Anusandhanvallari
Vol 2024, No.1
November 2024
ISSN 2229-3388

Bridging Policy and Practice: The Role of Indigenous Knowledge in Water Conservation

[1]Stany Mariya Joji [2]Dr. S. Rajalakshmi

Abstract: These days, saving water along with handling it well is key to building a future that lasts, especially in India. Here, changing weather, shrinking underground water supplies, alongside how land is used, create real challenges. Though governments have better rules for managing water, things often don't work as planned. Traditional ways of understanding water rooted in local culture and nature could help to reduce this gap. Kerala's Palakkad district a place steeped in water history but now struggling with shortages offers a look at how old ways meet new rules. We examine three projects: women building wells plus collecting rainwater in Pookkottukavu; restoring rivers and watersheds around Pallassana/Gayathripuzha; moreover, bringing back ancient underground reservoirs in Polpully. These efforts show that blending local knowledge alongside government programs like MGNREGA, involving people directly, and empowering communities can boost groundwater, help folks support themselves, also strengthen nature. Instead of dismissing traditional ways, this research suggests blending them with modern science when managing water resources. Specifically, it champions acknowledging, bolstering, then incorporating local knowledge of water systems working alongside established engineering methods. The success seen in Palakkad, India, demonstrates how others across the country could similarly unite heritage with new ideas for protecting water.

Keywords: Indigenous Knowledge; Water Governance; Community Participation; Groundwater Recharge; Palakkad; Traditional Water Management; MGNREGA; Watershed Restoration

1. Introduction

Life springs from water; ecosystems turn on it. Especially in India a land brimming with varied weather alongside a wealth of waterways keeping water secure, protected, and available feels increasingly urgent. More people, cities growing quickly, shifts in how we utilize property together with unpredictable rain, heavier reliance on underground water sources, and escalating needs from farming, businesses, plus households all strain our water supplies. Consequently, official responses have grown more extensive, encompassing nationwide initiatives alongside local water planning, projects aimed at replenishing groundwater, efforts to improve entire watersheds, also job programs that assist with water management.

Though policies multiply, they frequently fall short. Good ideas often get bogged down when put into practice because of slow rollouts, designs that don't fit the area, cultural clashes, or lack of local support. This is particularly true in countryside areas where challenging landscapes, established water management, and long-held customs complicate official plans.

[1] Stany Mariya Joji, Research Scholar, Department of Home Science Extension Education, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu 641043, ORCID: 0000-0003-2460-8427, Mail ID: 22phexf001@avinuty.ac.in
[2] Dr. S Rajalakshmi, Professor & Head, Department of Home Science Extension Education, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu 641043

It's readily apparent how valuable traditional ways of knowing are. These local skills customs, work arrangements, beliefs, organizations, also insights into the environment grew organically as people adapted to their surroundings through time. Local ways to save water like old wells, catchments built into the land, people working together to clear debris, collecting rain tailored to the landscape, alongside established rules for fair distribution and upkeep matter a lot. Ignoring these time-tested practices when making plans often leads to projects that don't last or simply don't work.

The piece looks at blending traditional ways of understanding water with official conservation rules to improve what happens on the ground versus just on paper. It centers on Palakkad, Kerala an area getting plenty of rain yet facing water problems like scarcity and dropping groundwater levels, given its hills and flatlands. Through three real-world examples, it demonstrates how people working together including women's groups, local leaders, and programs supporting employment and land management achieved results regarding replenished groundwater, stronger communities, and revitalized systems.

2. The Policy-Practice Gap in Water Governance

India has sound water strategies, however putting them into practice is a struggle. A web of problems keeps good intentions from becoming reality.

2.1 Bureaucratic and Institutional Constraints

Water gets attention from many groups those handling farms, supplies, villages, countryside improvements, woods, hygiene, even people's well-being. However, because each operates separately, working together isn't strong; efforts overlap sometimes, while pinning down who's responsible for results proves difficult. Villages frequently lack the skills, people, or money to keep things running smoothly. What's more, programs sometimes provide funding yet demand inflexible plans unsuitable for the area's landscape or water features.

