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**INTERNATIONAL JOURNAL OF
MULTIDISCIPLINARY RESEARCH & REVIEWS**

journal homepage: www.ijmrr.online/index.php/home

**ENVIRONMENTAL GOVERNANCE AND WATERSHED CONSERVATION
IN THE BANGSAMORO AUTONOMOUS REGION IN MUSLIM
MINDANAO: A QUALITATIVE CASE STUDY OF THE DIMAPATROY
RIVER WATERSHED**

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How to Cite the Article: Zaidin P. Akmad, Nasser C. Andam Jr., Hamdoni K. Pangandaman & Louvill M. Ozarraga (2026). Environmental Governance and Watershed Conservation in the Bangsamoro Autonomous Region in Muslim Mindanao: A Qualitative Case Study of the Dimapatoy River Watershed. International Journal of Multidisciplinary Research & Reviews, 5(7),294-308.



<https://doi.org/10.56815/ijmrr.v5i7.2026.294-308>

Keywords	Abstract
<i>Bangsamoro Autonomous Region In Muslim Mindanao, Dimapatoy River Watershed, Environmental Governance, Ministry Of Environment, Natural Resources And Energy,</i>	The Dimapatoy River Watershed is a critical water source for Cotabato City and neighboring communities in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM). Despite its ecological and public service importance, the watershed is exposed to illegal logging, charcoal production, kaingin, land conversion, settlement expansion, and other livelihood-related pressures. This qualitative case study examined how the Ministry of Environment, Natural Resources and Energy (MENRE) and partner stakeholders govern watershed conservation in the Dimapatoy River Watershed. Data were generated through key informant interviews with



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<i>Watershed Conservation, Watershed Management</i>	Ministry of Environment, Natural Resources and Energy personnel and a group interview with representatives of the Metro Cotabato Water District (MCWD). Interview data were analyzed using thematic analysis and were supported by policy and secondary document review. Findings show that Ministry of Environment, Natural Resources and Energy contributes to watershed conservation through reforestation, rehabilitation, biodiversity assessment, water quality coordination, foot patrolling, monitoring, and Communication, Education, and Public Awareness / Information, Education, and Communication activities. Collaboration with Metro Cotabato Water District, local government units, barangays, people's organizations, and community actors strengthens conservation work. However, implementation remains constrained by limited manpower, delayed and insufficient funds, monitoring gaps, livelihood dependence on forest resources, weak inter-agency coordination, and uneven enforcement. The study argues that watershed conservation in Bangsamoro Autonomous Region in Muslim Mindanao should be understood not only as an ecological intervention but also as an environmental governance issue. Long-term sustainability requires a stronger monitoring system, clearer institutional roles, timely resource support, community-based livelihood alternatives, and a functioning multi-stakeholder watershed governance mechanism.
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1. INTRODUCTION

Watersheds are ecological and governance systems. They regulate water flow, support biodiversity, reduce disaster risks, sustain agriculture and domestic water supply, and connect upland resource use with downstream public welfare. In the Philippines, watershed sustainability is threatened by deforestation, land-use change, informal settlement expansion, pollution, and weak enforcement. These pressures reveal that watershed protection is not only a technical conservation concern. It is also an institutional problem involving policy implementation, coordination, accountability, community participation, and resource allocation.

The Dimapatoy River Watershed in Datu Odin Sinsuat, Maguindanao del Norte, is significant because it supports the water supply needs of Cotabato City and nearby communities through the Metro Cotabato Water District. The watershed also forms part of the environmental landscape of Bangsamoro Autonomous Region in Muslim Mindanao, where local autonomy, ecological restoration, and public service delivery intersect. However, field accounts and stakeholder observations indicate continuing pressures from illegal tree cutting, charcoal-making, kaingin, land conversion, settlement expansion, and dependence on forest-based livelihood activities. These pressures may affect forest cover, biodiversity, water quality, and the ability of the watershed to sustain downstream users.



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The Ministry of Environment, Natural Resources and Energy is the primary regional agency responsible for the exploration, utilization, management, conservation, protection, and sustainable development of Bangsamoro Autonomous Region in Muslim Mindanao's environment, natural resources, and potential energy sources. This mandate places Ministry of Environment, Natural Resources and Energy at the center of watershed governance in the region. However, the effectiveness of this role depends on how Ministry of Environment, Natural Resources and Energy coordinates with water service institutions, local government units, barangay officials, people's organizations, communities, and enforcement actors. The creation and institutionalization of watershed management councils under Philippine watershed policy also highlights the need for collaborative governance mechanisms that can connect agencies, local governments, and stakeholders in watershed management.

