

Approved on-Going Research Projects

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P-1 WATER EROSION APPRAISAL IN DIFFERENT AGRO-ECOLOGICAL REGIONS

1.1 Inventory and database of erosion status using modern tools and procedures

- Development of intensity-duration-frequency curves using rainfall data for different agro-ecological regions of India.
- Assessment of soil erosion fluxes of Uttarakhand.
- Impact of land use land cover changes on soil erosion susceptibility in Bundelkhand region using Remote Sensing and GIS technique.
- Mapping and characterization of Jhola land areas in Koraput district.
- Developing methodological framework for delineating and characterization of Chambal and Yamuna ravines.

1.2 Soil erosion process modeling and climate change studies

- National Mission on Sustaining Himalayan Eco-system (NMSHE) - Task force on Himalayan agriculture for lower and middle Himalayan region.
- Effect of climate change on hydrology of small watersheds vis-à-vis soil and water conservation measures.
- Application of integrated spatial science tools for prediction of soil erosion map under changing climate scenario for the Uttarakhand state.

1.3 Soil carbon dynamics and erosion productivity studies

- Erosion productivity relationships for evaluating vulnerability and resiliency of soils under different agro-climatic regions of India.
- Assessment of soil organic carbon in transit under erosion processes: A source or sink for atmospheric CO₂.
- Environmental tracer based study on erosion induced loss of soil organic carbon and its impact on agronomic productivity and environmental quality.
- Development and validation of a spatially explicit simulation framework to quantify runoff-erosion-carbon flux at watershed scale.
- Assessing the vegetation and SOC recovery potentials of abandoned / fallowed shifting cultivated sites in Central Eastern Ghats.

P-2 CONSERVATION MEASURES FOR SUSTAINABLE PRODUCTION SYSTEM

2.1 Resource conservation measures for arable lands

- Evaluating the effect of organic amendments on resource conservation and productivity of rainfed semi-arid vertisols.
- Effect of varying water regimes on Zn and N dynamics and rice productivity in saline vertisols.
- Conservation tillage for resource management and higher production from Shiwaliks.

- Adaptation potential and productivity of organic vis-à-vis conventional farming system under rainfed conditions of Shiwaliks region.
- *In situ* moisture conservation practices under aonla based agro-forestry system for sustainable production in red soils of Bundelkhand.
- Restoration of shifting cultivated lands for resource conservation and sustainable production in Eastern Ghats.
- Conservation tillage systems for enhancing productivity and resource use efficiency under rainfed area of South-eastern Rajasthan.
- Resource conservation and productivity enhancement through organic and inorganic amendments in soyabean-mustard cropping systems.
- Cover crops and reduced tillage for enhancing productivity and soil health in rainfed farming system in the hilly areas.
- High value forage grass strips for resource conservation and enhancing production in crop fields.

2.2 Resource conservation measures for non-arable lands

- Improvisation of soil working techniques for enhancing tree establishment under rainfed conditions of North-Western Himalayas.
- Soil fertility restoration and carbon sequestration potential of five agro-forestry trees in Himalayan foothills.
- Evaluation of traditional minor millet based agro-forestry systems under recommended agri-silvicultural practices of North-Western Himalayas.
- Effect of degradation on conservation and production attributes of Sal forests in Uttarakhand.
- Influence of aromatic grasses and tree management on soil moisture and health under silvo-aromatic grass systems on bouldery land of Doon Valley.
- Efficacy of different soil and water conservation measures on bamboo productivity and resource conservation in Himalayan foothills.
- Canopy management in *Morus alba* for enhancing productivity and resource conservation.
- Development and characterisation of quality planting material of important MPT's for degraded lands of North-West Himalayas.
- Evaluation of *Bael* and Olive based agro-forestry system with soil amendments in Doon Valley.
- Phyto-rehabilitation of saline - sodic vertisols through *Prosopis juliflora* based silvipastoral system.
- Peach based agri-horticulture land use system for degraded Shiwaliks.
- Resource budgeting in agro-forestry for livelihood security by applying WANuLICAS model under Indian condition.
- Evaluation of moisture conservation techniques for sustainable production of Tree Borne Oil Seeds (TBOS) in Bundelkhand.
- Evaluation of promising fruit species with different moisture conservation practices in red soils of Bundelkhand region.
- Evaluation of cover crops under cashew and mango plantation for improving soil health and productivity in Eastern Ghats High Land Region of Odisha.
- Evaluation, characterization and development of elite genotypes of *Cassia auriculata* for cultivation *in* arid and semi-regions.
- Effect of shade trees on productivity and soil health in rejuvenated tea plantations in Nilgiris.
- Resource utilization and productivity of Dragon fruit based horti-silviculture system under rainfed agro eco-systems of Central Gujarat.