2.2 Standardisation of Interventions

Often, projects funded by states or countries follow a standard plan drilling deep well, fitting pumps, building pipelines, creating big storage areas. Though useful in some places, this cookie-cutter method doesn't consider what each location truly needs regarding its environment or community. Where the ground is red earth, slopes are sharp, water lies close to the surface, yet people work together, a powerful drill might not help replenish groundwater - nor does it fit how folks usually get things done. If solutions ignore the land itself alongside established ways communities function, they often fail to truly take root, remaining unsupported over time.

2.3 Socio-Cultural and Local Knowledge Disconnect

When policy interventions treat local traditions as redundant, symbolic or outdated, they risk alienating the community. Indigenous practices often embed not just physical infrastructure, but social norms, shared labour systems, ritual and relational understandings of water. If these are ignored, maintenance becomes weak, community motivation falls, and interventions may degrade. The result is that, despite investment, the system fails to achieve intended conservation outcomes.

2.4 Resultant Implementation Failure

The usual rules don't quite translate into real change. Though plans get made, money is set aside, also reports indicate everything's fine, rivers shrink, wells fail during hot months, moreover communities struggle to manage water effectively. Experts observing how we handle water resources point out that typical policies simply can't fix complicated situations in small towns.

2.5 Need for Bridging Mechanisms

The gap between policy and practice suggests the need for bridging mechanisms: community participation, local governance, adaptive design, recognition of indigenous infrastructure, and flexible implementation frameworks that allow local adaptation rather than rigid templates. It is here that indigenous knowledge can play a decisive role.

3. Indigenous Knowledge Systems: Concepts and Relevance

3.1 Definition and Characteristics

For generations, people in a place gather ways of doing things like skills, understandings, values, systems, tools that fit their land and weather. This wisdom gets passed down through families instead of schools. Take saving water, for example…

- Traditional wells, percolation tanks, surangas (tunnel wells) in hilly terrain.
- Community labour practices for desilting tanks, cleaning streambeds, repairing embankments.
- Rain-water harvesting linked to local monsoon rhythm and local topography.
- Rituals and cultural practices that enshrine water as sacred and protect catchments.
- Local mapping of terrain, recharge zones and groundwater flows, often passed down through generations.

This understanding shifts with place, thrives within ecosystems, exists through community ties, yet frequently isn't bought or sold. Instead, it prioritizes keeping things going, shared accountability, seeing water as something to live with not just taken.

3.2 Philosophical and Cultural Context: Water as Sacred

Throughout much of India, water called jal isn't simply something useful; people regard it as alive, holy, connected. Because of this belief, communities protect nature, understanding they belong to the flow of water, rather than merely taking from it. Spring protection through custom, shared work to clear silt from reservoirs, river celebrations they reveal what a place values. If planning ignores these traditions, improvements might feel shallow.

3.3 Relevance to Contemporary Conservation

As weather gets wilder, water sources diminish traditional ways offer strength. These methods work with places, cost little, originate within communities, so they genuinely matter. Water storage in the ground refills natural reserves, while locally built wells give people power over their water source. Groups of workers, often women, keep these systems running smoothly. Traditional methods also favour working with nature, spreading out resources, letting communities manage things themselves ideas that echo today's efforts to build a better future.

3.4 Why Integration is Needed

Rather than seeing indigenous knowledge as a nostalgic by-product, it should be seen as complementary to scientific, engineered solutions. Integration means policy frameworks recognise traditional systems, invest in them, support community maintenance, link them to formal schemes rather than replacing them. As the UN's

training materials on indigenous water management state, indigenous peoples "possess invaluable knowledge on sustainable water management" yet often are not engaged meaningfully in planning or implementation.

4. Case Studies from Palakkad District, Kerala

Palakkad sits nestled where the Western Ghats meet Kerala's lowlands, receiving plenty of rain – though patterns shift. Its landscape blends rugged hills alongside gentler valleys. For generations, people here built ways to collect water ponds, wells, systems letting rainwater soak into the ground relying on neighbours to maintain them. However, growing populations, more intense farming, drawing too much from underground, together with changing weather now strain these resources. What follows showcases instances where local wisdom worked alongside official rules to achieve positive results.

