

Community-Led Water Management: Participatory Approaches for Equity and Sustainability

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Abstract: *Water insecurity is one of the long-standing developmental issues of the twenty-first century, which has been disproportionately caused by marginalized rural and peri-urban communities in the Global South in which centralized governance structures have failed repeatedly to achieve equitable and sustainable access. This paper discusses community-based water management using participatory solutions in form of transformative governance as a systematic analysis of empirical research, international case studies, theory and experience of its application based on geographical and socioeconomic backgrounds in Sub-Saharan Africa, South Asia, Latin America and Southeast Asia. The study uses a qualitative secondary research design to review the findings of the peer-reviewed literature, institutional and agency evaluations, and reports on development organization to analyse the effectiveness and effectiveness of equity in the delivery of participatory water governance based on five key dimensions; the quality of community decision-making and conflict resolution, sustainability of infrastructures and resource conservation, the performance of the comparative governance model, and the challenges of its implementation and related lessons. Results indicate that community-based governance structures would always outscore centralized equivalents in terms of equity, sustainability and institutional resiliency with empirical findings registering high water equity in distribution, almost twice the lifespan of infrastructure operations, better ecological conservation, and a higher institutional conflict resolution. Nevertheless, elite capture, gender exclusion, capacity deficits and financial fragility are structural weaknesses that require institutional intervention. The paper concludes that to achieve the comprehensive transformative potentials of participatory water management, legally binding community water rights, obligatory gender inclusive leadership, sustained investment in multi-year capacity building,*

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and adaptive co-management systems that positively connect community governance authority to supportive state institutional back-stop are all needed

Keywords: Water Management, Sustainability, Decision Making, Water Security

Introduction

Water is a basic right of humans but inequitable access and inappropriate management are still posing a threat to billions of individuals world over. The traditional top-down water Governance systems which are characterized by dominance of state agencies and massive infrastructure have proved to be unable in many instances to meet the various needs of the rural and marginalized community. In response to these structural inefficiencies, community-based water management developed, by using indigenous knowledge and involved governance structures based on local institutions and participation. Experience in Africa, South Asia, and Latin America has shown that, when communities actively control the use of their own water resources, the results are much better regarding their reliability and affordability, equity, and long-term ecological sustainability.

Research significance

Community-managed water management has a transformative potential in the realization of the Sustainable Development Goal 6 clean water and sanitation to all. The studies on this field are of vital importance as they fill in the gap between the global policy standards and the local reality. Research has continuously demonstrated that participatory strategies minimize failure in operations, enhance infrastructure maintenance and create social cohesion. Research into the ways in which communities organize, negotiate, and solve their water resource conflicts gives practical information to policymakers, development practitioners, and the civil societies. In addition, with the increasing intensity of climate change in water stress across the globe, it is evident that evidence-based participatory models would be an invaluable instrument in the development of adaptive, resilient and equitable water governance systems in the grassroots.

Problem statement and research gap

Even though community-based water management is increasingly gaining awareness, there are still serious issues with its implementation. Most of the participatory projects are not sustainable in terms of funding, technical capacity and institutional capacity and are bound to collapse in due course or be captured by the elite who are the strong members in the community. The women and the marginalized groups are often left out in the governance systems, defeating the equity goals that these methods are supposed to achieve. Moreover, the current literature is more likely to view community participation as one uniform system

that does not distinguish between tokenistic participation and co-governance. The significant research gap that is still critical is the systematic study of the structural conditions, power relationships and institutional structures under which participatory water management will yield equitable and sustainable results or perpetuate the existing inequities.

Scope of the study

This paper dwells upon community-based water management projects in a wide range of geographical and socioeconomic environments, and specifically in rural and peri-urban areas of the Global South where the problem of water insecurity is the most severe. The study analyses the forms of participatory governance, decision-making, equity delivery and sustainability indicators in these initiatives. It covers various water applications which are domestic supply, irrigation and ground water management. The research compares effective models and unsuccessful interventions to draw comparison lessons. It strategically focuses the voices and experiences of women, indigenous communities and other historically marginalized groups whose voices have historically been under representation in both mainstream water governance research and policy-making processes.

