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Sustainable Watershed Management in Panabo City, Davao del Norte, Philippines

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Abstract

This study evaluated the course of community participation in sustainable management of watersheds in Panabo City, Davao del Norte, in the Philippines. A quantitative, non-experimental research method analyzed the variances, and one-way analysis of variance is used to discuss the finding involving factors that impact community awareness and involvement in watershed activities. This simply means that while stakeholder participation is communicating an alternative way of water management, some barriers exist, such as limited awareness, socio-economic hurdles, and institutional deficiencies. This study shows that most community members do not know their responsibilities in watershed conservation, resulting in participation limitations. Also, the most important factors affecting participation include socio-economic variables like income levels and resource access. It recommends implementing educational campaigns to produce well-informed citizens, integrating local knowledge in decision-making, and formulating incentive strategies such as payments for ecosystem services if the community would engage in using them. Successful case studies show that collective efforts of local communities, NGOs, and government bodies bear fruit in improving watershed conditions. This research is geared toward providing realistic and immediate courses of action toward the promotion of sustainable practices and cooperation of stakeholders so that the integrity and resilience of Panabo's watersheds could benefit greatly from climate change and other environmental challenges.

Keywords: Watershed Management, Community Participation, Sustainable Practices, Stakeholders Engagement, Environmental Awareness

1. Introduction

Watershed management presents direct application of the integrated approach to land, water, and biodiversity management, hence the prioritization to certain types of watersheds for ecological, social and economic benefits (Wang et al., 2016). As stated by Chimdesa (2016), Wang et al. (2016), and Prasad et al. (2020), rainwater harvesting has changed into more effective activity for not only disaster risk reduction in a traditional sense but also an indigenous knowledge for soil or water conservation runoff harvest or erosion control. It is, however, true to say that this has continued to struggle with a lot of issues on watershed management due to the rampant population pressure and overexploitation of resources, effects of climate change, and others in the Philippines (Mandugay et al., 2022). This management plays a major role in stimulating the conservation of the natural resources to maintain healthy ecological systems, especially in upland communities that rely heavily on ecological resources. As fate would have it, the

Philippines is a prey to climate change and natural disasters, thus leading to increased efforts in communal ways of ensuring protection, both to watersheds and to human lives (Pasion et al., 2019).

Management plans are said not to function due to limited financial resources and political constraints (Garcia-Hansel & Metillo, 2016). According to Sharma et al. (2016), some of the challenges farmers in watershed areas are as follows: the significant challenge being the short period of seriousness to effect change. In a new work, Aglanu (2014); Randhir (2015) proposed that the integrated approach should engage all stakeholders in order to solve these problems, which is very much difficult in the socio-economic investigation. Problems in finance and political circumstances hinder these management plans from being turned into actions (Garcia-Hansel & Metillo, 2016). For farmers in the watershed situations, some conditions without quick fixes have arisen. According to Randhir, (2015) & Aglanu, (2014), they should seek to address these problems in the context of a more integrated participatory approach in which all the stakeholder voices are heard, taking into account the environment-economic trade off. Although the phases of watershed management differ, with planning and monitoring phases receiving less participation than implementation (Teressa, 2018).

Panabo City which is part of Davao Del Norte is considered a Lowland City because it also has uplands and lowlands with significant dependence on the upland watersheds to agricultural production, stock of potable water, and has rendered management and sustainability of the upland watersheds to the core concern in both livelihoods and biodiversity protection (Ureta, 2014). In turn, the affected communities should be engaged in watershed management for stewardship and improvement of ecosystem adaptation capabilities to climate change effects. Rolston et. al (2017) hasten the shift in stakeholder engagement toward realizing more community benefits through localized and standardized communication processes. Watershed management rends significant tools in tackling various environmental issues, especially those found in flood and erosion-prone areas as well as those that experience major loss in biodiversity. Proper watershed management would conserve natural resources, improve water quality, and establish ecological balance that is very important for the life of the community. Panabo City has rich natural resources and agricultural landscapes that make it more exposed to climatic factors and human activities in Davao del Norte, Philippines.

Over the years, rapid urbanization coupled with agricultural expansion has resulted in increased soil erosion, water bodies pollution, and loss of biodiversity in Panabo City. This stated really calls for the sustainable management of the watersheds since ecological integrity would require it. This study would assess the awareness, participation level, and attitudes of the community in Panabo City towards sustainable watershed management practices. This study specifically examines different dimensions among upland communities involved in sustainable watershed management in Panabo City. Relating to their participation in such activities, the study will make use of a data sample that captures 150 upland communities engaged in upland activities in Panabo City with a focus on their involvement in sustainable watershed management.

