9th INDIA INTERNATIONAL WATER WEEK 2026

TF-8: Community Participation in Groundwater Recharge

Community Participation in Groundwater Recharge:

Integrating science, community planning and government schemes for water security in India



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Topics for Discussion

Governing groundwater outcomes through science, participation and accountable implementation

01 India’s Groundwater Challenge

02 Infrastructure Delivery and Groundwater Security Outcomes

03 Existing Building Blocks and the Governance Gap

04 Evidence Base and the Six-Stage Decision Framework

05 Community Participation and Policy Shifts

06 Institutional Accountability, Synthesis and Phased Pilots

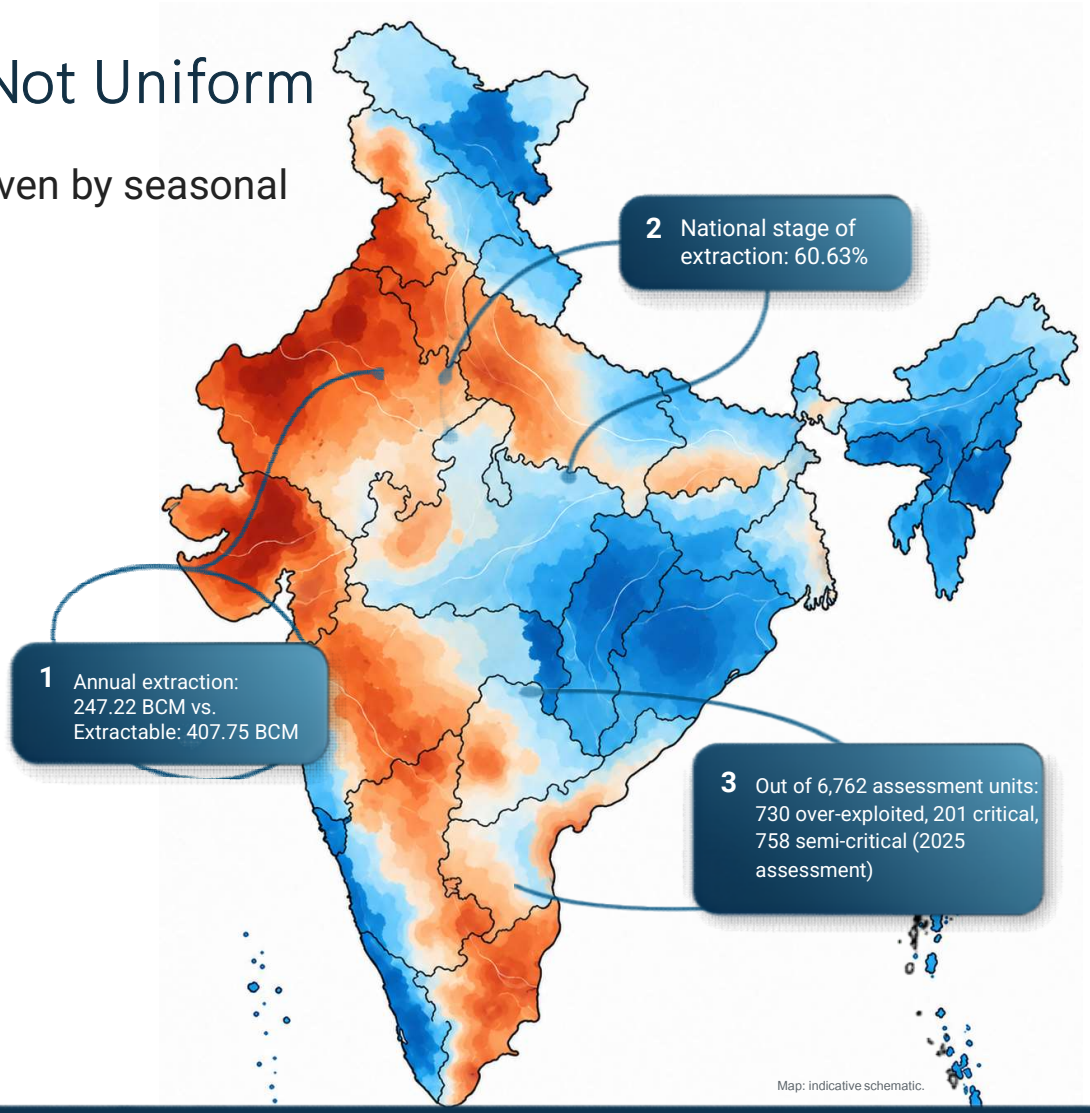
India's Groundwater Challenge Is Not Uniform

India faces spatially diverse groundwater stress driven by seasonal variability and high extraction rates.