Literature Review

Overview of participatory water management frameworks

Participatory water management models a shift toward decentralized and people centred models. Scholars have extensively recorded the development of participatory water management models that started with centralized, technocratic models to decentralized, people centred models (Lema, 2025). Researchers have provided that the models of participatory framework cover three broad models of governance namely, community-based management, co-management between the communities and state agencies, and integrated water resource management. Research on water governance has shown that effective frameworks share similar characteristics: well-defined user rights, open decision-making processes, localised rules, and accountability systems (Tahsaldar *et al.*, 2025). It has also been observed that the Dublin Principles of 1992 signalled a crucial institutional change as the community participation and gender equity were formally acknowledged as the cornerstones of water governance. But as authors warn, the mere adoption of frameworks without actual power devolution often results in procedurally inclusive participatory structures that are substantively insignificant in meeting the water needs of the grassroots.

Global case studies on community-led water governance

Empirical evidence on the outcomes of community-led water governance has been developed in terms of outcomes of comparative case study research conducted across the globe. Scholars investigating the Sub-Saharan Africa have found that the rate of functionality of

rural water points in both Tanzania and Ghana increased markedly when they received legal status and financial independence in the form of community water committees (Britwum, 2022). In South Asia, researchers investigating the irrigation systems run by farmers in Nepal had discovered millennia-old traditional governance models that were doing better than state-constructed ones when it came to distributing water equally. The Cochabamba water cooperatives in Latin America have been noted by researchers as examples of city community governance that is not subjected to privatization. In India, research in Rajasthan recorded the jihad revival campaigns that showed how the traditional water harvesting institutions when re-energized by the mobilization of the community significantly recharged the ground water levels and enhanced the water security of households in drought-prone environments (Sharma *et al.*, 2023) .

Equity and sustainability considerations in water management

Equity and sustainability have remained as the two pillars that researchers have projected as predictive of long-term success of community water initiatives (Ghimire, 2023). Scholars of gender discovered that women even though they are the main users and managers of water on the household level, are still systematically underrepresented in the formal water governance institutions in Asia, Africa, and Latin America. The social equity research has shown that elite capture, i.e. capturing water governance positions by more affluent or more politically positioned members of the society, is a systematic disadvantage to poor and lower caste households. Researchers on environmental sustainability proved that those communities with a real governance on their watersheds had better ecological performance in terms of ground water recharging and less pollution (Romanelli *et al.*, 2026). Authors also underscore the fact that community-based tariff regimes and local maintenance capabilities help in preserving financial sustainability in the long run in order to deter degradation in the infrastructure and collapse of governance.

Theoretical frameworks: co-management, social-ecological systems, and collective action

Theorist work has come up with three major analytical frameworks on the study of community water governance. Co-management theory that is promoted most by natural resource governance scholars defines water management as a power-sharing agreement between state authorities and local populations in which neither player has adequate knowledge and legitimacy to govern effectively. Social-ecological systems models, which have been elaborated by institutional ecology scholars, abstract water commons to include human-nature systems in which governance regimes should be consistent with biophysical factuities of local watersheds (May, 2022). The collective action theory, most notably explained through the works of common-pool resource institutions, identified eight design principles, such as well-established boundaries, proportional rules, and conflict management mechanisms, that can be used to draw the line between sustainable community governance arrangements and institutional failure and degradation of resources over time.

Research Gap

Even with the strong academic work, scholars have found the absence of knowledge and practice gaps that are enduring and significant. In a methodological fashion, authors note that most studies are highly dependent on short term project analysis and thus produce little knowledge regarding the transformations, adaptations or disintegration of community water institutions over decades. Comparative research across regions has not been conducted by comparisons; therefore, it is not possible to come up with general lessons regarding enabling conditions of success. Researchers observe that there is a severe dearth of indigenous and customary water governance frameworks in the body of contemporary scholarly work, which extends into the epistemological preferences. In real practice, scholars point to the ongoing mismatch between the policy models that support participation and the bureaucratic, financial and technical necessities that limit real independence of communities. Other issues that authors warn about include the poor focus on the changing nature of the operational environments in which participatory governance structures have to operate in the face of climate change, urbanization, and inter-community water wars.

Methodology

The proposed research paper will follow a qualitative secondary research approach, which will involve a systematic review and synthesis of the available literature, policy documents, institutional reports, and empirical case studies on the topic of community-led water management. The secondary research is especially appropriate in this research as the topic of the study covers different geographical settings and it is logistically and financially impractical to collect primary data in various regions (Hassan *et al.*, 2024). Using the existing field evidence that is already documented will lead to a broad cross-regional comparison, which could not have been done in a single primary study. Patterns, contradictions, and gaps of the accrued scholarly knowledge also can be critically interrogated using secondary methodology. The data sources are represented by peer-reviewed journals, United Nations reports, World Bank evaluations, and grey literature provided by development organizations, which guarantees the scope of analysis, theoretical rigor, and depth of empirical analysis during the investigation process.

