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Social Perception of Watershed Degradation and Its Influence on Collective Conservation Behavior

Asikin Muchtar✉
Universitas Indonesia Timur, Indonesia
muchtar.asikin@yahoo.com✉

Abstract:

The Rongkong Watershed (DAS) in North Luwu Regency is a strategic area in flash flood control, but it also represents a space of ecological and social trauma after the 2020 flash flood event. Until now, the management of the Rongkong watershed has tended to be dominated by technical and structural approaches, such as the construction of dams, hydrological monitoring stations, and the reforestation of critical land, while the social dimension of community perception and collective conservation behavior has not been the main focus. This study aims to analyze the social perception of the community towards the degradation of the Rongkong watershed and its influence on the formation of collective conservation behavior after the disaster. The study used a qualitative approach with a case study design, involving 12 key informants who were purposively selected from the upstream, middle, and downstream watersheds. Data were collected through in-depth interviews, field observations, and documentation, then analyzed using thematic analysis. The results show that the direct experience of flash floods shapes diverse social perceptions, ranging from reflective perceptions that view watershed degradation as a shared ecological threat to passive perceptions that place disasters as external phenomena. Reflective perceptions tend to encourage community participation in collective conservation activities, such as reforestation and environmental mutual cooperation, while passive perceptions underscore social engagement and reliance on structural interventions. This study concludes that the effectiveness of watershed management is not only determined by technical solutions, but is greatly influenced by how communities interpret watershed degradation and its social role in conservation efforts, so that the integration of social perception dimensions is key in community-based sustainable watershed management.

Keywords: Social Perception, Watershed Degradation, Collective Conservation Behavior, Post-Disaster Community, DAS Rongkong.

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Introduction

Watershed degradation is an environmental phenomenon that has a global impact because it reduces ecosystem functions, increases the risk of hydrometeorological

disasters, and threatens the welfare of communities that depend on ecosystem services (Alemu, 2022). Ecologically, watershed degradation contributes to soil erosion, river sedimentation, and flooding, with negative implications for food and clean water security (Zerga, 2025). This situation is also exacerbated by unsustainable land-use change and resource utilization in many developing countries. Although technical approaches such as reforestation and the development of flood control infrastructure have been widely applied in watershed management, the social dimension of the communities living around watershed areas is still less focused in research and policy. This condition shows the urgency of studies that link social aspects, especially public perceptions of watershed degradation, as a basis for collective behavior for effective conservation.

Social perceptions of environmental conditions play an important role in determining how communities assess, respond, and engage in natural resource conservation efforts because perceptions shape attitudes and choices of action (Constantino et al., 2021). Studies on community perceptions and participation in natural resource management show that social values and community experiences can be driving or inhibiting factors in environmental conservation, including in the context of river ecosystems (Haase et al., 2025). However, previous research has tended to emphasize the technical or behavioral aspects of conservation separately without integrating public understanding of watershed degradation and environmental collective behavior as a whole. This creates a research gap related to a deeper understanding of the relationship between social perceptions of watershed degradation and collective conservation actions at the community level. Other research links social aspects to technical conservation, but still lacks the discussion of how perceptions drive community collective behavior (Basuki et al., 2022). Therefore, until now, empirical studies are still needed to link social perception factors and collective behavior in the context of watersheds that experience significant ecological disturbances.

Furthermore, the study shows that public perceptions of environmental management can correlate with direct participation and action in natural resource conservation (Ruano-Chamorro et al., 2022). Research on watershed perception in the Citarum River downstream also reported that people's understanding of watershed conditions affects their awareness and perception of watershed function and the impact of degradation (Sugianto, 2021; Perkasa et al., 2021). However, most of the studies did not explicitly investigate how differences in perceptions among community groups in different parts of the watershed affected their collective behavior in conservation efforts, especially in areas exposed to serious disasters such as flash floods. This gap demonstrates the need for a deeper understanding of the social construction of perception and how those perceptions transform into collective behavior in the context of post-disaster watersheds.

