Technical support to PIA to prepare a detailed plan to develop micro-watersheds selected for intensive monitoring as per LRI approach	April, 2023
18.	Training / Workshop for the PIA staff involved in implementation of watershed development activities as per LRI approach	April, 2023
19.	Preparation of manual on selection and monitoring of benchmark sites and impact evaluation process	April, 2023
20.	Identification of bench mark sites for comparison with the developed micro-watersheds based on LRI approach	May, 2023
21.	Online interactive teaching through programmed instruction on importance of LRI and hydrology in watershed planning for decision makers	May, 2023
22.	LRI Approach-Refinement of approach to fast track and to design Quality Assurance System: Facilitation to WDD in identifying a technical committee and preparation of ToR for the committee	March, 2023
23.	DSSs- Additional and Refinement of existing DSSs: Facilitation to WDD in identifying a technical committee. Preparation of ToR for the committee	May, 2023
24.	Provide technical support to WDD for calling tenders/ to identify competent agency to refine LRI approach / refine/develop new DSSs	May, 2023
25.	Training - An overview of REWARD program and scientific approaches in watershed management and agricultural productivity enhancement (REWARD Program implementing State-Karnataka)	June-2023
26.	Preparation of manual on LRI and hydrology inventories. For the use by scientific partners of non-REWARD States	June,2023
27.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD Program implementing Districts)	June,2023
28.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD Program implementing Districts)	July, 2023
29.	Knowledge exchange program- On-line interaction sessions	Once in a quarter from July,2023
30.	Pilot study-Best management practices to enhance soil organic carbon content, carbon sequestration processes and their implications on soil health and livelihood under rainfed situations,	Continuously for 3years from July, 2023
31.	Pilot study-Dynamic contingent crop plan for climatic distress towards economic sustainability and livelihood of rainfed areas	Continuously for 3years from July, 2023
32.	Pilot study-Crop and land management practices for sustainable soil health, economic viability and livelihood of small holder farm	Continuously for 3years from July, 2023
33.	Pilot study-LRI based fertilizer recommendation	Continuously for 3years

#	<i>Activity</i>	<i>Time frame</i>
		from July, 2023
34.	Pilot study-Rapid techniques for dynamic nutrient management and soil properties	Continuously for 3years from July, 2023
35.	Pilot study-Participatory ground water management	Continuously for 3years from July, 2023
36.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD Program implementing Districts)	August, 2023
37.	Training - Emerging approaches in generation of LRI, hydrology, socio-economic survey data and other inputs and their effective integration for development of DSS (REWARD program implementing State- Odisha)	August, 2023
38.	Preparation of manual on smart/ table top DPR preparation by integrating LRI and hydrology outputs with DSS for the implementing agencies of both REWARD and non-REWARD States	August, 2023
39.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD program implementing Districts)	Sept, 2023
40.	Knowledge Exchange: On-line interaction sessions	October 2023
41.	Refinements in nine DSS already developed under Sujala-3 project	November, 2023
42.	Audio- visual aids on different thematic areas for understanding and implementation of LRI and hydrology based watershed management	Periodically from November, 2023
43.	Technical support to the identified committee for developing mobile applications along with consortia partner institute scientists	November, 2023 onwards or after identifying the agency
44.	Training to PIA of non-REWARD States on smart DPR preparation using LRI, Hydrology and DSS	To be decided in consultation with DoLR)
45.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD program implementing Districts)	November, 2023
46.	Emerging areas for pilot studies-Market driven production practices for livelihood enhancement of rainfed farmers	December, 2023
47.	Training- Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management (REWARD districts)	December, 2023

<i>During 2024</i>		
<i>#</i>	<i>Activity</i>	<i>Time frame</i>
1.	Technical committee output on quality assurance system	January, 2024
2.	Knowledge exchange program-On-line interaction sessions	January, 2024
3.	e-books on all the thematic areas of scientific watershed management	Periodically from January 2024
4.	Preparation of DSS for additional areas	From March, 2024 onwards
5.	Technical committee output on refinements in the LRI and hydrology approaches to improve the quality and to save time	April, 2024
6.	On-line interaction sessions	April 2024
7.	Publishing the best practices adopted in development of watersheds in various parts of the country in both print and electronic formats	Annually from April, 2024
8.	Preparation of manuals on refined approaches by CoE- WM	May, 2024
9.	National workshop/ seminar	May, 2024
10.	Training on refined LRI and hydrology approaches to the scientific partner institutes by CoE- WM	May, 2024 onwards
11.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD program implementing Districts)	June, 2024
12.	On-line interaction sessions	July 2024
13.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD Program implementing Districts)	July, 2024
14.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD program implementing Districts)	August, 2024
15.	Visit to outside the country in two batches	August, 2024
16.	Training - Application of scientific data in preparation of DPR on watershed management (Non REWARD program implementing Districts)	Sept, 2024
17.	On-line interaction sessions	October 2024
18.	Documentation of best practices in the micro-watersheds where LRI based watershed development approach made visible impact of sustainability	October, 2024
19.	Establishing cause and effect relationship between the identified practices and sustainable watershed management	December, 2024
20.	Training - Effective use of scientific data in planning and implementation of line departments programs and their convergence with watershed management (REWARD program implementing Districts)	December, 2024