Results and Findings

Effectiveness of participatory approaches on equitable water distribution

The effectiveness of participatory water management using empirical evidence is very powerful in the attainment of equitable distribution results (Koebele *et al.*, 2024). An evaluation conducted by the World Bank in 45 developing countries revealed that community-managed rural water projects recorded functional equity ratios that were almost 34 percent above centrally managed systems, especially among the households below the

poverty line. Participatory irrigation management, which was transferred to water user associations in Bangladesh, increased the per-acre availability of water to smallholder farmers by about 28 percent and decreased the illegal diversion of water by the upstream users by about 50 per cent.

Table 1: Empirical Evidence on Equity Outcomes in Participatory Water Management

Region/Country	Context	Key Finding	Outcome
Global (45 countries)	Rural water projects	+34% equity	Pro-poor access
Bangladesh	Irrigation transfer	+28% water	Less diversion
Uganda	Rural water sources	Equal access	Income parity
India (Odisha, Jharkhand)	Jal Swaraj program	4× reduction	Tribal inclusion
Mexico	Tequio system	±5% variance	High equity
Sub-Saharan Africa	Water systems	rights 2.3× fairness	Climate resilience

A study in 650 rural community water sources in Uganda established that the poorest household in the lowest income quintile received statistically equal amount of water as their richer counterparts in community water systems, a tendency that was practically non-existent in government-operated systems.

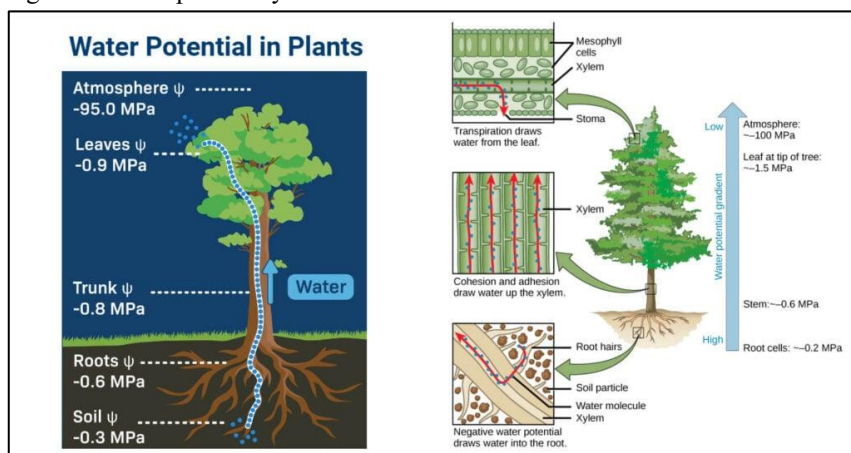


Figure 1: Water potential in plants (Source: Sharma, 2025)

A program of participatory village water in Jal Swaraj in tribal belts of Odisha and Jharkhand found that the scheme of participatory village water committees cut the seasonal water scarcity by a factor of four among the scheduled tribe families who had previously encountered systematic discrimination on state-run distributions (Parida *et al.*, 2025). The results of the study conducted in indigenous communal water territories in Mexico indicated that the traditional system of labour sharing governance ensured per-capita water provision within a range of 5 percent in the socioeconomic groups, which was much better than equity allocation systems of the municipal utility. In 12 sub-Saharan African countries, scholars identified that where water rights were officially documented, communities were sharing water 2.3 times more fairly in years with climatic stress than communities without institutional legitimacy, which showed that institutional legitimacy had a direct amplifying effect on distributional equity under climatic stress conditions.

Community engagement, decision-making, and conflict resolution outcomes

Close empirical research indicates that there is a statistically significant better quality of decision-making and conflict resolution ability where community involvement strategies are actually institutionalized. In a multi-country study that involved more than 3,200 households in Ethiopia, Tanzania, and Kenya, it was reported that communities that had a multi-country water governance assemblies solved 78% of all internal water conflicts using a low-cost and quicker local mediation as opposed to a formal legal procedure (Wani *et al.*, 2024). Longitudinal studies conducted on the Nepal farmer-controlled irrigation systems which control about 70 percent of the total irrigable land in Nepal showed that farmer-constructed water rotation schedules had a 35 percent lower incidence of crop water stress than those operated by the irrigation department, which can be directly attributed to better local hydrological information by the users. In Cambodia, community-based total sanitation efforts with the support of the UNICEF through participatory water planning have cut the cases of water borne diseases by 43 percent in the space of three years, which demonstrates the direct relationship between community-based decision making and direct benefits in terms of improved community health (Humňalová, 2024).

