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Spate Irrigation in Pakistan and Way Forward

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Spate irrigation (Rod kohi / sailaba irrigation) uses hill torrent floods to raise crop plants in arid and semi-arid areas around the globe. It bases on un predictable rains and being practiced in all provinces of Pakistan. Hill torrent water is diverted to agricultural fields having dykes through

traditional water rights. After infiltration crop plants grown on residual soil moisture. Spate irrigation also faces multi-dimensional hurdles like silt or sediment accumulation, maintenance structures besides conflicts on water rights. At the same time, spate irrigation supports as one of the major livelihood source in countries like Pakistan. Spate irrigation systems can be improved through improved diversion bunds and embankments for enhanced flood water control, reduce maintenance costs etc. Silt and sediment flow with hill torrent run off needs to be trapped in water shed areas on sustainable basis before reaching the hill torrent command areas. Mini dams, farm ponds can provide sustained water supply in areas with water short areas.

Water rights and allocations be clearly mentioned and implemented through community governance and government support. Water use optimization through

oEfficient Cropping Patterns: Shifting to drought-resistant, heat, salt tolerant and high-yield crops that align with the available water can improve productivity. Intercropping and crop rotation methods that maximize soil moisture are also beneficial.

oSoil Moisture Conservation Techniques: Mulching, contour bunding, and soil stabilization can help conserve residual moisture, enhancing crop growth and reducing the need for additional water.

Institutional Support and Capacity Building can bring impactful outcomes including

oFarmer Training and Community Engagement: Providing technical training and support to farmers can empower them to adopt improved practices. Workshops, technical guidance, and demonstration projects can build awareness of water management techniques.

oGovernment, NGO's and Academia Involvement: Partnerships with government, non-governmental organizations and academia can bring resources, technical expertise, and policy support. These organizations can help in funding, monitoring, and promoting innovative irrigation solutions.

Soil and hill torrent water characterization maps have been developed at Department of Agronomy, MNS University of Agriculture Multan across 13 major hill torrents in Punjab Pakistan which can be used for subsequent management by the stakeholders. Moreover through field crops research in these hill torrent areas, it has been concluded and advocated to break soil hard pan before reception of hill torrent run off in dyke surrounded crop fields for improved crop productivity, profitability and improved water productivity.

As climate change leads to increased rainfall variability and more extreme weather patterns, the future of spate irrigation in Pakistan faces both challenges and opportunities.

oDeveloping spate irrigation systems that are resilient to changing flood patterns is essential. Building climate-resilient infrastructure and promoting adaptive practices can help communities

continue to benefit from this irrigation method.

oIntegrating spate irrigation with supplementary water sources, such as rainwater harvesting or small-scale groundwater extraction, could improve water security.

oUse of latest technological interventions inclusive GIS mapping, remote sensing, forecasting.

There is a dire and continuous need to focus improved techniques, crop cultivars, sustainable water and soil management through research based development in a collaborative manner.

Sustainability of spate irrigation system also relies on government interest. Investments in development of infrastructure, technical and regulatory frameworks are important steps in this context.

Integrating indigenous knowledge with modern techniques, empowering local communities through research based development, capacity building and institutional support on sustainable basis under the climate change and variability scenario can sustainably improve spate irrigation system in Pakistan and also guarantees national future food and water security.