4.1 Case Study 1: Women-Led Well Digging and Rainwater Harvesting in Pookkottukavu

Location and context: In the panchayat of Pookkottukavu in Palakkad district, water availability was under pressure due to hard rock terrain, limited surface storage, and over-dependency on external supplies.

Intervention: Under the MGNREGA scheme, local self-government authorities mobilised women's self-help groups and labour collectives to dig open wells manually in the rocky terrain. Approximately 278 women were trained as well-diggers. These wells ranged from 10 to 12 metres depth into hard rock formations. Simultaneously, rain-water harvesting pits and recharge structures were installed adjacent to new wells, with the aim of capturing monsoon runoff and recharging the open wells and shallow aquifers.

Integration of indigenous practices: The labour-intensive, manual well-digging drew upon traditional local techniques, community labour norms and women's networks. The rainfall-harvesting structures were designed taking account of terrain slope, catchment flows, and local hydrology, rather than standardised engineering modules.

Outcomes: The combined intervention led to:

- **Increased groundwater levels** as indicated by local observation of previously intermittent wells now yielding year-round water.
- **Reduced dependence on external tanker supply** and improved water security for domestic use.
- **Strengthened women's leadership and community ownership**, as the labour and maintenance of the wells remained under local groups.
- **Positive spill-over**: neighbouring panchayats observed and replicated the model. Qualitative reports suggest that, in Pookkottukavu, the sense of agency among women increased, turning them into agents of water conservation rather than passive recipients.

4.2 Case Study 2: Watershed and River Restoration in Pallassana and the Gayathripuzha Basin

Location and context: The village of Pallassana lies along the basin of the Gayathripuzha river, a tributary of the Bharathapuzha. Over decades the catchment had experienced deforestation, unplanned land conversion, encroachment of riverbanks, sedimentation of tanks and ponds, declining flows and biodiversity loss.

Intervention: The local panchayat, in collaboration with the Kerala State Land Use Board (KSLUB) and under MGNREGA funding, carried out a detailed village-level mapping exercise of the watershed. Indigenous local knowledge of springs, old water-flow paths, existing tanks and recharge zones was combined with GIS mapping. Following mapping, interventions included afforestation of riparian slopes, desilting of traditional tanks and ponds, construction of small check-dams and contour trenches to slow runoff and allow infiltration.

Integration of indigenous practices: Local villagers, many of whom grew up using the older tanks, wells and streams, contributed oral histories of water flow, traditional bund locations and seasonal patterns. The design deliberately revived old tank-sites and desilting traditions that had faded. Community labour under MGNREGA was used to execute the work and local governance monitored progress.

Outcomes: The results included:

- Increased base-flow in the river, with downstream wells and stream-junctions showing improved continuity of flow.
- Enhanced biodiversity: riparian vegetation recovered and small fish populations in side-pools improved.
- Replication: other villages in the basin began adopting similar mapping-plus-revival models.

The case shows how integrating local ecological knowledge with mapping and labour schemes can rejuvenate degraded water-systems.

Table 1. Interventions and Ecological Impact in Gayathripuzha Watershed (Pallassana)

Component of Intervention	Technique Used	Indigenous Knowledge Element	Ecological Effect Observed
Tank desilting	Manual community labor	Traditional seasonal cleaning cycles	Increased holding capacity and recharge
Check-dam construction	Local stone bunding	Local knowledge of flow direction	Slower surface runoff, higher infiltration
Afforestation	Riparian planting of native species	Knowledge of hardy, water-holding plants	Improved micro-climate and soil moisture
Watershed mapping	Community GPS mapping with elders and KSLUB	Oral mapping of historical water paths	More context-appropriate design decisions

4.3 Case Study 3: Revival of Kokkarnis (Percolation Tanks) in Polpully

Location and context: The village of Polpully in Palakkad has a number of traditional percolation tanks, locally called *kokkarnis*, which historically served to capture runoff, recharge aquifers and support dry-season flows. Over time many of these became silted, under-maintained, and functionally idle. In 2018 a severe flood followed by erratic monsoon renewed interest in their revival.

