



भूमि संसाधन विभाग
DEPARTMENT OF LAND RESOURCES
Government of India

National Workshop on Pilot Projects on River Rejuvenation by Watershed Development Approach

**Bharat Mandapam, New Delhi,
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Pilot projects on River Rejuvenation by Watershed Development Approach (RRWDA) under WDC-PMKSY 3.0

Need for Pilot on RRWDA under WDC-PMKSY 3.0

- Rejuvenation of small Rivers / Streams where water flow has significantly reduced over years, by following Watershed Development Approach.
- Distinct from existing river rejuvenation programmes of DoWR, RD & GR, which primarily focuses on pollution abatement.
- DoLR's watershed interventions address the root causes of drying up of river through catchment area treatment and hydrological restoration.

Watershed-Based River Rejuvenation Approach

- Ridge-to-Valley treatment of catchments.
- Soil & Moisture Conservation measures.
- Rainwater harvesting and groundwater recharge.
- Afforestation and vegetative measures.
- Improved base flow and restoration of seasonal streams/rivers.



Implementation

- Pilot projects proposed in 4 States, namely Andhra Pradesh, Gujarat, Madhya Pradesh, and Maharashtra, where a significant area is under rainfed farming.
- 2 km on both sides of the stream for 50 Km length.
- Covering 80,000 ha @ 20,000 ha per State.
- Cost norm: Rs. 1.07 Lakh/ha

Outcome

- Demonstrate watershed-led river/stream rejuvenation as a scalable model for rainfed landscapes.
- Generate technical protocols and best practices for wider replication.



Objectives

- . To undertake intensive soil and water conservation including the construction of water-harvesting structures
- . To enhance groundwater recharge and aquifer sustainability
- . To increase base flow contribution to rivers
- . To reduce surface runoff losses and soil erosion
- . To strengthen climate resilience in drought-prone regions
- . To ensure continuous or extended surface flow in rivers
- . To improve water security and agricultural productivity



Selection of Pilot Rivers/Streams

Criteria	Indicative Consideration
Decline in flow	Documented reduction in flow/duration over the years
Catchment condition	Significant degradation, erosion or low vegetation cover
Rainfall	Predominantly rainfed catchment
Groundwater	Evidence of declining groundwater/reduced recharge
Stream characteristics	Seasonal/intermittent streams preferred
Intervention potential	Availability of treatment area in the catchment
Data availability	Availability of rainfall, discharge, groundwater etc data

The pilot should avoid highly regulated river systems where reduced flow is primarily attributable to large dams, major diversion structures or inter-state water allocation issues, unless such factors can be separately addressed.

Strategy for River Rejuvenation by Watershed Development Approach

- Ridge-to-Valley Approach
- Saturation-Based Implementation
- Catchment Treatment
- Micro-Watershed-Based Planning
- Maximizing Runoff Capture
- Higher Density of Interventions



Monitoring and Evaluation Framework

The success of the pilots should be measured through hydrological outcomes, rather than merely physical completion of works. Key Outcome Indicators are:

Hydrological

- Increase in duration of streamflow;
- Increase in lean-season/base flow;
- Improvement in groundwater levels;

Environmental

- Reduction in soil erosion;
- Reduction in sediment load;
- Increase in vegetation cover;

Agricultural

- Increase in irrigated area;
- Increase in cropping intensity;
- Improvement in agricultural productivity;
- Diversification towards sustainable crops.

Socio-economic

- Increase in farm income;
- Reduction in water stress;
- Employment generated;

Key Issues for Workshop Discussion

- How should rivers and streams with declining flow be identified?
- What criteria should be used for river/stream selection?
- How much of the catchment should be treated?
- Which watershed interventions are most effective for improving base flow?
- How can the impact on streamflow be scientifically measured?
- What should be the appropriate size and duration of a pilot?
- How can WDC-PMKSY, VB-G RAM G and other schemes be converged?
- What institutional mechanism, expertise, and financial provision are required for effective implementation?
- How should GIS, remote sensing, and hydrological modelling be used?
- What outcomes should determine the success of a pilot?
- How can communities protect and maintain the created assets?



Suggestive Watershed Interventions for Improving Base Flow

- **Check dams & nala bunds:** Slow runoff and enhance infiltration.
- **Percolation tanks & recharge ponds:** Store monsoon runoff and promote groundwater recharge.
- **Contour bunds & trenches:** Reduce runoff velocity, erosion, & increase soil-water retention.
- **Vegetative & riparian restoration:** Improve infiltration and stabilize stream channels.
- **Wetland & floodplain restoration:** Increase water storage and sustain groundwater–stream connectivity.
- **Groundwater management:** Control excessive abstraction to retain recharge gains.

Key Process:

**Reduce runoff → Increase infiltration & recharge → Strengthen groundwater storage
→ Sustain dry-season base flow**



Component-wise comparison of cost norms for project level under WDC-PMKSY 3.0 and RRWDA

S.No.	Component	WDC-PMKSY 3.0 (% of unit cost)	RRWDA (% of unit cost)
1.	DPR preparation	1	1
2.	Inst. & Capacity Building including IEC	2	3
3.	Entry Point Activity (EPA)	1	0
4.	NRM works	72	81
5.	Monitoring & Evaluation (M&E)	2	2
6.	Production system	10	0
7.	Consolidation phase component	2	3
8.	Administration cost	10	10
Total		100	100

Note: The component wise cost indicated above is tentative. It can be fine-tuned while finalizing the guidelines of respective program.