Groundwater is central to India's water security:
It supports irrigation, drinking-water supply, livelihoods, springs, ecosystem services and drought resilience across the country.

Groundwater stress is highly uneven across India:
National averages conceal major local differences in aquifer conditions, extraction pressure, recharge potential and groundwater quality. Management responses therefore need to be location-specific.

Public investment in water conservation and recharge has been substantial:
About ₹3,79,783 crore was spent under MGNREGS on water conservation and groundwater recharge related activities during 2014–15 to 2023–24, millions of structures have been constructed.



High public investment and structure creation are not enough. Groundwater security requires scientifically targeted, outcome-oriented management.

From Infrastructure Delivery to Groundwater-Security Outcomes

STRUCTURE COMPLETION DOES NOT AUTOMATICALLY MEAN REALISED RECHARGE OR GROUNDWATER SECURITY

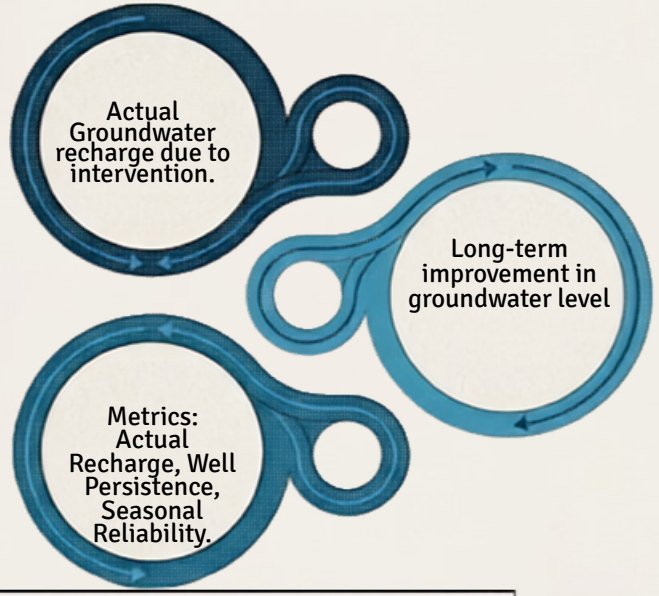
Physical outputs and expenditure prove administrative delivery, but they do not prove hydrogeological impact or actual water security.