The local context in North Luwu Regency, especially the Rongkong watershed, offers an empirical opportunity to address the above research gap. The region has been in the spotlight due to the experience of major flash floods in 2020 that had a wide ecological and social impact, as well as triggering technical mitigation efforts such as dam construction and critical land rehabilitation. Although such technical efforts are important, their impact on public perception and their involvement in collective conservation behavior is still poorly identified in the scientific literature. Ecological trauma and post-disaster community experiences can be factors that shape unique social perceptions of their environmental conditions, which in turn influences the collective decisions and actions they make at the community level. This situation demonstrates the need for research that bridges social and natural resource management perspectives in

understanding the collective behavior of conservation in watershed communities.

Socio-ecological theory views the human–environmental system as a dynamic interaction between social and ecological components, in which people's perceptions of environmental conditions can influence collective behavior and conservation outcomes (Paulus et al., 2023). The study of the collective behavior of watershed conservation needs to pay attention to the social construction of risk perceptions, historical experiences, and the context of local norms that develop after a disaster event. International research also confirms the importance of public awareness and perception in increasing community involvement in watershed management and resource conservation (Cotler et al., 2022). Taking into account this theoretical context, this study departs from the understanding that the interaction between social perception and collective action is an important element in the sustainable development of watersheds, particularly in areas vulnerable to ecological and social disturbances.

Based on the description above, this study aims to analyze how the social perception of the community around the Rongkong watershed was formed after the 2020 flash flood disaster and how these perceptions affect the formation of collective conservation behavior. This study explicitly explores the variables of watershed degradation perception and collective conservation behavior, as well as the relationship between the two in post-disaster social contexts. A qualitative approach is used to capture social dynamics, community experiences, and patterns of action that are not easily revealed by quantitative methods alone. Thus, this study is expected to be able to provide a more comprehensive and contextual understanding of conservation behavior based on social perceptions in watershed spaces that are experiencing ecological stress.

The contribution of this research is theoretical and practical. Theoretically, this study enriches the literature on environmental sociology and natural resource management by confirming the relationship between social perceptions and collective behavior in the context of watershed degradation influenced by ecological trauma. The findings can expand the framework of collective behavior theory in the study of socio-ecological conservation. Practically, the results of this study provide recommendations for policymakers, conservation planners, and local stakeholders to design watershed management strategies that take into account the social aspects of the community so that conservation efforts are more effective and sustainable.

Method

Types and Approaches to Research

This study uses a qualitative approach with a case study design to examine in depth the social perception of the degradation of the Rongkong Watershed and its influence on the formation of collective conservation behavior after the disaster (Muzari et al., 2022). The qualitative approach was chosen because it allows researchers to understand the subjective meaning, social experience, and construction of community perceptions formed through direct interaction with the environment and the 2020 flash flood event. Case study design is used because the research focuses on one specific context that has distinctive ecological and social characteristics. Case studies are also relevant for examining complex phenomena that cannot be separated from their social context (Thomas, 2021).

Research Location and Context

This research was carried out in the Rongkong watershed, North Luwu Regency,

South Sulawesi Province, which covers the upstream, middle, and downstream watersheds. The selection of the location was based on the strategic role of the Rongkong watershed in controlling flash floods and the significant impact of the 2020 disaster on people's lives (Manaf et al., 2022; Paski et al., 2021). This region also represents a space of ecological and social trauma that affects the way communities interpret environmental degradation. In addition, the management of the post-disaster Rongkong watershed is still dominated by technical and structural approaches, while the social dimension has received relatively little attention. This condition makes the Rongkong watershed a relevant empirical context and has novelty value in the study of social perception and collective conservation behavior.

Population, Informants, and Sampling Techniques

The population of this study is people who live and work around the Rongkong watershed. The technique of taking informants uses non-probability sampling with the purposive sampling method, which is the deliberate selection of informants based on criteria that are in accordance with the research objectives (Ahmad & Wilkins, 2025). This study involved 12 key informants, consisting of: four informants from the upstream watershed area (farmers and land managers), four informants from the central watershed area (community leaders and village officials), and four informants from the downstream watershed area (residents directly affected by flash floods). The selection of cross-regional informants aims to capture variations in social perceptions and collective conservation behaviors along watersheds.

Data Collection Techniques and Instruments

The implementation of the research is carried out gradually and systematically. The initial stage includes literature review to build a conceptual framework and compile research instruments. The next stage is the management of licensing and identification of informants in the upstream, middle, and downstream areas of the Rongkong watershed. Data collection was carried out through interviews and field observations with regard to research ethics, including informant consent and data confidentiality. After the data was collected, the researcher transcribed the interviews and organized the field notes. The final stage includes data analysis, drawing conclusions, and systematically compiling research reports.