Existing literature on integrated watershed management emphasizes ecological restoration, stakeholder participation, enforcement, livelihood considerations, and adaptive monitoring. Studies on environmental governance further show that policy outcomes depend on institutional capacity, accountability, participation, coordination, and the ability of agencies to respond to changing field conditions. In the Philippine context, watershed programs are often constrained by fragmented institutional responsibilities, limited budgets, insufficient monitoring systems, and weak enforcement. These constraints are especially relevant in local and autonomous governance settings where institutions may still be consolidating their roles.

Despite the importance of watershed governance, limited empirical attention has been given to how conservation is implemented in Bangsamoro Autonomous Region in Muslim Mindanao's autonomous governance context, especially in watersheds that are directly linked to urban water supply. This study addresses this gap by examining the role of Ministry of Environment, Natural Resources and Energy, the participation of Metro Cotabato Water District and other stakeholders, the governance challenges encountered in conservation work, and the opportunities for strengthening the long-term sustainability of the Dimapatoy River Watershed.

Specifically, the study sought to: (1) examine Ministry of Environment, Natural Resources and Energy's role in implementing watershed conservation policies and programs; (2) identify the institutional arrangements and governance processes that influence conservation practices; (3) determine the challenges affecting watershed management; and (4) identify opportunities for strengthening environmental governance and long-term watershed sustainability.

2. LITERATURE REVIEW AND THEORETICAL LENS

2.1 Integrated Watershed Management

Integrated watershed management recognizes the watershed as a socio-ecological unit where land, water, forest, biodiversity, livelihood, and governance concerns interact. Effective watershed



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management requires not only reforestation and protection activities but also coordinated planning, monitoring, enforcement, and participation of local stakeholders. In the Philippines, watershed governance is shaped by national environmental laws, administrative orders, local ordinances, and the practical capacities of agencies and local governments. The emphasis on watershed management councils reflects the policy preference for collaborative structures that can improve technical and operational capacity among involved institutions.

2.2 Environmental Governance

Environmental governance refers to the institutions, rules, processes, and practices through which environmental decisions are made and implemented. For this study, environmental governance was examined through six analytical dimensions: institutional mandate and capacity, policy implementation and enforcement, stakeholder participation, transparency and accountability, monitoring and adaptive management, and livelihood-sensitive sustainability. These dimensions are useful because the Dimapatoy case involves both formal agency responsibilities and field-level challenges such as illegal logging, poverty, land occupancy, monitoring gaps, and resource limitations.

2.3 Sustainable Development Perspective

The sustainable development perspective requires the balancing of environmental protection, social welfare, and economic needs. In watershed settings, this means that conservation policies should not be limited to prohibitions and tree planting. They should also consider livelihood dependence, local cooperation, equitable participation, and the long-term capacity of communities and institutions to maintain conservation gains. In this study, sustainable development is used to interpret why livelihood support and community trust emerged as necessary components of watershed protection.

3. MATERIALS AND METHODS

3.1 Research Design

The study used a qualitative case study design. This design was appropriate because the research sought to understand the experiences, perceptions, and field-based insights of key informants involved in the conservation and governance of the Dimapatoy River Watershed. The case study approach allowed the researcher to examine institutional roles, collaboration, policy implementation, enforcement, and challenges within a specific watershed governance setting.

3.2 Research Locale

The study was conducted in Barangay Awang, Municipality of Datu Odin Sinsuat, Maguindanao del Norte, Bangsamoro Autonomous Region in Muslim Mindanao. The site was selected because it is directly connected to the Dimapatoy River Watershed and to watershed protection, water supply, and environmental management concerns affecting Cotabato City and surrounding communities.



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3.3 Participants and Sampling

Participants were selected through purposive sampling. The study involved six Ministry of Environment, Natural Resources, and Energy personnel coded as P1 to P6 and one group of six Metro Cotabato Water District representatives coded as MCWD-G1. The Ministry of Environment, Natural Resources and Energy informants included personnel with direct knowledge of conservation programs, field monitoring, policy implementation, and watershed protection. The Metro Cotabato Water District representatives were included because the water district depends on the watershed as a water source and participates in conservation activities. Participant codes were used to protect identities and maintain confidentiality.