Comparison Matrix

Administrative Outputs

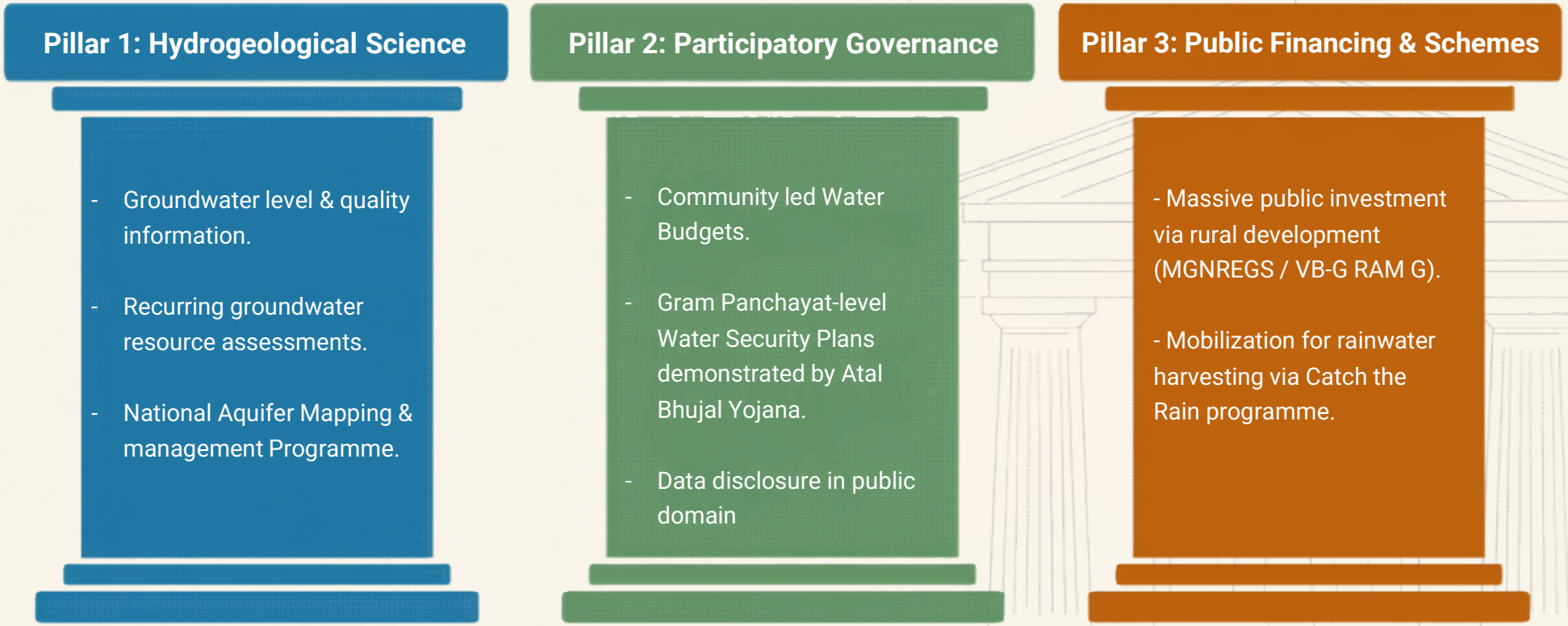
- Expenditure and designed capacity are administrative metrics, not hydrological ones.
- A completed structure does not guarantee source-water availability or actual aquifer recharge.
- Metrics: Structures Completed, Expenditure, Designed Capacity.

Water-Security Outcomes



Infrastructure delivery is a means to an end, not the end itself.

India Already Has the Building Blocks



The challenge is to connect these building blocks around a common groundwater-security objective.

The Governance Gap: Strong Components, Weak Operational Linkages

Scientific assessment, community planning, programme implementation and monitoring do not automatically function as one groundwater-management system because they are generally executed through **fragmented, disconnected** institutional silos.

1.Science

Aquifer assessment and groundwater information may not be translated into locally usable management priorities.

2. Community Planning

Community-prioritized projects may lack technical screening.



3. Convergence

Schemes may operate through separate eligibility, financing and planning processes rather than around groundwater-security priority