Data Analysis Techniques

Data analysis was carried out using thematic analysis to identify patterns, themes, and meanings that emerged from qualitative data (Lochmiller, 2021). The analysis process includes the initial coding stage, code grouping, discovery of key themes, and interpretation of the relationship between social perception and collective conservation behavior. Analysis is done manually with the help of NVivo 12 software to make it easier to manage and trace data (Kraiwanit et al., 2023).

Results

1. Patterns of Community Participation in the Public Service Innovation Process

Based on the results of in-depth interviews, field observations, and documentation, it was found that some communities developed a reflective perception of the degradation of the Rongkong watershed after experiencing the 2020 flash flood firsthand. This perception is formed through a process of reflection on traumatic experiences, visually observed changes in environmental conditions, and social discourse that develops at the

community level. Thematic analysis shows that informants with reflective perceptions interpret watershed degradation as the result of interactions between human activities and ecological damage, rather than purely natural phenomena. Field observations reinforce these findings through local practices such as land clearing restrictions and vegetation replanting initiatives in upstream and central watersheds. Documentation of post-disaster community activities also shows an increase in ecological awareness based on collective experience.

The following interview excerpts reflect the formation of such reflective perceptions: *"After the flood, we realized that the forest above was already a lot of deforestation, the water was falling very quickly, so this is not an ordinary disaster, but the result of our own actions"* (WA-01, October 12, 2025 interview). A similar perception was conveyed by community leaders in the central watershed area who stated, *"We used to think that floods were fate, but now people are starting to understand that the damage to rivers and slopes also determines the magnitude of disasters"* (WB-02, interview October 15, 2025). From the downstream area, directly affected residents also expressed ecological reflections, *"If the upstream is damaged, we are at the bottom who are affected, so now we feel that this is a common problem, not just the top"* (WC-03, October 18, 2025 interview). This view was reinforced by another informant who stated, *"Yesterday's flood is a lesson, if nature is damaged, everyone is affected, we can't blame each other"* (WA-04, October 20, 2025 interview). These findings suggest that reflective perception is formed through a combination of hands-on experience, social interaction, and ongoing environmental observation.

2. Passive Perception and Externalization of Disasters as Phenomena Beyond Social Control

In addition to reflective perception, this study also found that there is a passive perception that interprets flash floods and watershed degradation as external phenomena that are beyond the control of the community. This perception tends to develop in groups of people who have limited access to information, fragmented ecological experiences, or high dependence on government intervention. Thematic analysis of the interview data showed that passive perception was characterized by fatalistic narratives, surrender to nature, and the lack of linkage between human activities and watershed damage. The results of the observations show that areas with passive perception have relatively few community-based conservation initiatives, while government program documentation shows the dominance of structural approaches without active citizen participation.

This is reflected in the statement of the informant downstream of the watershed, *"Floods are indeed from nature, it can't be helped, rivers have been like that for a long time"* (WC-01, October 10, 2025 interview). A similar view was conveyed by another informant, *"We are here only victims, forest and river affairs are the government's task"* (WC-02, interview October 14, 2025). From the central area of the watershed, village officials stated, *"There are still many people who are waiting for the program from above, they do not feel that it is a shared responsibility"* (WB-03, interview October 17, 2025). Even in the upstream area, there are informants who reveal, *"We farm as usual, the issue of flooding is a matter of nature and the government"* (WA-02, October 19, 2025 interview). These findings suggest that passive perceptions inhibit the internalization of social responsibility for watershed degradation.

3. Reflective Perception as a Trigger for Community-Based Collective Conservation Behavior

Data analysis showed a strong association between reflective perception and the emergence of collective conservation behaviors. Informants with reflective perceptions tend to be actively involved in conservation activities such as reforestation, mutual cooperation in river cleaning, and local agreements on land use restrictions. The results of field observations show collective practices that grow independently, while documentation of village activities shows an increase in citizen participation after the disaster. Thematic

analysis reveals that this collective behavior is not only driven by fear of disasters, but also by ecological awareness and social solidarity across watersheds.