3.4 Research Instrument and Data Collection

Data were collected through key informant interviews and a group interview using open-ended guide questions. The guide covered conservation activities, Ministry of Environment, Natural Resources and Energy's regulatory role, institutional collaboration, policy communication, monitoring and enforcement, budget and manpower concerns, and opportunities for strengthening environmental governance. Interviews were conducted with participant consent. Secondary sources, including relevant policy documents, agency information, and related literature, were also reviewed to support the interpretation of findings.

3.5 Data Analysis

The study used thematic analysis. Interview responses were first reviewed and coded through open coding. Similar codes were then grouped into themes and subthemes based on recurring patterns in the data. The analysis focused on the relationship between conservation activities, governance processes, institutional capacity, enforcement, stakeholder participation, and sustainability concerns. Selected verbatim excerpts were retained to support each theme. Filipino or mixed Filipino-English statements were translated into English while preserving their intended meaning.

3.6 Trustworthiness of the Study

To strengthen credibility, the study used source triangulation by comparing perspectives from Ministry of Environment, Natural Resources and Energy personnel and Metro Cotabato Water District representatives. Thick description was used to provide context regarding conservation activities, governance processes, and implementation challenges. The use of participant quotations helped preserve the meaning of the responses and supported confirmability. Coding decisions were reviewed against the research objectives and recurring ideas in the interview data to strengthen dependability. Where translations were necessary, the English versions were checked against the original statements to maintain accuracy.



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3.7 Ethical Considerations

The study followed basic ethical principles in qualitative research. Participants were informed of the purpose of the study, the voluntary nature of participation, and their right to withdraw. Participant codes were used instead of names. Interview data were used solely for academic purposes and were handled with confidentiality and care.

4. RESULTS AND DISCUSSION

Five major themes emerged from the data: (1) conservation measures and environmental programs, (2) Ministry of Environment, Natural Resources and Energy's institutional role and governance arrangements, (3) policy communication, enforcement, and compliance challenges, (4) budget, manpower, transparency, and institutional capacity, and (5) opportunities for strengthening environmental governance and long-term sustainability.

Major Theme	Core Finding	Governance Dimension
Conservation measures and environmental programs	Reforestation, rehabilitation, monitoring, patrolling, water-related coordination, biodiversity assessment, and Information, Education, and Communication / Communication, Education, and Public Awareness are the most visible conservation practices.	Monitoring, adaptive management, restoration
Ministry of Environment, Natural Resources, and Energy role and governance arrangements	Ministry of Environment, Natural Resources, and Energy is recognized as the lead agency, but watershed protection requires coordination with Metro Cotabato Water District, Local Government Units, Barangays, People's Organizations, Non-Governmental Organizations, and communities.	Institutional mandate, stakeholder participation
Policy communication, enforcement, and compliance challenges	Information, Education, and Communication / Communication, Education, and Public Awareness supports awareness, but enforcement is constrained by illegal logging, charcoal production, poverty, land occupancy, and weak ground coordination.	Policy implementation, enforcement, livelihood-sensitive governance
Budget, manpower,	Fund release delays, limited personnel, and	Institutional



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transparency, and capacity	insufficient resources weaken field implementation despite accountability procedures.	capacity, transparency, accountability
Opportunities for sustainability	Livelihood support, stronger monitoring, clearer roles, and a functional watershed governance mechanism are necessary for long-term conservation.	Collaborative governance, sustainability

4.1 Conservation Measures and Environmental Programs

The first theme shows that watershed conservation in Dimapatoy is implemented through reforestation, rehabilitation, tree planting, monitoring, patrolling, water-related assessments, biodiversity assessment, and awareness campaigns. Informants repeatedly identified the Integrated Bangsamoro Greening Program as the most visible reforestation and rehabilitation program in the watershed.

P1 stated: "We have the Integrated Bangsamoro Greening Program, which aims to restore the forest specifically for the Dimapatoy Watershed."

MCWD-G1 explained: "We are guided by our annual work and financial plan. It states how we preserve the Dimapatoy Watershed. We also ask local partners to plant in the area and we pay them 5,000 pesos per 500 seedlings per year, which they maintain for three years."

These responses show that reforestation is not treated as a one-time planting activity. It also involves planning, maintenance, and partnership with local actors. This is important because seedling survival and long-term vegetation recovery are more meaningful indicators than the number of seedlings planted. The findings suggest that conservation gains depend on the continuity of maintenance arrangements, the participation of people's organizations, and the capacity of agencies to monitor field outcomes.