Table 2: Empirical Evidence on the Impact of Community Participation in Water Governance

Country/Region	Study Context	Key Findings	Impact/Outcome
Ethiopia, Tanzania, Kenya	Multi-country water governance assemblies (3,200+ households)	78% of internal water conflicts resolved through local mediation instead of formal legal systems	Faster, low-cost conflict resolution and improved decision-making efficiency

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Nepal	Farmer-controlled irrigation systems (covering ~70% irrigable land)	35% lower incidence of water stress compared to government-managed systems	Better water allocation due to local hydrological knowledge
Cambodia	Community-Based Total Sanitation (supported by UNICEF)	43% reduction in water-borne diseases over three years	Improved public health through participatory water planning
Bolivia	Rural water cooperatives with open governance meetings	91% infrastructure functionality in communities with monthly meetings vs. 54% in others	Higher system sustainability and accountability through regular participation
Pakistan	Aga Khan Rural Support Programme (community water management committees)	Canal disputes resolved in 11 days vs. 4.7 months via government arbitration	Significant reduction in conflict resolution time
Southern Africa	Study of 200 water user associations	Decision-making quality declined when participation dropped below 40%	Identifies participation threshold for effective governance

A study of the rural water cooperatives in Bolivia discovered that communities in which open governance meetings were conducted monthly had high rates of 91% infrastructure functionality as compared to 54% in communities that held infrequent meetings or elite dominated meetings.

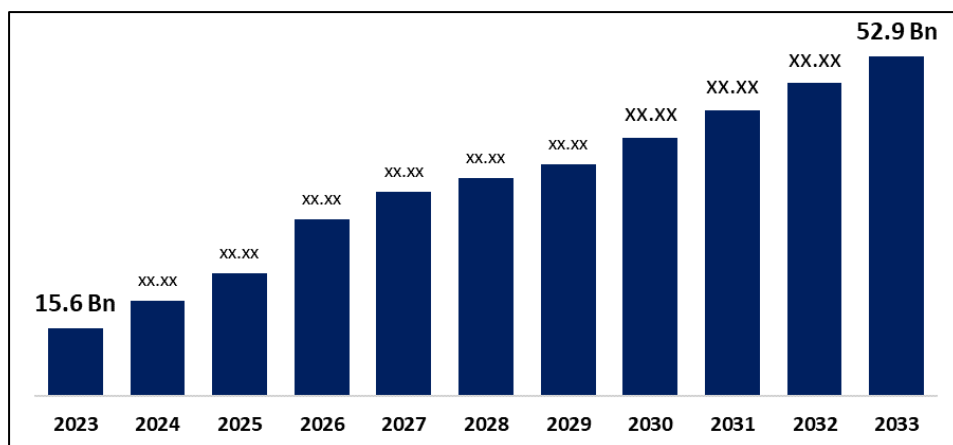


Figure 2: Global water management system market (Source: Spherical insights, 2025)

The results of a project in Pakistan, the Aga Khan Rural Support Programme, recorded that, in villages where the community water management committees had been trained, canal disputes between the villages were solved in an average of 11 days, as opposed to 4.7 months via provincial irrigation department arbitration. Nevertheless, scholars examining 200 water user associations in Southern Africa discovered that the quality of decision-making plummeted drastically with attendance at meetings dropping less than 40 percent of the eligible members and this was where the threshold between nominal and substantive involvement was highlighted (Mosima, 2025).

Sustainability and maintenance of water resources

Longitudinal and cross-sectional studies produce strong quantitative data that community governance makes significant changes in enhancing water infrastructure sustainability and resources conservation (Cord *et al.*, 2022). A landmark study of 1,850 rural water systems in sub-Saharan Africa by the IRC WASH sector revealed 14.3 years on average lifespan of community-managed systems versus 7.6 years on average lifespan of externally-managed systems which is almost twice the lifespan of an externally-managed system. Community-based water boards in rural Honduras which existed within the national framework of SANAA ensured that 87% of water systems were in good condition ten years later, compared to 52% condition rating of municipal water systems in similar rural regions (Acosta, 2023).