These data were attained from 150 upland communities that have an upland area in Panabo City for which sustainable watershed management is achieved. This study will explore the following research questions, to wit;

What are the factors of community participation in watershed management activities in Panabo City?

How aware are community member of sustainable watershed management practices?

What socio-economic factors affect participation in watershed management activities?

How effective are current watershed management initiatives perceived to be by the community?

2. Methodology

A systematic review has been used to address a research question; for that, it tries to gather all relevant data that satisfies defined inclusion criteria for this type of review. It uses clear, systematic techniques for discovery, selection, synthesis, and summary of studies as a way of reducing bias in all of these processes (Moher et al., 2015). The authors outline several steps that would facilitate carrying out a systematic review of the challenges and coping behaviors of public cemetery caretakers. The first step was to define the types of literature review to include; step number two was optimizing the information obtainable from the websites of organizations whose work is similar to that of the focus study on public cemetery caretakers; the third step was sifting through research articles published in the last ten (10) years; the fourth step was Developing a systematic procedure for screening and extracting data from identified studies use screening software to facilitate title/abstract screening and full-text assessment by several reviewers..

3. Results and Discussion

Stakeholder engagement is a major factor in the achievement of watershed management programs (Pasion et al., 2019). The engagement of local communities in planning development and evaluation enhances the credibility of the practice, increases community contextual knowledge, and ownership (Gonzalez et al., 2022). According to Ureta (2016), studies in the Philippines found that community participation in the forest and watershed management had a positive outcome on forest cover and better water management. There are many challenges that discourage active community participation in watershed management. For example, ignorance is a factor. Most upland communities do not know that they have a responsibility to protect the watersheds (Gonzalez et al., 2022). The self-generated economic constraints of communities like dependency on activities that cause further degradation in the watershed also limit sustainable management of watersheds-establishment (Estrada et al., 2018). In addition, the institutional aspects, such as poor governance or non-compliance with environmental laws, are blocking effective promotion of community participation (Manguiat & Zerrudo, 2020).

However, it was found that the following measures will improve community involvement in watershed management: And this strengthens capacity through dissemination of educational information for the promotion of people's maintenance of the health of the watersheds (Pasion et al., 2019). Community participation using local knowledge and involvement in the processes of decision-making can greatly add to resolution (Rivas, 2021). And these proved to be valuable-the development of the incentive strategies for community engagement like payment for ecosystem services (Molina-Maturano et al., 2021). There are also case studies that demonstrate the role of communities in watershed management. Likewise, there was reported successful project implementation by Pasion et al. (2019) in a Northern Luzon for the farmers and upland communities, NGOs and government agencies for restoration of the affected watershed. In fact, conditions like the above will improve training, continuity of engagement and incentives in upland communities for better water quality, and storage, increased forest cover, and better source of income of the community.

Community Participation in Watershed Management

Participation of people living close to the watershed is critical for effective management. According to Adebayo et al. (2020), involving local communities in all stages of decision-making processes would bring about contextually appropriate and more effective strategies. The authors point out that participatory approaches promote ownership and commitment, the building blocks of watershed program sustainability. Participatory approaches indeed encourage ownership and commitment-the bedrock on which watersheds

program sustainability has to stand. Community participation is a vital condition but often neglected in watershed programs. Refinement et al. (2021): quoted different studies conducted in some municipalities in the Philippines and found many local residents unaware of watershed management initiatives; this demonstrates the gap in community engagement as regards improved outreach strategies. The same cohere with findings by Sulaiman et al. (2022), who observed that socio-cultural barriers and lack of trust in local governance structures seem to limit therewith that many communities at the grassroots level do not participate.

Awareness of Sustainable Watershed Management

By having knowledge of watershed management practices, the community would be helped towards its involvement in participatory management processes. Osuna et al. (2022) found a correlation between the awareness of the communities regarding the importance of watersheds conservation and their participation in management activities. The authors contend that educational activities could dramatically enhance comprehension and create a propensity for active participation in sustainable practices. Conversely, low-level awareness would fail the activities. Cruz et al. (2023) conducted a research survey, which showed that many of the community members were clueless about the basic knowledge concerning the functions of watersheds and sustainable management practices. This marks an immediate urgent need for education and outreach programs directed to informing and engaging the populations at the local level.