Intervention: A community-driven effort under MGNREGA mobilised 230 residents who desilted and restored a badly silted kokkarni in 35 days. The labour adopted locally appropriate practices (manual desilting, stone bund repair, local vegetation planting) and the revived tank was reconnected to minor irrigation channels and village reuse systems.

Integration of indigenous practices: Restoration of the tank relied on the local knowledge of how traditional kokkarnis worked (settling of silt, percolation characteristics of local soil, seasonal recharge cycles). The revival emphasised local materials, manual labour and community maintenance rather than mechanised dredging alone.

Outcomes: Key outcomes included:

- Year-round water availability for domestic and agricultural use in the village.
- Enhanced resilience to climatic events: during the subsequent dry season, the revived tank served as a crucial buffer.
- Renewed community pride and renewed maintenance regime: the villagers formed a maintenance committee to monitor silt build-up, vegetation, and cleaning cycles.

This case demonstrates that reviving indigenous infrastructure can be an efficient and sustainable route to water conservation rather than constructing entirely new systems.

5. Policy Integration: Mechanisms and Recommendations

From the case studies several mechanisms become clear for how policy and indigenous knowledge can integrate to produce sustainable outcomes.

5.1 Recognise and Value Indigenous Systems

It's time for policies to stop thinking old ways of doing things that is which are practiced by native peoples are outdated. Rather, acknowledge things like ancient wells, shared work within communities, knowledge of natural cycles, alongside the roles women play, as valuable assets. New projects ought to be adaptable, allowing space for local techniques regarding digging, cleaning, replenishing, and upkeep.

5.2 Participatory Planning and Knowledge Dissemination

Behavioural change and community ownership are pre-conditions for sustainability. Using culturally resonant tools like local language, village assemblies (gram sabha), women's self-help groups, local labour networks facilitate knowledge transmission. As seen in Pookkottukavu, women-led labour groups not only build infrastructure but embed new norms of conservation. Policy must formally allocate time and resources for training, peer learning, and local knowledge dissemination.

5.3 Blended Traditional-Scientific Approaches

The watershed restoration in Gayathripuzha showed that combining GIS mapping (scientific) with community mapping (traditional knowledge) yields robust plans. Policies should encourage hybrid approaches: scientific assessment of groundwater recharge zones, but with local validation of terrain, traditional flow paths and community labour capabilities. Funding guidelines should allow such hybrid models rather than forcing purely engineered templates.

5.4 Empower Local Governance and Labour Bodies

Local self-government institutions such as panchayats, gram sabha, water user associations should be empowered with decision-making, technical support and budgetary flexibility. Labour schemes such as MGNREGA can be aligned with water-conservation objectives: manual well digging, desilting tanks, afforestation, check-dam construction. The key is giving local bodies autonomy to choose interventions suited to their ecosystem, using both policy funds and local labour.

5.5 Institutionalise Maintenance and Monitoring Mechanisms

Infrastructure is only as good as its maintenance. Policies must include post-construction maintenance regimes, community monitoring committees, indicators of groundwater levels, and local transparency of outcomes. For example, in Polpully the revived kokkarni remains functional because the community monitors silt build-up,

vegetative cover and ensures periodic cleaning. Formal schemes should include provisions for such community maintenance.

5.6 Provide Flexible Implementation Frameworks

Rigid policy templates hamper localisation. Policy design should allow local adaptation of intervention types, timelines and labour modalities. For instance, rather than mandating a standard "10-metre bore-well", the policy might offer options: "open well dug by manual labour in hard rock terrain" or "percolation tank restoration". Similarly, rainfall-harvesting systems, bunds, check-dams, percolation tanks should all be eligible under water-conservation scheme funding.

5.7 Scale-Up and Learning Platform

Successful models in one village or panchayat should be documented, shared and scaled. A knowledge-sharing platform across districts (e.g., through the state water mission) would allow grassroots practitioners to exchange experiences. Policy should fund such documentation and peer-learning, and feedback mechanisms to refine interventions.

6. Lessons Learned and Broader Implications

From the empirical evidence above, a number of lessons and implications for broader policy and academic practice emerge.