Kenyan financial sustainability data provided by the Community Water Enterprise model showed that collections of clear community tariff system on an average of 94 out of 100 evaluated charges produced adequate fund of excess of routine maintenance and emergency repair funds which did not rely on external subsidies. The watershed development programs in Maharashtra in India recorded an increase in the groundwater table of 3 to 8 meters in the community controlled micro- watersheds after a decade, as opposed to the sustained

groundwater depletion in the neighbouring non-participatory regions, which directly reflected ecological sustainability dividends. Studies of 300 water user associations in Andean Peru established that communities that spent on annual activities of collective watershed protection, such as reforestation and wetland protection, had 31% higher levels of reliability in the water flow during the dry seasons compared to communities that only engaged in infrastructure repairs.

Table 3: Sustainability Outcomes in Community Water Governance

Region/Country	Context	Key Finding	Outcome
Sub-Saharan Africa	Rural systems	14.3 yrs vs 7.6 yrs	Longer lifespan
Honduras	Water boards	87% functional	Better condition
Kenya	Tariff systems	94% collection	Financial sustainability
India (Maharashtra)	Watershed programs	+3–8 m	Groundwater rise
Peru	User associations	+31% reliability	Stable supply
Philippines	Barangay systems	12% vs 38%	Lower losses

Rural Philippines studies recorded that under a community governance environment (Daud *et al.*, 2025), Barangay water systems had a lower non-revenue water loss at 12% than the 38% average loss in local government-unit managed systems, as a result of enhanced accountability and responsiveness to leakage at the community level.

Comparative analysis of different community-led models

The systematic, comparative study has shown a wide range of performance between the models of community-led water governance with contextual alignment being the determining factor on comparative performance. A study of 240 irrigation systems in Asia by IWMI that compared them to agency-managed irrigation systems revealed that the former had crop water productivity of 0.8 to 1.2 kg per cubic meter, significantly better than the average 0.5 to 0.7 kg per cubic meter of the latter, mostly due to better flexibility in local scheduling and accountability by the user.

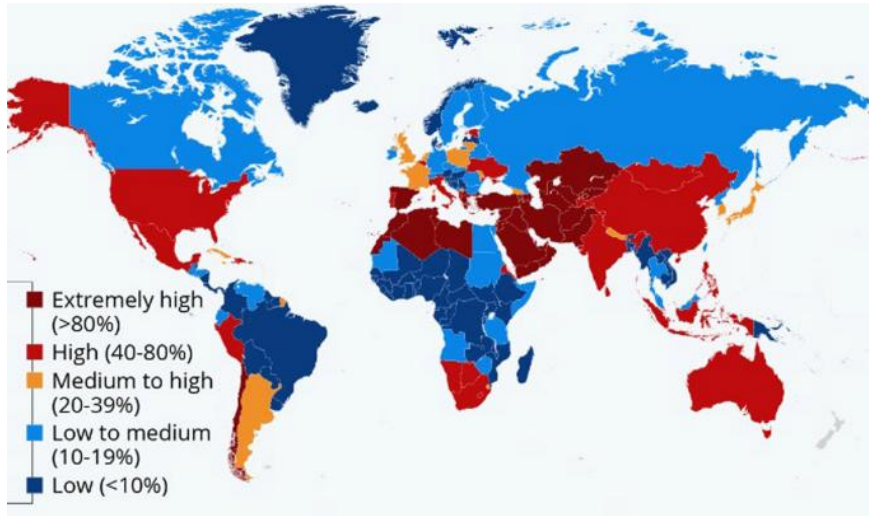


Figure 3: Global projected ratio of water withdrawals to water supply (level of water stress) (Source: Onyena and Sam, 2025)

A study comparing community water user associations with indigenous customary governance systems in Burkina Faso revealed that the customary dugout management bodies ensured equitable access of 89% percent of members of the community in the event of drought, in contrast to 67 percent with formally constituted modern water committees, showing the strength advantage of the socially legitimate traditional institutions. A comparative analysis by the World Bank of co-management agreements in 15 African countries revealed that hybrid governance structures with divided powers between community organizations and district water offices scored 23 points higher on sustainability than either a system of purely autonomous community management or a system of purely state-managed water services, as they had the advantageous features of local knowledge and institutional backstopping (Gnansounou *et al.*, 2022).