This is reflected in the following quote: *"Now if there is a tree planting community service, almost everyone participates, because we already know the impact if the river is damaged"* (WA-03, interview October 13, 2025). Community leaders in the central watershed said, *"We began to agree to make local rules so that we do not arbitrarily cut down trees, this is the result of the residents' own discussions"* (WB-01, interview October 16, 2025). From the downstream area, the informant stated, *"Even though we live downstream, we still participate in river cleaning activities because this is for the common good"* (WC-04, interview October 21, 2025). Another statement affirms the collective dimension, *"If we work together, the community feels more owned and willing to protect the river"* (WB-04, interview October 22, 2025). These findings show that reflective perception plays a role as a social foundation for the formation of collective conservation actions.

4. . Passive Perception and Weakening of Social Engagement in Watershed Conservation

In contrast, passive perception has been shown to weaken community engagement in collective conservation behavior. Thematic analysis showed that groups with passive perceptions tended to be reactive, pseudo-participatory, or completely dependent on government programs. Field observations show low sustainability of conservation activities in areas with a predominance of passive perception, while documentation shows that conservation activities often stop after external projects are completed. This condition reflects the absence of a sense of social ownership of watersheds.

This is reflected in the informant's statement, *"If there is no assistance or projects, people rarely move on their own"* (WB-02, interview October 18, 2025). Another informant stated, *"We participate in planting trees if there is a program, after that it will go back to normal"* (WC-02, interview October 20, 2025). From the upstream region, a similar view was found, *"If there is no official direction, we are confused about where to start"* (WA-01, interview October 23, 2025). This statement was reinforced by another informant who said, *"The community still considers conservation to be a government affair, not an obligation of citizens"* (WB-03, October 24, 2025 interview). These findings confirm that passive perceptions contribute to the weak sustainability of community-based conservation.

Discussion

The main findings of this study show that watershed degradation is not only a biophysical problem, but also a social phenomenon mediated by public perception. These results reinforce a socio-ecological approach that views humans and the environment as interinteracting and inseparable systems (Herzog et al., 2022). In the context of the Rongkong watershed, the direct experience of the flash flood in 2020 plays a role as a trigger for the formation of social meaning towards the environment, both in the form of reflective and passive perception. These perceptions then influence the way people assess the risks, responsibilities, and collective actions that need to be taken. Thus, these findings confirm that the effectiveness of watershed management is highly dependent on the cognitive and social dimensions of the community, not solely on technical interventions.

The reflective perception found in this study is in line with the theory of risk perception which states that direct experience of disasters increases awareness, critical reflection, and changes in attitudes towards the environment (Diakakis et al., 2021). Societies that develop reflective perceptions view watershed degradation as the result of interactions between human activities and ecological degradation, rather than as a natural occurrence separate from social action. This reinforces the argument that traumatic experiences can serve as

"social learning moments" that drive changes in environmental norms and values (Féaux de la Croix & Samakov, 2024). In the context of the Rongkong watershed, post-disaster collective reflection encourages the emergence of ecological awareness across upstream, middle, and downstream regions. The novelty of this research lies in the affirmation that ecological trauma can be transformed into social capital for conservation when mediated by reflective perception.

Conversely, findings on passive perceptions show how disaster externalization undermines social responsibility and collective participation. This passive perception is in line with the concept of environmental fatalism, which is the view that humans have no control over environmental changes so that individual and collective actions are considered meaningless (Rao & Power, 2021). The community's dependence on government structural interventions found in this study shows that a technocratic approach without strengthening the social dimension has the potential to create environmental apathy. This phenomenon has also been reported in watershed management studies in developing countries, where the dominance of top-down approaches undermines local community initiatives (Dhungana et al., 2025; Shunglu et al., 2022). Thus, the results of this study criticize the assumption that infrastructure development automatically increases socio-ecological resilience.

The relationship between reflective perception and collective conservation behavior found in this study supports the theory of collective action in shared resource management. According to Eaton et al., (2021), the success of natural resource management is largely determined by common understanding, common norms, and a sense of collective ownership. In the Rongkong watershed, reflective perceptions encourage the formation of mutual cooperation, self-help reforestation, and local agreements as a form of community-based collective action. These findings expand the literature by showing that post-disaster social perceptions serve as a connecting mechanism between ecological experiences and collective action. The theoretical contribution of this research lies in strengthening the role of perception as a mediating variable in the socio-ecological system of watersheds.