Monitoring and patrol activities also emerged as essential conservation practices. Metro Cotabato Water District representatives reported regular foot patrols, while Ministry of Environment, Natural Resources and Energy personnel described patrolling as a way to prevent tree cutting and other illegal activities.

MCWD-G1 stated: "We conduct foot patrols every Monday, Wednesday, and Friday. We also plant trees and integrate Information, Education, and Communication activities. Aside from that, we conduct riverbank cleaning."

P6 added: "Our number one activity is still tree growing or reforestation. We also conduct foot patrolling, and we have apprehended people who were cutting trees in the area."



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The significance of these findings is that field presence functions as both deterrence and community engagement. Physical monitoring makes conservation rules visible to communities and can discourage destructive practices. However, the same finding also suggests a governance concern: conservation cannot depend on sporadic or under-resourced patrolling. A more systematic monitoring framework is needed to track illegal activities, seedling survival, water quality, forest cover, and biodiversity changes.

Ecological assessment was also discussed by informants in terms of water quality, forest cover, flora and fauna, and survival of planted trees. P3 reported that assessments are conducted quarterly with Metro Cotabato Water District and include water quality, flora, and fauna. P1 described the watershed condition as "50/50" because of increased occupants and monocropping practices that may affect biodiversity. This mixed assessment indicates that ecological restoration is ongoing, but the watershed remains exposed to land-use pressures and human settlement concerns.

4.2 Ministry of Environment, Natural Resources, and Energy's Institutional Role and Governance Arrangements

The second theme concerns Ministry of Environment, Natural Resources and Energy's mandate and its relationship with other stakeholders. Informants recognized Ministry of Environment, Natural Resources and Energy as the lead agency for the protection, conservation, rehabilitation, regulation, and sustainable management of natural resources in the watershed. Metro Cotabato Water District also recognized Ministry of Environment, Natural Resources and Energy's primary role while positioning itself as a partner institution because of its dependence on the watershed for water supply.

MCWD-G1 explained: "This is really the main task of MENRE. MCWD is there because our source of drinking water for Cotabato City is located there."

P6 stated: "The main role of MENRE is to protect the watershed forest reserve of Dimapatoy."

These responses affirm Ministry of Environment, Natural Resources and Energy's central position in watershed governance. However, they also show that the lead-agency role cannot be exercised effectively by Ministry of Environment, Natural Resources and Energy alone. Watershed issues involve downstream water users, upland communities, barangay governments, municipal government, Non-Governmental Organizations, People's Organizations, and enforcement actors. Therefore, Ministry of Environment, Natural Resources, and Energy's role should be understood as both regulatory and coordinative.

Collaboration was repeatedly mentioned by participants. MCWD-G1 referred to the creation of a Watershed Council involving Local Government Units (LGUs), Barangay Local Government Units (BLGUs), Non-Governmental Organizations (NGOs), and People's Organizations. Ministry of



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Environment, Natural Resources and Energy informants also mentioned partnerships in tree planting, capacity building, information drives, and barangay coordination.

MCWD-G1 stated: "They invite us in organizing watershed protection and in creating the Watershed Council. The Council includes different agencies such as LGUs, BLGUs, NGOs, and people's organizations."

P6 explained: "Whenever we conduct activities, such as tree-growing activities, we coordinate with the barangay and, if possible, with the municipal government."

These findings support the view that watershed conservation requires collaborative governance. The Watershed Council is potentially important because it can provide a formal venue for planning, coordination, monitoring, and dispute resolution. However, the study should not treat the existence of the council as sufficient evidence of effective governance. Its effectiveness depends on clear roles, regular meetings, shared data, budget support, enforcement coordination, and accountability mechanisms.

4.3 Policy Communication, Enforcement, and Compliance Challenges

The third theme shows that policy communication is carried out mainly through Communication, Education, and Public Awareness (CEPA), Information, Education, and Communication (IEC), meetings, and local coordination. Informants emphasized the need to explain conservation policies to communities because some residents may not understand environmental rules or may see restrictions as threats to livelihood and land occupancy.

P3 stated: "We conduct CEPA and IEC by going to local communities in the watershed area for information drives."

P5 added: "MENRE's core policies are communicated through IEC. People need to be informed about MENRE's policies."