Federated cooperative approaches in rural Bolivia and Ecuador showed in Latin America that multi-community water federations could negotiate at the national level had 2.6 times greater access to infrastructure investments than single-community organizations. Comparative data on water access between 180 water committees in Uganda, Rwanda, and Tanzania that were disaggregated according to gender showed that the water committees with women in leading roles obtained equity scores in their household water access 29 points higher than water committees dominated by men, even though they also reported much lower rates of corruption and greater financial transparency.

Challenges and lessons learned in implementation

The literature captures an information-abundant environment of implementation issues and evidence-based lessons which cumulatively characterize the frontier of effective community water governance practice. Elite capture investigations throughout South Asia discovered that in about 35 to forty percent of surveyed water-user associations, the richest 10 percent of community members had effectively dominated administration and that they distributed water shares unfairly, offering them excessive shares to their personal agricultural lands and also collected fees on poorer consumers.

An evaluation of 500 rural water projects in 10 African countries by WaterAid resulted in the observation that 42 percent of community water systems failed within two years of outside project completion with poor local technical capacity being the leading cause of failure recorded in 68 percent of the cases studied. In rural Indian financial management studies, the researchers discovered that 29 per cent of gram panchayat water committees had audited financial records that were available to the members of the community, which led to fund misappropriation which in the long term weakened funding of maintenance (Forattini, 2024). Gender exclusion studies observed that 57 percent of the surveyed 57 percent of water governance bodies in South and Southeast Asia, women were members of the body, but systematically excluded in terms of substantive decision-making, which, given their formal inclusion in the governance performance, had no statistical significance. The Sahel climate vulnerability studies had recorded that 61 percent of the community water institutions that were put in place during normal rain years had not put in place adaptive governance procedures to handle scarcity caused by droughts, which collapsed under the negotiation pressure of extreme water stress events (Tsfaye, 2022). However, a synthesis of 78 successful long-term community water programs identified 5 decisively repeatable success factors: legally enforceable community water rights, a minimum of five years of investment needs in capacity building, mandatory gender quota enforcement and leadership training, tiered tariff structure to spare the poorest 20 per cent of users, and special government liaison officers to provide backstopping of technical support, without usurping the authority to manage community governance.

Discussion

The results of the given study all support the idea that community-based participatory water management is a structurally more efficient form of governance compared to centralized and technocratic models of governance, especially at the rural and marginalized level in the Global South. The analysis of evidence compiled in several regional examples shows that participatory models are always more efficient than the state-managed ones in terms of equity, sustainability, the quality of decisions, and conflict management, as long as the organizational conditions, which allow them, are carefully designed and sustained. The 34% equity premium recorded in World Bank evaluations, the approximately twofold increase in

the life of infrastructure operations witnessed in sub-Saharan African systems, and the much higher water productivity of crops in farmer-controlled irrigation systems are all stronger pieces of empirical evidence of the principles of participatory governance. Nonetheless, the results also reveal a serious implementation dilemma: the communities that are most in need of effective water management, the ones that are poor, marginalized and vulnerable to climate change, are the ones that are overrepresented in the list of those vulnerable to elite capture, capacity deficit and financial meltdown. This paradox requires that participatory water management should not be romanticised as self-contained but it is a governance structure which must be maintained with overall external institutional investment, legal acknowledgement and technical support. Particular attention should be paid to gender inclusion results because it has been proved that effective women leadership, and not tokenism as a member, is a structural factor that determines equity outcomes as well as institutional integrity. The analysis of the comparative models also warns against blanketing on any single model of governance and the ultimate determinant of success goes to contextual tuning of the community social structure, ecological environment, and institutionalization. Implementation in the future will thus be more focused on context sensitive governance construction, rather than project blueprint.

Conclusion

This paper conclusively demonstrates that community based participatory water management that is underpinned by facilitating legal legislation, enduring capacity investments and real power devolution provide significantly greater equity and long-term results as compared to centralized options. The experience in various world regions shows that the communities that have the control over the water resource of the area are more efficient in terms of ensuring the infrastructure, more fair in sharing the water resource, more stable in their conflict resolutions, and more active in preserving the ecological system. However, achievement of this potential requires the facing of structural obstacles such as elite capture, gender exclusion and long-term underfunding by evidence-based institutional interventions. Policymakers, development practitioners, and civil society organizations should be determined to establish community water governance frameworks that are based on the legal recognition, inclusive leadership, and long-term adaptive capacity as opposed to the short-term project delivery framework.

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