5.Monitoring & feedback

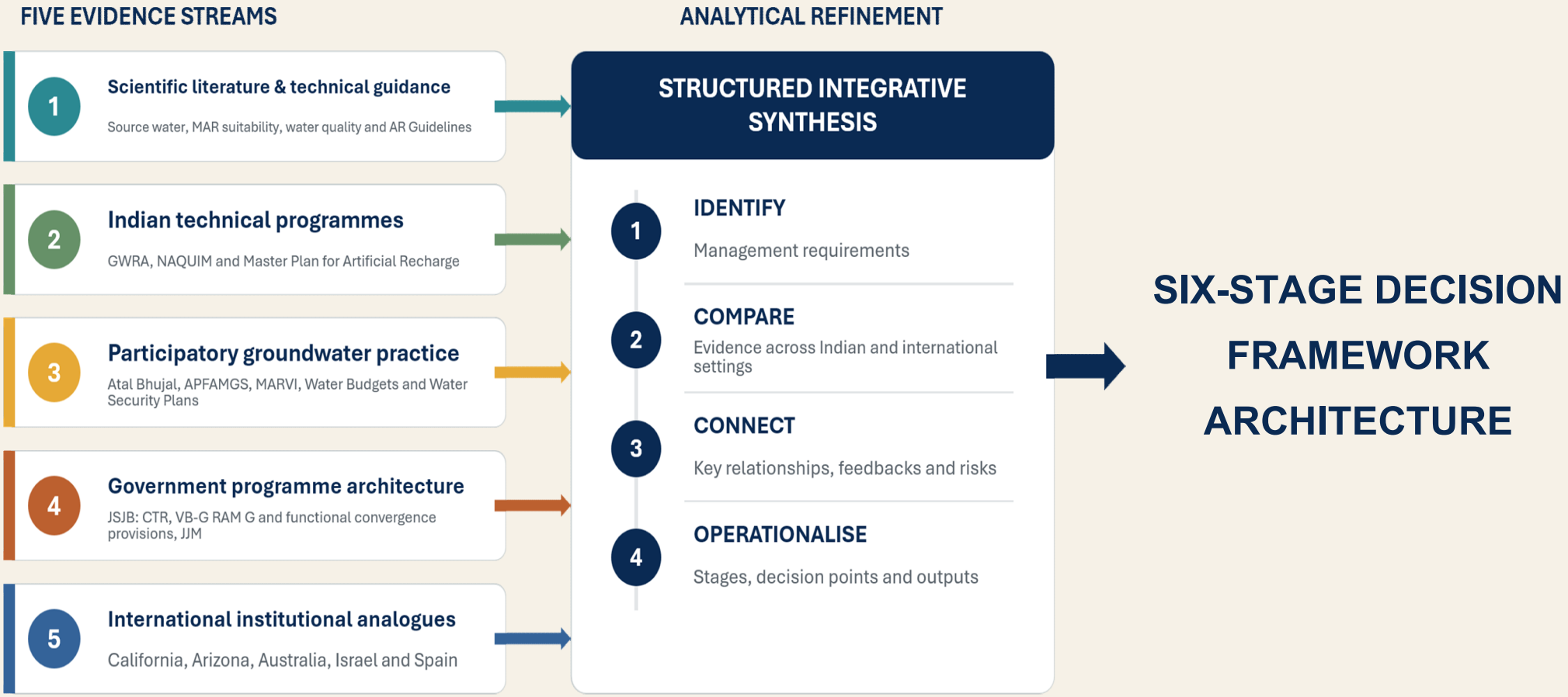
Monitoring often records structures completed rather than groundwater response, so evidence rarely informs subsequent decisions.