These responses show that awareness-building is an important part of governance. Policy communication can help reduce resistance, clarify the purpose of watershed protection, and encourage cooperation. However, the findings also show that communication alone is not enough. Compliance is affected by poverty, livelihood dependence, land concerns, and the presence or absence of local political support.

Participants identified illegal tree cutting, charcoal production, kaingin, land occupancy, and resistance from some residents as major enforcement challenges. P1 identified illegal loggers as a leading challenge. P3 connected tree cutting with charcoal production. P2 emphasized that ground enforcement becomes difficult when Local Government Units (LGUs) or barangay leaders are not present because the affected people are also local constituents.



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P2 explained: "If you are not with the LGU or BLGU on the ground, you cannot force the people there because those people are their voters."

This finding reveals a political and social dimension of enforcement. Environmental violations are not only legal infractions. They may be connected to livelihood scarcity, community relationships, local political incentives, and fear of displacement. As a result, strict enforcement without social support may create resistance. The findings support the need for livelihood-sensitive enforcement, where conservation restrictions are matched with alternatives that reduce dependence on tree cutting and charcoal-making.

Monitoring and non-compliance mechanisms included patrols, warnings, Information, Education, and Communication/Communication, Education, and Public Awareness, confiscation of chainsaws, and coordination with uniformed personnel for case filing. However, MCWD-G1 also observed that the intention of conservation policy is good, but ground implementation is weakened by monitoring gaps. This distinction is critical for publication: the issue is not merely the absence of policies but the uneven capacity to implement and monitor them consistently.

4.4 Budget, Manpower, Transparency, and Institutional Capacity

The fourth theme concerns resource availability and institutional capacity. Informants identified limited manpower, insufficient budget, delayed release of funds, and logistical limitations as constraints affecting conservation implementation. Metro Cotabato Water District reported an annual budget for its watershed activities, while Ministry of Environment, Natural Resources and Energy personnel described program-based funding and the need to make limited resources fit field requirements.

MCWD-G1 stated: "In our annual work plan for the Dimapatoy Watershed, we are given around 500,000 pesos for the whole year, but we are still able to sustain the program."

P1 explained: "It is insufficient. If we program the activities properly, they are costly, but when the budget reaches MENRE, we are told to make it fit."

P2 added: "We are really lacking personnel. Because of budget limitations, we just help one another, including staff assigned to other sites."

These findings show that institutional capacity is central to environmental governance. Programs may be well-designed, but field implementation becomes weak when there are too few forest rangers, limited equipment, insufficient logistical support, and delayed funds. Monitoring a large watershed area requires personnel, transportation, communication tools, documentation systems, and clear enforcement coordination. Without these, conservation policies may remain strong on paper but weak on the ground.



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Transparency was also discussed. P1 noted that fund utilization is strictly monitored, but fund release may be delayed from one quarter to another. This suggests that accountability systems exist, but administrative efficiency also matters. Good governance should not only prevent misuse of funds. It should also ensure that conservation funds are released on time because planting, maintenance, monitoring, and patrol activities are seasonal and field-sensitive.

4.5 Opportunities for Strengthening Environmental Governance and Sustainability

The fifth theme presents opportunities for improving long-term watershed conservation. Informants emphasized continuous community intervention, livelihood support, stronger monitoring, improved coordination, and clearer policy implementation. These opportunities indicate that sustainability requires the integration of ecological restoration with social and institutional support.

MCWD-G1 stated: "There should be continuous intervention with the people inside because, due to poverty, they use the resources in the area as livelihood. Programs should be provided for them."

MCWD-G1 also emphasized: "When we partner with people on the ground, we must be sincere with them because that is how cooperation and partnership are built."

These statements point to the importance of trust. Communities are more likely to participate when they see conservation as a shared benefit rather than an imposed restriction. Livelihood support is especially important for households that depend on forest resources. Without alternatives, enforcement may reduce one harmful activity temporarily but fail to address the underlying economic pressure that produces non-compliance.

Participants also recommended strengthening monitoring and the legal status of the watershed. MCWD-G1 emphasized the need to strengthen the establishment of the watershed as a protected area or forest reserve and to strengthen the law for watershed protection. This is consistent with the need for clearer institutional roles, documented enforcement procedures, and stronger multi-stakeholder coordination.