The difference in perception between the upstream, middle, and downstream watersheds shows that spatial context also shapes the way people interpret environmental degradation. Upstream communities tend to have a more direct perception of the relationship between land use practices and disaster risk, while downstream communities place more emphasis on their position as victims. These findings are consistent with previous research that states that spatial proximity to sources of degradation affects the level of conservation awareness and participation (Phyoe et al., 2023). However, this study adds a new dimension by showing that disaster experiences can bridge these spatial differences through ecological solidarity across watershed regions. This enriches the understanding of social dynamics in integrated watershed management.

Although it makes an important contribution, this study has some limitations that need to be critically examined. First, the relatively limited number of informants may limit the generalization of findings to other watershed contexts with different social characteristics. Second, this study focuses on post-disaster perception in a certain time frame, so it has not fully captured the dynamics of long-term perception changes. In addition, structural factors such as government policies and local economic forces have not been analyzed in depth as variables that influence perceptions and behaviors. Therefore, follow-up research is recommended to combine qualitative and quantitative approaches and expand the temporal and spatial scope of the study.

Overall, this discussion emphasizes that the integration of the social perception dimension is the key to community-based sustainable watershed management. The novelty

of this research lies in the disclosure of the typology of reflective and passive perception as a determining factor for the success or failure of post-disaster collective conservation behavior. These findings provide practical implications for policymakers to focus not only on technical solutions, but also on strategies for strengthening awareness, collective reflection, and social learning of watershed communities. Thus, this research contributes to the development of environmental sociology and natural resource management by placing social perception as a strategic element in building socio-ecological resilience of watersheds.

Conclusion

This study concludes that the community's social perception of the degradation of the Rongkong Watershed plays a decisive role in the formation of collective conservation behavior after the 2020 flash flood disaster. Reflective perceptions, formed through direct experience and awareness of the linkages between human activities and ecological damage, have been shown to encourage community participation in shared conservation actions, while passive perceptions actually weaken social engagement and reinforce dependence on structural interventions. These findings confirm that sustainable watershed management cannot rely solely on technical approaches, but must integrate the social dimension in the form of meaning, awareness, and collective responsibility of the community. Therefore, strengthening reflective social perceptions is a strategic key in building more effective, adaptive, and sustainable community-based watershed management.

Reference

Ahmad, M., & Wilkins, S. (2025). Purposive sampling in qualitative research: A framework for the entire journey. *Quality & Quantity*, *59*(2), 1461–1479.

Alemu, M. M. (2022). *Human Activity, Biodiversity and Ecosystem Services in Protected Areas*. Springer.

Basuki, T. M., Nugroho, H. Y. S. H., Indrajaya, Y., Pramono, I. B., Nugroho, N. P., Supangat, A. B., Indrawati, D. R., Savitri, E., Wahyuningrum, N., & Purwanto. (2022). Improvement of integrated watershed management in Indonesia for mitigation and adaptation to climate change: A review. *Sustainability*, *14*(16), 9997.

Constantino, S. M., Schlüter, M., Weber, E. U., & Wijermans, N. (2021). Cognition and behavior in context: a framework and theories to explain natural resource use decisions in social-ecological systems. *Sustainability Science*, *16*(5), 1651–1671.

Cotler, H., Cuevas, M. L., Landa, R., & Frausto, J. M. (2022). Environmental governance in urban watersheds: the role of civil society organizations in Mexico. *Sustainability*, *14*(2), 988.

Dhungana, N., Lee, C.-H., & Gentle, P. (2025). Assessing mountain communities' willingness to adaptation strategies for watershed management in changing climate. *Climatic Change*, *178*(8), 151.

Diakakis, M., Skordoulis, M., & Savvidou, E. (2021). The relationships between public risk perceptions of climate change, environmental sensitivity and experience of extreme weather-related disasters: Evidence from Greece. *Water*, *13*(20), 2842.

Eaton, W. M., Brasier, K. J., Burbach, M. E., Whitmer, W., Engle, E. W., Burnham, M., Quimby, B., Kumar Chaudhary, A., Whitley, H., & Delozier, J. (2021). A conceptual framework for social, behavioral, and environmental change through stakeholder engagement in water resource management. *Society & Natural Resources*, *34*(8), 1111–1132.