4. Implementation

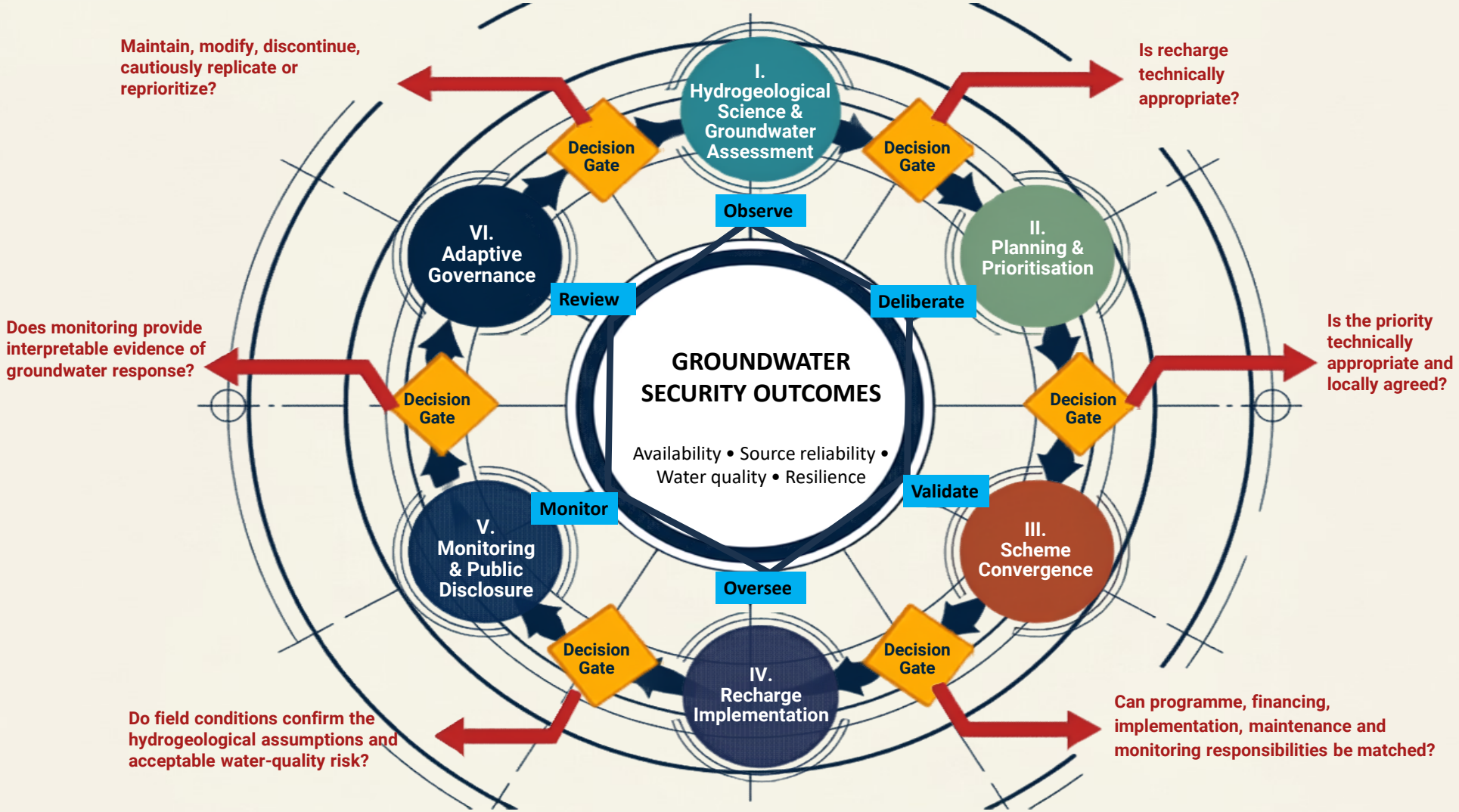
Field siting, design and construction need to preserve the hydrogeological rationale.

The challenge is not the absence of science, participation or programmes—it is connecting them into one accountable decision system

Evidence Base & Framework Development



Six-Stage Decision-Gate Framework



How the Six Stages Work

OPERATIONAL LOGIC

Each stage converts a governing question into a decision-relevant output.

STAGE / FUNCTION	GOVERNING QUESTION	IMMEDIATE OUTPUT
I **ASSESS** Hydrogeological Science & Groundwater Assessment	**Is recharge technically feasible and safe?**	If Not, move to demand side management options.
II **PRIORITISE** Community Planning & Prioritisation	**Is the priority defensible and locally agreed?**	Water Budget + ranked Water Security Plan
III **CONVERGE** Scheme Convergence	**Can programme, finance and responsibilities be matched?**	Convergence matrix: agency, finance, timing, maintenance and monitoring
IV **IMPLEMENT** Recharge Implementation	**Do field conditions confirm assumptions and acceptable risk?**	Functional, documented intervention — or justified non-implementation
V **MONITOR** Monitoring & Public Disclosure	**Does monitoring provide interpretable performance evidence?**	Public performance record: baseline, context, response and review
VI **ADAPT** Adaptive Governance	**Maintain, modify, discontinue, cautiously replicate or reprioritise?**	Revised plan + documented management decision

↺ **Stage VI feeds evidence back to Stages I–II: updated evidence ⟶ revised assessment and community priorities**

Every stage must produce a decision-relevant output — not merely another activity.

Community Participation Across the Groundwater Management Cycle

Participation is associated with every framework stage, while the community function changes from observation to adaptive review.

Participation is a cross-cutting governance function throughout the decision cycle.