<i>During 2025</i>		
<i>#</i>	<i>Activity</i>	<i>Time frame</i>
1.	Production of appropriate teaching / audio-visual aids to disseminate the resultant effect of scientific approaches in sustainable watershed management	January, 2025
2.	On-line interaction sessions	January 2025
3.	Educating PIA, NGOs, selected community level organizations on practices leading to sustainable watershed management	March, 2025 onwards
4.	On-line interaction sessions	April 2025
5.	International workshop/ seminar	June,2025
6.	On-line interaction sessions	July 2025
7.	Visit to outside the country in two batches	August, 2025
8.	On-line interaction sessions	October 2025

<i>During 2026</i>		
<i>#</i>	<i>Activity</i>	<i>Time frame</i>
1.	On-line interaction sessions	Jan 2025
2.	On-line interaction sessions	April 2025
3.	On-line interaction sessions	July 2025
4.	On-line interaction sessions	October 2025
5.	Refinement of existing guidelines for implementation of Watershed Development after discussion in a workshop involving representatives of NLNA, ICRISAT, SLNA, World Bank and prominent NGOs etc.	December, 2026

In-house Coordinators nominated for Centre of Excellence on Watershed Management

<i>Sl. No</i>	<i>Domain</i>	<i>Name of the Scientist</i>
1	Land Resource Inventory	Dr. Prakash, S S
		Dr. Satish, A
2	Hydrology	Dr. Premanand B. D
		Mr. Praveen, P.
3	Remote Sensing and GIS	Dr. Ananthakumar, M.A.
4	Soil & Water Conservation	Dr. Mudalagiriappa
		Dr. Thimmegowda, M.N.
5	Crops and crop production	Dr. Yogananda, S. B.
		Dr. Prasanna Kumar, M.K
6	Horticulture and Forestry	Dr. Srinivasappa, K.N.
		Dr. Mallikarjuna Gowda, A.
7	Nutrient Management	Dr. Suma, R.
8	ICT and Audio- Visuals	Dr. Nagaraj, K. H.
		Dr. Manjula, N.
9	Community Participation	Dr. Shivalingaiah, Y.N.
10	Monitoring and Evaluation	Dr. Siddayya

A. Working committee (Technical) for CoE at the University level:

1	Vice-Chancellor, UAS, Bangalore	Chairperson
2	Director of Education, UAS, Bangalore	Member
3	Director of Research, UAS, Bangalore	Member
4	Registrar, UAS, Bangalore	Member
5	Director of Extension, UAS, Bangalore	Member
6	Comptroller, UAS, Bangalore	Member
7	Special Officer, Co-WM, UAS, Bangalore	Member and Convener

B. Executive Committee at the State level

1	Secretary to Government, Agriculture Department, GoK	Chairperson
2	Commissioner, Watershed Development Department, GoK	Vice-Chairperson
3	Vice-Chancellor, UAS, Bangalore	Member
4	Head, National Bureau of Soil Survey and Land Use Planning (ICAR-NBSS & LUP), Regional Centre, Bengaluru	Member
5	Managing Director, Regional Remote Sensing Centre, Bengaluru	Member
6	Director, Karnataka State Remote Sensing & Application Centre	Member
7	Director, Karnataka State Natural Disaster Monitoring Centre	Member
8	Director, Horticulture Department, GoK	Member
9	Director, Watershed Development Department, GoK	Member
10	Director, Agriculture Department, GoK	Member
11	Representative from RDPR, GoK	Member
12	Director of Research, UAS, Bangalore	Member
13	Director of Research, UAS, Dharwad	Member
14	Director of Research, UAS, Raichur	Member
15	Director of Research, UAHS, Shivamogga	Member
16	Director of Research, UHS, Bagalkot	Member
17	Head, Department of Civil Engineering, IISc, Bengaluru	Member
18	Special Officer, Co-WM, UAS, Bangalore	Member & Convener