Hypothetical analysis to explain difference in intensity of NRM Works

Activity/Structure	WDC-PMKSY	RRWDA	Increased by
Contour trench	5 ha	50 ha	10×
Gabion structures	6	24	4×
Plantation	3 ha	50 ha	16×
Farm ponds	3	75	25×
Tanks/Talab	1	4	4×
Check dams	2	10	5×
Recharge shafts	2	10	5×
Field bunding	Sparse	200 ha	Emphasized
Percolation Tank	Sparse	4	Emphasized

- A substantial increase in the number and coverage of key interventions under the RRWDA (in 500 ha. area).
- This increase is not incremental, but multi-fold across most activities.
- Reflecting the shift from partial to saturation-based treatment of the catchment area of the river.

Classification of Drainage network in the different Stream orders

First-order stream: The smallest, uppermost headwater channel with no incoming tributaries.

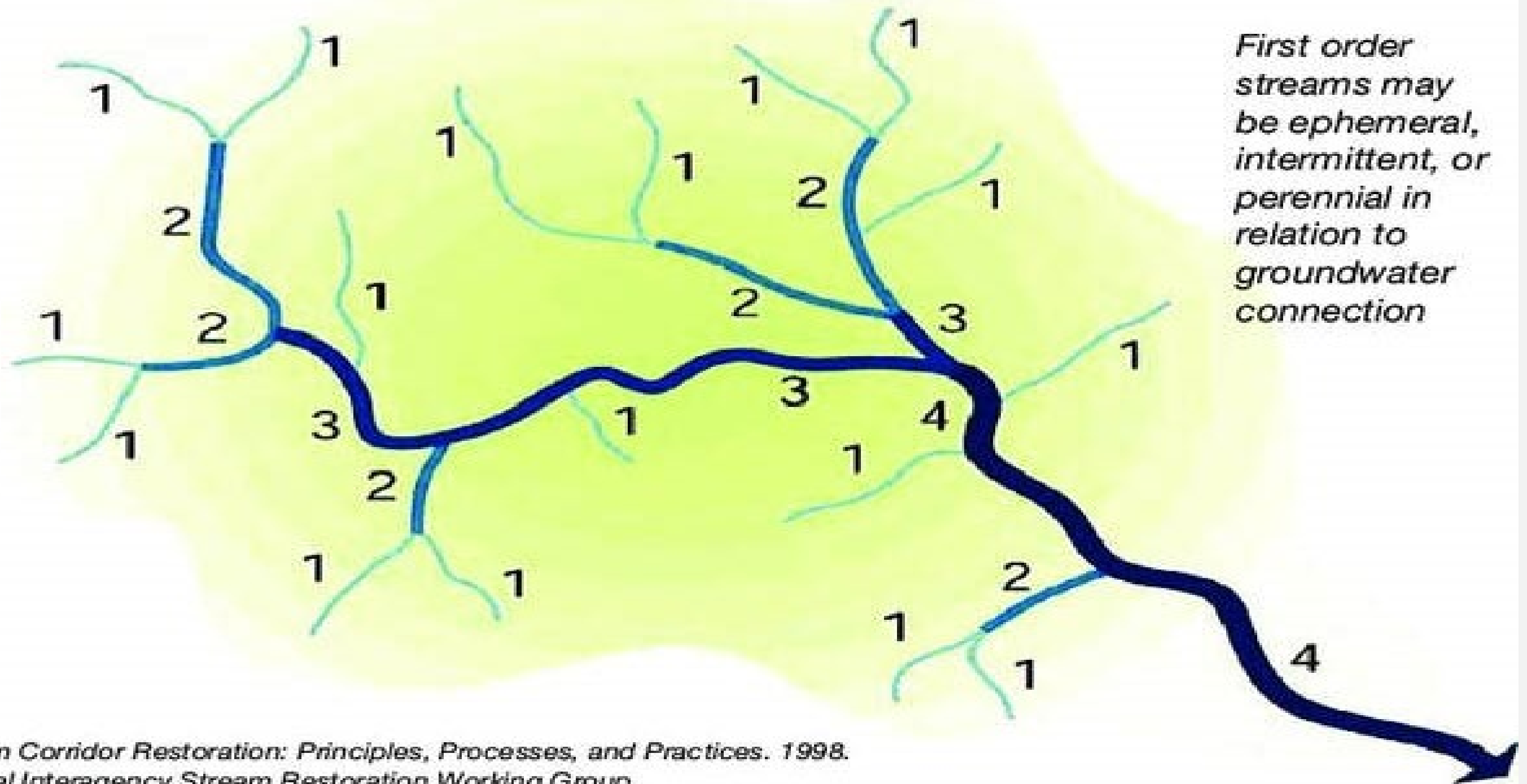
Second-order stream: Formed when two first-order streams join together.

Third-order stream: Created when two second-order streams

Feature	1st Order	2nd Order	3rd Order	4th Order
Formation	No tributaries	Two 1st-order streams	Two 2nd-order streams	Two 3rd-order streams
Size	Very small	Small	Medium	Large
Water discharge	Very low	Low	Moderate	High
Channel width	Narrow	Wider	Moderate	Wide
Sediment transport	Low	Moderate	High	Very high
Ecological importance	water quality	Habitat development	Supports fisheries	Major river ecosystem



Classification system describing position within the drainage network





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