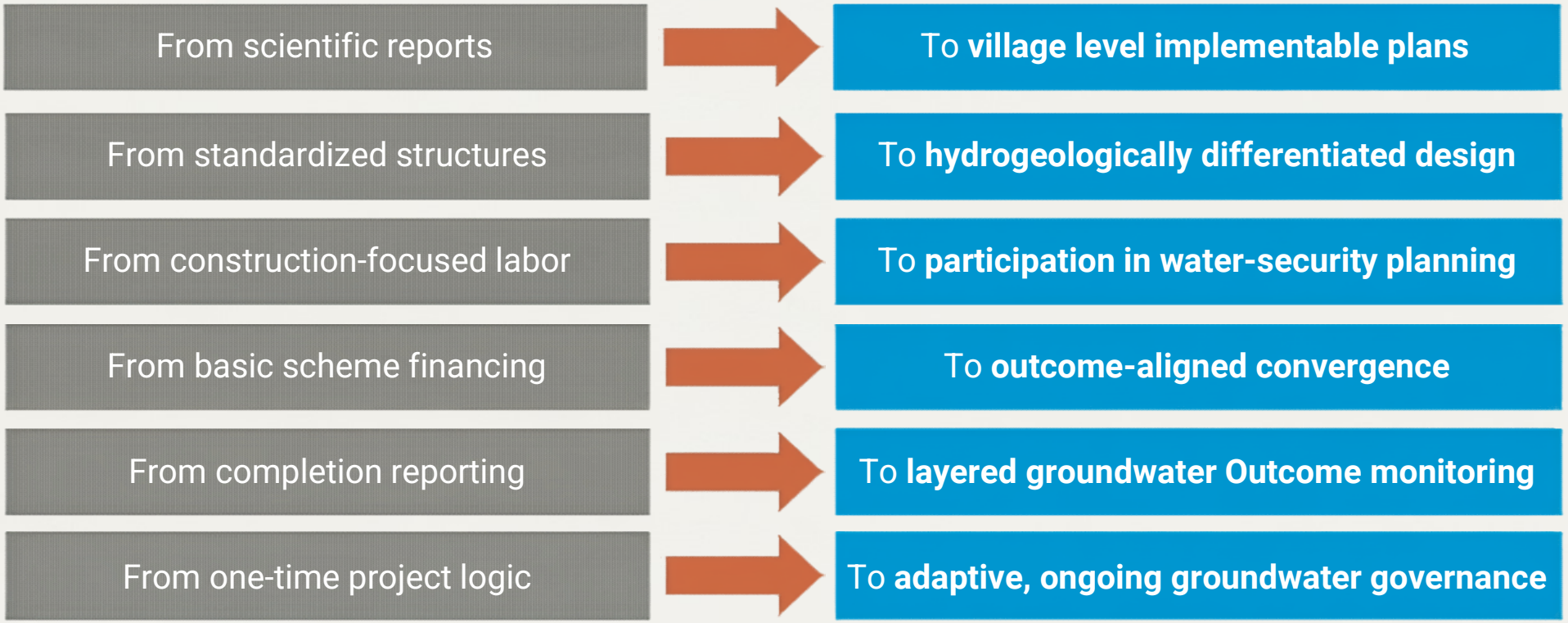
I	II	III	IV	V	VI
ASSESS	**PLAN**	**CONVERGE**	**IMPLEMENT**	**MONITOR**	**ADAPT**
Hydrogeological Science & Assessment	Community Planning & Prioritisation	Scheme Convergence	Recharge Implementation	Monitoring & Public Disclosure	Adaptive Governance
Local observations of wells, seasonal scarcity, source behaviour and existing structures.	Water Budget, Water Security Plan, representation, demand discussion and priority setting.	Validate that programme supported actions reflect agreed groundwater security priorities & converge with existing schemes or programs	Local oversight of implementation quality, operation, maintenance and participation in implementation.	Participatory observations, functionality checks, disclosure and verification of local performance.	Review evidence and participate in decisions to modify, stop, replicate cautiously or reprioritise.
Observe	**Deliberate**	**Validate**	**Oversee**	**Monitor**	**Review**

Hydrogeological evidence sets the feasibility and safety envelope. ⟷ **Participation shapes relevance, legitimacy, oversight and accountability.**

Communities help observe, deliberate, validate, oversee, monitor and review.

