Solution:

Participatory Watershed Based Soil and Water Conservation Measures for Profitability and Sustainability

Submitter: ICAR

Solution Overview

What is it, and what problem does it solve? Brief 2–3 sentence description.

Watershed management has emerged as a well-accepted, single window approach for joint management of land, water, vegetation, livestock and human resources. It is a biophysical, socio-economic and a community unit for the purpose of planning and development. Active involvement of people in conceptualization, implementation and management of the watershed is of prime consideration.

Key Features & Benefits

Main components and why it is useful? Bullet points summarizing methods, tools, and value added.

A good watershed management project considers the social, economic, environmental, sustainability and institutional components of the watershed. Methods and tools include:

- Benchmark survey, problem identification and resource inventorisation
- Stakeholders' Institution formation
- Planning / DPR preparation
- Mechanical measures for arable lands
- Biological measures for arable lands
- Conservation measures for non-arable lands
- Drainage line treatment
- Rainwater harvesting
- Production systems and practices for arable and non-arable lands
- Watershed monitoring and impact evaluation

Where It Works and Where It Can Work

Existing and potential target regions, agroecologies, or farming systems. Include examples if available.

The watershed concept is applicable in all agro-eco regions of the country, especially in areas/regions having high rate of soil erosion leading to associated environmental, production and socio-economic negative impacts. Well known examples are O.R.P. Sukhomajri (1970's) to Ayalur watershed (2008-2014).

The technology is up-scalable in majority of the countries in south-south cooperation including BRICS countries (Brazil, Russia, China, and South Africa) and others including Algeria, Bangladesh, Cambodia, Chile, Egypt, Indonesia, Iran, Jordan, Lao People's Democratic Republic, Malaysia, Morocco, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Turkey, Viet Nam besides many African countries including Cameroon, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, South Africa, and Uganda, where land degradation and resource conservation problems constraint agriculture production and sustainability.

Evidence & Impact

What results has it shown? Stats, pilot outcomes, or testimonials.

Impact of nine watershed projects implemented under the NWDPRA are

Reduction in runoff (field scale) – 80%

Reduction in soil loss (field scale) – 84%

Creation of storage for harvested water 0.43 – 24.2 ha-m

Increase in cropping intensity – 11%

Average rise in water table
– 0.18-4.0 m (Summer)
– 12.8-18.3 m (Post monsoon)

Increase in crop productivity – 28-83% (various crops)

Increase in water use efficiency
– 15-26% (kharif crops)
– 22-32% (rabi crops)

Improvement in soil quality – 6.7-11.5 %

Increased area under horticulture/agroforestry – 5-24 ha

Reduction in fallow area – 13%

Reduction in runoff (watershed scale) – 40%

Reduction in soil loss (watershed scale) – 17%

Average rate of silt deposition – 13.6 t ha-1 yr-1

Overall increase in vegetation cover – 4-9%

Income earned by SHGs – Rs. 11,500-50,400 per year

Overall increase in income – 5-13%

Scalability & Adoption Support

Why it can be scaled and what's needed to adopt it?

Low-cost, adaptable, partner-ready, etc.

It can be upscaled by the following actions

- Strengthening the data and knowledge base for watershed development to improve planning process and DPR preparation: Watershed development activities and other initiatives for improving productivity in rain-fed areas are being taken up by a variety of implementing agencies. The research/ knowledge inputs into watershed development projects are minimal and there are limited efforts to use the research findings to improve the science/ technique behind watershed approaches. It is therefore important to devise mechanisms to harness knowledge and know-how from all available sources and make it available to field practitioners. A possible way is to establish a GIS based national level data facility on bio-physical resources of the country. This will not only make the watershed planning effective but also would improve the skills of the stakeholders. The GIS database developed by IISWC, Dehradun; NBSS&LUP, Nagpur; NRSA, Hyderabad; SOI, Dehradun and digital cadastral data of States would be quite useful in planning and implementation of all development projects. It is expected that such national level data facility would play a critical role in the process of evolving and institutionalizing the network based research and development system for not only watershed management but also for other development projects in the country.
- Focus of DPR should be on problem solving and resource creation approach so that it caters to the objectives of new programmes like PMKSY, MGNREGA, etc.
- Target of developing number of watersheds in a given period should be realistic considering availability of technical manpower. Outsourcing to only genuine and experienced agencies and not to fly-by-night NGOs should be done.
- Common course curriculum for skill development in watershed development need to be devised at national level (with region-specific technology base) and strengthening of existing training agencies at regional/state level is essentially needed.
- Complete package of practices of every intervention (organic farming, improved agronomic practices, horticultural interventions, agroforestry, pasture development) well supported with all materialistic requirements are essentially required to meet the objective of "per drop more crop" (PMKSY) and enhancing resource use efficiency.
- Rainwater harvesting system needs to be equipped with energy efficient micro-irrigation systems to fit with objectives of "har khet ko pani" and "per drop more crop" of PMKSY, and Intended Nationally Determined Contributions (INDC).
- Building of strong watershed institutions - local community based organizations – for creating favourable environment for watershed development in rural setting and good governance, especially for conflict resolution, should be given high priority through appropriate policy measures and if required such institutions may even be supported through law to achieve the ultimate aim of sustainable watershed development.
- For effective monitoring and evaluation (M&E) – benchmarking and geo-tagging of every intervention, particularly engineering interventions, in a GIS framework should be adopted.
- Revisiting of watershed after withdrawal – convergence with MGNREGA and other central/state sponsored NRM schemes – for post-withdrawal operation and maintenance of assets created in a watershed should be mandatory for every watershed project.

Partners & Contact Info

Who's involved and how to connect? List of key contact and partners + email / phone.

Director, ICAR-IISWC, Dehradun-248195, Uttarakhand.

Dr M Madhu, Director, IISWC, Dehradun. directorsoilcons@gmail.com; 8895036750

Dr Pradeep Dogra, Principal Scientist, IISWC Chandigarh RC. dogra.pradeep@gmail.com; 9412058615

Dr M Muruganandam, Principal Sci. and OIC PME & KM Unit, IISWC, Dehradun. Mail2mmm20@gmail.com; 9411106447

Dr D V Singh, Principal Sci and I/c Head, SSA Division, IISWC Dehradun. dvs_icar@yahoo.co.in; 9897752659

Dr RK Singh, Principal Sci & Head, H&E Division. rksingh_ars@yahoo.com; 9436731762