Féaux de la Croix, J., & Samakov, A. (2024). Moving beyond the Framing Impasse in the Aral Sea Delta: Vernacular Knowledge of Salinization and Its Potential for Social Learning towards Sustainability. *Sustainability*, *16*(19), 8605.

Haase, P., Cortés-Guzmán, D., He, F., Jupke, J. F., Mangadze, T., Pelicice, F. M., Palmer,

M. A., Rolls, R. J., Schäfer, R. B., & Welti, E. A. R. (2025). Successes and failures of conservation actions to halt global river biodiversity loss. *Nature Reviews Biodiversity*, *1*(2), 104–118.

Herzog, L., Tanguay, L., Beisner, B. E., Pahl-Wostl, C., Audet, R., & Schlüter, M. (2022). Studying human-nature relations in aquatic social-ecological systems using the social-ecological action situations framework: how to move from empirical data to conceptual models. *Ecology and Society*, *27*(3).

Kraiwanit, T., Limna, P., & Siripipatthanakul, S. (2023). NVivo for social sciences and management studies: A systematic review. *Advance Knowledge for Executives*, *2*(3), 1–11.

Lochmiller, C. R. (2021). Conducting thematic analysis with qualitative data. *The Qualitative Report*, *26*(6), 2029–2044. https://doi.org/https://doi.org/10.46743/2160-3715/2021.5008

Manaf, M., Muhibuddin, A., Suriandjo, H. S., Muspida, A., Widodo, S., & Abdulbar, F. (2022). Mitigation and public coordination for flood disaster risk reduction (FDRR) in the implementation of North Luwu sustainable development. *IOP Conference Series: Earth and Environmental Science*, *1109*(1), 12018.

Muzari, T., Shava, G. N., & Shonhiwa, S. (2022). Qualitative research paradigm, a key research design for educational researchers, processes and procedures: A theoretical overview. *Indiana Journal of Humanities and Social Sciences*, *3*(1), 14–20.

Paski, J. A. I., Makmur, E. E. S., Permana, D. S., Nurrahmat, M. H., Praja, A. S., Riama, N. F., & Fitria, W. (2021). Analysis of Multi-Scale Hydrometeorological Triggering Flash Flood Event of the 13 July 2020 in North Luwu, South Sulawesi. *IOP Conference Series: Earth and Environmental Science*, *893*(1), 12014.

Perkasa, H. W., Nurfatriani, F., & Astana, S. (2021). Analysis of soil and water conservation practices by community throughout the Upper Citarum River Watershed: motivational, technical and institutional aspects. *IOP Conference Series: Earth and Environmental Science*, *917*(1), 12006.

Phyoe, S. S. S., Htay, T., Thant, Z. M., Kyaw, H. Y., San, K. N., Tun, Z. P. H., Ranke, P. S., & Røskaft, E. (2023). Exploring Community Perceptions and Attitudes toward Protected Areas in Myanmar: The Role of Socio-Spatial Factors in Conservation Support. *Human Ecology*, *51*(6), 1189–1203.

Rao, N., & Power, S. A. (2021). "Communities change when individuals change": The sustainability of system-challenging collective action. *European Journal of Social Psychology*, *51*(3), 525–537.

Ruano-Chamorro, C., Gurney, G. G., & Cinner, J. E. (2022). Advancing procedural justice in conservation. *Conservation Letters*, *15*(3), e12861.

Shunglu, R., Köpke, S., Kanoi, L., Nissanka, T. S., Withanachchi, C. R., Gamage, D. U., Dissanayake, H. R., Kibaroglu, A., Ünver, O., & Withanachchi, S. S. (2022). Barriers in participative water Governance: A critical analysis of community development approaches. *Water*, *14*(5), 762.

Sugianto, Y. D. M. W. (2021). *Integrating Nature-Based Solutions (NBs) for Sustainable Urban Development and Climate Resilience in Indonesia's Citarum River Watershed*.

Thomas, G. (2021). *How to do your case study*.

Zerga, B. (2025). Integrated watershed management: a review. *Discover Sustainability*, *6*(1), 657.