Six Essential Policy Shifts

To realize this framework, Indian groundwater policy must evolve across Six operational dimensions.



We must shift our investments from delivering infrastructure to securing outcomes.

Institutional Roles, Accountability & Traceability

Groundwater security requires differentiated roles—but one connected accountability chain.

CONNECTED ROLES

1 | National Government
- Groundwater-resource assessment
- Aquifer information and technical guidance
- Monitoring approaches

2 | State Government
- Technical appraisal
- Inter-departmental coordination
- Regulation

3 | District Administration
- Line departmental coordination
- Scheme and financing convergence
- Implementation, maintenance and monitoring arrangements

4 | Gram Panchayat & Community Institutions
- Problem identification and Water Security Plan
- Priority setting and implementation oversight
- Maintenance feedback and public review

ACCOUNTABILITY SPINE

TRACEABILITY CHAIN

TECHNICAL RECOMMENDATION

APPROVED INTERVENTION

COMMON PROJECT / MANAGEMENT-UNIT ID

GEOTAGGED ASSET + IMPLEMENTING AGENCY

MONITORING LOCATION + BASELINE / CONTEXT

DISCLOSED PERFORMANCE EVIDENCE

RESPONSIBLE DECISION AUTHORITY

DECISION OUTCOMES

- MAINTAIN
- MODIFY
- DISCONTINUE
- REPRIORITISE
- CAUTIOUSLY REPLICATE

Key concept

Every intervention should remain traceable from technical advice to evidence and management decision.

Evidence creates accountability only when it is traceable to an institution authorised to act.

Synthesis

Five findings for groundwater policy and practice, followed by a clear agenda for phased testing.

1 **Recharge effectiveness depends on context**

Aquifer properties, source water, abstraction, maintenance and hydrogeochemical response determine benefit.

2 **Participation matters when it influences decisions**

Communities should shape Water Budgets, priorities, oversight, monitoring and adaptive review.

3 **Aquifer science becomes actionable through local planning**

Resource assessment, aquifer mapping and recharge planning must connect with Water Security Plans and feasible choices.

4 **Monitoring requires cautious interpretation and authorised action**

Interpret observed response with rainfall, pumping and groundwater movement. Link evidence to maintain, modify or stop decisions.

5 **Integration requires testing**

Use phased pilots across contrasting aquifer and institutional settings.

ASK LESS
How many structures were built?

→

ASK MORE
Did groundwater security improve?

PHASED PILOTS SHOULD TEST technical feasibility • participation quality • convergence fidelity • monitoring burden • decision responsiveness

The framework should be tested and strengthened across contrasting aquifer and institutional settings.

Conclusion

Participatory recharge will deliver lasting water security only when it is scientifically targeted, institutionally convergent, publicly monitored, and genuinely community-owned.

Groundwater security — not structure completion — should define success.

1

Decision-gated recharge

Recharge should proceed only where hydrogeological, water-quality and demand conditions justify it.

2

Participation as governance

Communities should shape priorities, oversight, monitoring and adaptive review—not merely support construction.

3

Convergence with accountability

Schemes should align with groundwater-security priorities, with clear responsibility for implementation and maintenance.

4

Evidence-led adaptation

Monitoring must lead to decisions: maintain, modify, discontinue, reprioritise or cautiously replicate.

SCIENCE — COMMUNITY — CONVERGENCE — IMPLEMENTATION — EVIDENCE — ADAPTATION — WATER SECURITY

Recharge is a continuous governance process, not a one-time construction event.

Thank You

Community Participation in Groundwater Recharge

Integrating Science, Community Planning, and Government Schemes
for Water Security in India

SCIENCE ⟶ COMMUNITY ⟶ CONVERGENCE ⟶ IMPLEMENTATION ⟶ EVIDENCE ⟶ ADAPTIVE ACTION ⟶ GROUNDWATER SECURITY

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Questions & Discussion

From counting structures to governing groundwater outcomes.