Socio-Economic Factors Influencing Participation

The participation of communities in watershed management is most influenced by socio-economic factors. Economic stability, educational achievements, and resource access are critical determinants in defining the capacity and willingness of an individual to conduct environmental activity (Cañete & Guanzon, 2019). According to Villa et al. (2021), households with higher income and educational attainment showed a higher participation rate in watershed management activities. This implies that socio-economic level very much influences community participation. Geographic and logistical barriers are also constraints in the active participation of communities in watershed conservation activities. Garcia et al. stressed that remote communities are typically hundred percent deficient in everything that relates to transportation and information access, and this too affects their participation in saved watershed management programs. Such barriers must be surmounted to enhance community participation in sustainable practices.

Let us apply these barriers by making sure that they really improve people's lives in practice. Through general identifiable socio-economic concerns, people are encouraged not to participate in watershed management. Major determinants include economic stability, educational achievement and resource access. Such determinants influence the ability and inclination of an individual to engage in an environmental activity. According to study-research finding of Villa et al. 2021 that High income households and those of higher education have proof participation in watershed management activities, thus, socio-economic status plays an important role in community participation. Geographic and logistical barriers also limit energetic participation in watershed-conserving acts. Garcia et al. (2020) pointed out that remote communities are always challenged with inadequate transport facilities and lack of access to information, which in turn affects their participation in these watershed management programs. These barriers have to be surmounted to spur community participation in sustainable practice.

Barriers to Community Participation

Numerous obstacles exist to public participation in watershed management despite well-understood engagement advantages. In the recent work of Decena et al. (2022), socio-cultural, community mistrust, and government barriers to effective development participation were highlighted. As pointed out in this

study, often community members do not really trust the local authorities' intentions and, as a result, have less participation in watershed activities. Health inequalities and the digital divide can impede awareness and participation, especially in poorer sections of the population. Quijano et al.'s (2021) study indicated that to shape comprehensive participation of communities against barriers, health and environmental education have to be incorporated in watershed management programs.

4. Recommendation

It envisions a comprehensive multi-pronged approach through awareness, capacity building, and the removal of socio-economical barriers to improving community participation in watershed management programs. Conduct awareness-raising educational campaigns to get the communities informed on the need for watershed management and their roles in protecting those critical resources. Hold workshops, seminars, and make local informational materials to fill knowledge gaps identified in different studies. Promote participatory decision-making processes that consider local knowledge. Such engagement can easily be achieved through establishing forums or community meetings. Establish incentive programs, like payment for ecosystem services, to propel community involvement. This alignment of economic benefits with conservation objectives might result in communities being more willing to engage in sustainable practices. Address socio-economic concerns among vulnerable communities by providing resources and support to financially disadvantaged communities. Increased access to education and economic ends will strengthen individual role effectiveness in watershed management. Create faith between community and local authorities by improving governance and ensuring transparency in watershed development initiatives. Mistrust and therefore collaborative relationships may be created by including community leaders in this process. Also include providing logistical support to remote communities by improving transport and communication infrastructure to participate in watershed management activities.

To improve community engagement in watershed management programs, a multi-faceted approach that emphasizes awareness, capacity building, and addressing socio-economic barriers is necessary. Develop campaigns targeting educational institutions to inform people about the need for watershed management and their responsibilities toward protecting these resources. Hold workshops, seminars and develop local informational materials to fill in the knowledge gaps identified in various studies. Encourage participatory decision-making processes that include local knowledge. Establish forums or community meetings to facilitate this. Introduce incentives such as payment for ecosystem services to incentivize community participation. The alignment of the economic benefits with conservation objectives might induce the communities towards participation in sustainable management practices. Address basic socio-economic concerns as well as providing resources and support for financially weak communities. As facilitating access to education and economic opportunities will empower people to become active agents in watershed management initiatives, it is necessary. Building trust between communities and local authorities through transparency and better governance should be priorities in watershed management initiatives. To assist overcome mistrust and develop collaborative relationships, community leaders can be part of these processes. And provide logistical support to these remote communities such as improving transport and communication infrastructure in order to facilitate participation in watershed management activities.

5. Conclusion

Empowerment of communities in watershed management requires a multidimensional approach covering

awareness, socio-economic constraints, and institutional barriers. Provide an enabling environment, and allow stakeholders to work together for sustainable watershed management that brings positive impacts to both environment and communities. Ongoing research and practical implementations of these strategies are a must for permanent watershed management improvements in critical areas as Panabo City, Davao del Norte.

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