P-3: WATERSHED HYDROLOGY FOR CONSERVATION PLANNING

3.1 Hydrological behaviour of land uses and management practices

- Hydrological evaluation of recommended forest grasses in Himalayan foothills.
- Evaluation of hydrological behaviour and production potential of recommended land use system / practices under different agro-ecological regions of India.
- Hydrologic systems analysis across multiple spatial scales and its implications on hydro-logic processes in sub-humid catchment of Eastern Ghat High Land Region of Odisha.
- Modelling the nutrient movement in agricultural watersheds and their impact on surface water resources of Nilgiris.

3.2 Water harvesting, groundwater recharge and management

- Development and rejuvenation of natural springs through soil and water conservation measures
- Consortia Research Platform-Water Theme 1 Water Resources Augmentation/ Conservation.
- Efficient groundwater management for enhancing adaptive capacity to climate change in sugarcane based farming systems in Muzaffarnagar district, U.P.
- Water quality assessment and its impact on adjacent soil and vegetation in riparian areas of Hindon and Kali rivers.
- Water budgeting of a ravine watershed pond for optimum crop planning under semi-arid region.
- Study on pollution status of Yamuna river and its impact on soil and crop health in Western U.P.
- Socio-economic implication and vulnerability of farmers to ground water exploitation in hard rock region of the Deccan.
- Estimation of water budget components for predominant land uses of south-eastern Rajasthan for conservation planning.
- Development of efficient and innovative blue and green water harvesting techniques for enhancing the land and water productivity of semi-arid districts of Gujarat.
- Strategies for rainwater harvesting and its multiple uses in rainfed agriculture in Central Gujarat
- Development of cost effective plastic check dams for water harvesting in rainfed regions.

P-4 REHABILITATION OF AREAS AFFECTED BY MASS EROSION

4.1 Development and refinement of technologies for rehabilitation of ravines, landslides, mine spoils, riverbed mining, stream banks, torrents etc.

- Assessment of impact of extraction of RBM (River bed material) on physiography of stream flow courses of Himalayan foot hill streams.
- Ecological restoration of stone mine spoil area in south-eastern Rajasthan.
- Field evaluation of refinement of ravine reclamation technology in a model ravine area development project at Lohli-Bagli village in district Bundi (Rajasthan).
- Field evaluation of design of trenches under different agro-climatic regions.
- Enhancing productivity of ravine lands by plantation of *A. sapota* with intercropping systems.



P-5 INTEGRATED WATERSHED MANAGEMENT FOR SOCIO-ECONOMIC GROWTH AND POLICY ADVOCACY

5.1 Participatory watershed management and integrated farming system (IFS)

- Multiple criteria decision for identifying suitable Integrated Farming Systems in different agro-ecological regions for optimizing resource conservation and productivity.
- Evaluation of criteria and techniques for classification of fisheries - sensitive watersheds for conservation and production management
- Socio-economic analysis of farming/livelihood systems of farmers across different land categories in Yamuna ravine area.
- Refining methodologies for data validation, planning, monitoring and evaluation of watersheds.
- Socio-economic analysis of tribal farming system in different topo-sequence in Koraput District, Odisha.

5.2 Common property resource management

- Devising economic frame work for ecosystem services payment and farmers' livelihood in Mahi and Chambal ravine ecosystems.

P-6 HUMAN RESOURCE DEVELOPMENT AND TECHNOLOGY TRANSFER

6.1 Capacity development approaches and information and communication technology (ICT)

- Developing ICT based e- learning tools for conservation measures and watershed management.
- Creation of ICT network to disseminate knowledge about the soil and water conservation technologies to farmers in Himalayan region.
- Role of soil and water conservation technologies for climate resilient agriculture in Himalayan ecosystem - An action research.

6.2 Participatory technology dissemination and adoption

- Ensuing sustainable agricultural development and livelihood security in lower Shiwalik range of Uttarakhand.
- Assessing farmer's knowledge, vulnerability and adapting capacity of soil and water conservation technologies under changing climatic scenario.
- Determination of heterogeneity in agro-forestry practices and acceptability alongwith altitude gradient in Western Himalayas.
- Assessment of sustainability factors for soil and water conservation projects.
- Documentation and validation of ITKs in soil and water conservation practiced by tribal farmers of Tamil Nadu.