6.1 Indigenous Practices Are Strategic Assets

Rather than being peripheral, indigenous water-management practices can be central to sustainability. They bring cost-effective, community-owned, ecologically adapted solutions. Recognising them shifts the paradigm of water conservation from top-down engineering toward grounded community-centric innovation.

6.2 Women's Empowerment Strengthens Conservation

The case study of women-led well digging shows that women's participation is not only socially just but functionally effective. Women often have local familiarity with water systems, strong interest in domestic water security and networks for labour and collective action. Policies that deliberately include women's labour and leadership in water-conservation programmes generate better ownership and outcomes.

6.3 Multi-Stakeholder Collaboration Is Essential

Effective conservation demands collaboration among community groups, local governance bodies, technical experts (hydrologists, land-use planners), policy implementers (MGNREGA, watershed schemes) and researchers. No single actor suffices. Institutional mechanisms that allow such collaboration mapping exercises, community consultation, participatory design exhibit stronger outcomes.

6.4 Flexibility and Adaptation Over Standardisation

Rigid templates fail to account for context. The soil, geology, hydrology, community labour practices, cultural norms differ radically across Indian regions. The Palakkad cases illustrate that open wells, manually dug in rock, and traditional tanks revived manually, are more appropriate than one-size-fits-all solutions. Policies need built-in flexibility.

6.5 Ownership and Maintenance Over One-Time Intervention

Many water-intervention failures result not from lack of funds, but from lack of community ownership and maintenance. The revived kokkarni in Polpully continues functioning because the community monitors and maintains it. Policy must include maintenance funding and community monitoring mechanisms from the start.

6.6 Implications for Other Regions

While the Palakkad experience is geographically specific, the underlying approach combining indigenous knowledge, community labour, local governance and policy alignment is replicable. Regions with traditional water infrastructure (tanks, wells, percolation pits) would benefit from similar hybrid approaches.

7. Conclusion

The challenge of water conservation in India is not simply one of engineering, budget or technology as it is fundamentally a challenge of governance, culture and ecology. The policy-practice gap persists because many interventions fail to engage the local social-ecological context. Indigenous knowledge systems, whether wells dug by women, traditional percolation tanks, or community-mapped river-basins, offer strong anchors for bridging this gap. The Palakkad district experience shows how such systems, when aligned with policy mechanisms like MGNREGA, local governance and participatory design, can yield meaningful water-security gains, ecological resilience and community agency.

Going forward, water governance must shift from replacement of tradition with modernity to integration of tradition and innovation. Policies must recognise community labour, women's leadership, local terrain, and ecological rhythms. Maintenance and monitoring platforms must be built in from the start. Learning across villages, districts and states must be institutionalised. Only then will the promise of sustainable water futures be realised.

As sum, the question is not whether indigenous knowledge has value and it clearly does have, but how policy frameworks can embed that knowledge, support it, invest in it and scale it. The result lies in bridging policy and practice through locally grounded, socially embedded, ecologically tuned interventions. The Palakkad model provides a pathway and a hopeful blueprint for regions across India and beyond.

References

[1] Bhattacharya, P. (2009). *Women and water: Managing domestic water scarcity in rural India*. Journal of Rural Studies, 25(3), 343–352.
[2] Down to Earth. (2021). River revived: MGNREGA brings Palakkad women to water conservation forefront. *Down to Earth Magazine*. Retrieved from https://www.downtoearth.org.in
[3] Indian Express. (2017, July 9). Women dig wells to make village self-sufficient in water. *The Indian Express*. Retrieved from https://indianexpress.com
[4] Kohonen, A.-R. (2019). *Indigenous peoples and water: Traditional knowledge and sustainable technologies*. Cap-Net UNDP.
[5] Krishnan, J. (2009). Land and water rights in south-eastern Palakkad, Kerala: A study of sustainable resource governance. *Indian Journal of Social Research*, 50(4), 485–503.
[6] Thomas, S. T. (2021). Community ecological restoration and lessons from Attappady. *Discover Sustainability*, 2(1), 1–12.
[7] The News Minute. (2017, May 2). How 300 women dug wells to combat drought in Kerala. *The News Minute*. Retrieved from https://www.thenewsminute.com