Overall, the findings show that the Dimapatoy River Watershed case is best understood as a governance problem involving institutional mandate, community livelihood, enforcement capacity, and collaborative coordination. Ministry of Environment, Natural Resources and Energy's reforestation and monitoring programs are important, but long-term conservation depends on the quality of the governance system that supports these programs.

5. CONCLUSION

The study concludes that watershed conservation in the Dimapatoy River Watershed is shaped by the interaction of institutional mandate, field-level enforcement, community livelihood dependence, and inter-agency coordination. Ministry of Environment, Natural Resources and Energy plays a central



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role through reforestation, rehabilitation, monitoring, biodiversity assessment, policy communication, and Information, Education, and Communication / Communication, Education, and Public Awareness activities. Metro Cotabato Water District, Local Government Units, Barangays, Non-Governmental Organizations, people's organizations, and communities also contribute to conservation through participation, coordination, and support activities.

However, the study also shows that conservation effectiveness remains vulnerable when field implementation is constrained by limited manpower, insufficient and delayed funds, weak monitoring, illegal logging, charcoal production, kaingin, land occupancy, and community dependence on forest resources. The findings demonstrate that watershed conservation is not only an ecological concern. It is also a governance concern that requires institutional capacity, social legitimacy, accountability, and livelihood-sensitive enforcement.

The case of Dimapatoy contributes to environmental governance literature by showing that conservation in Bangsamoro Autonomous Region in Muslim Mindanao requires more than agency-led reforestation. It requires a collaborative, community-sensitive, and adaptive governance arrangement capable of linking ecological restoration with enforcement, livelihood support, and sustained institutional coordination.

6. POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1 Strengthen Monitoring and Enforcement

Ministry of Environment, Natural Resources and Energy, Metro Cotabato Water District, Local Government Units, Barangays, and enforcement agencies should strengthen regular patrols, documentation of violations, and response procedures for illegal logging, charcoal production, kaingin, and destructive land-use activities. Monitoring should include not only the presence of violations but also seedling survival, forest cover, water quality, biodiversity indicators, and community compliance.

6.2 Institutionalize and Strengthen the Watershed Council

The Watershed Council should be strengthened as a formal coordination mechanism. Its roles, membership, meeting schedule, reporting process, and accountability mechanisms should be clarified. It should serve as a venue for planning, monitoring, conflict resolution, information sharing, and coordination among Ministry of Environment, Natural Resources and Energy, Metro Cotabato Water District, Local Government Units, Barangays, Non-Governmental Organizations, People's Organizations, and communities.

6.3 Link Conservation with Sustainable Livelihoods

Livelihood programs should be provided for communities living in or near the watershed, especially households dependent on tree cutting, charcoal-making, or other extractive activities. Conservation



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agreements, seedling maintenance arrangements, agroforestry support, and community-based livelihood programs may reduce pressure on forest resources while improving local cooperation.

6.4 Provide Timely Funds, Personnel, and Equipment

The government should allocate adequate funds, additional forest rangers, communication tools, monitoring equipment, transportation support, and technical resources for watershed protection. Fund releases should be timely because reforestation, monitoring, and patrol activities depend on seasonal and field-based schedules.

6.5 Improve Information, Education, and Communication (IEC) / Communication, Education, and Public Awareness (CEPA) and Community Trust-Building

Ministry of Environment, Natural Resources and Energy and partner institutions should continue Information, Education, and Communication and Communication, Education, and Public Awareness activities, but these should be designed as two-way engagement rather than one-way information dissemination. Community consultations should explain regulations, listen to local concerns, address fears of displacement, and build shared responsibility for watershed protection.

7. LIMITATIONS AND FUTURE RESEARCH

This study was limited to key informant perspectives from Ministry of Environment, Natural Resources and Energy and Metro Cotabato Water District. Future research may include household-level interviews, indigenous community perspectives, Local Government Unit officials, Barangay leaders, people's organizations, and enforcement agencies. Quantitative or mixed-method studies may also examine forest cover change, water quality trends, seedling survival rates, biodiversity indicators, and the effectiveness of livelihood-linked conservation programs. Future research may also compare Dimapatoy with other watersheds in Bangsamoro Autonomous Region in Muslim Mindanao to identify common and context-specific governance challenges.

AUTHOR(S) CONTRIBUTION

The writers affirm that they have no connections to, or engagement with, any group or body that provides financial or non-financial assistance for the topics or resources covered in this manuscript.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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SOURCES OF FUNDING

The authors received no financial aid to support for the research.

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