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## ARTICLES

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*Rani Amor B. Serquiña, Ron Jay P. Dangcalan, Marife B. Dapito, Evangeline Buella-Mandia, Dana Stephanie M. Sandoval*

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### **Soil erosion control and nutrient cycling capacity of Palawan State University rubber plantation in Rizal, Palawan, Philippines**

*Frances Muriel L. Tuquero, Alexes Mae C. Diaz*

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# Table of Contents

|           |                                                                                                                                                                                                                                                                                       |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>v</b>  | <b>Editor's Note</b>                                                                                                                                                                                                                                                                  |
| <b>1</b>  | <b>Challenges and recommendations for long-term rehabilitation of Boac River, Marinduque, Philippines, 20 years after the Marcopper mining disaster</b><br><i>Rani Amor B. Serquiña, Ron Jay P. Dangcalan, Marife B. Dapito, Evangeline Buella-Mandia, Dana Stephanie M. Sandoval</i> |
| <b>41</b> | <b>Understanding the lived experiences of Filipino male victims of domestic violence</b><br><i>Diana Jane D. Badua-Oquendo, Bethany Claire A. Beronio, Fretz Akiko B. Ferolino, Riemuel Dave Z. Rocaberte</i>                                                                         |
| <b>63</b> | <b>Some psychological factors affecting the COVID-19 vaccine confidence of selected residents from Puerto Princesa City</b><br><i>Alvie P. Bergado-Timbancaya, Crisostomo M. Arenio, Jr., Angel Mickaela T. Castillo, Beatriz Danna G. Manota, Mary Micah B. Vitin</i>                |
| <b>83</b> | <b>Soil erosion control and nutrient cycling capacity of Palawan State University rubber plantation</b><br><i>Frances Muriel L. Tuquero, Alexes Mae C. Diaz</i>                                                                                                                       |

## **EDITOR'S NOTE**

Readers, researchers, and agents of resilience, we welcome you to this year's issue of the Asian Journal of Resilience. You will find a lot here to satiate your intellectual appetite. While the articles may seem unrelated, they are united in pointing out various challenges—environmental, social, and psychological—and how it may be possible, explicitly or implicitly, to draw upon various means to successfully navigate those challenges.

The article of Serquiña, Dangcalan, Dapito, and Buella-Mandia provides an overview of the 1996 Marcopper Mining Disaster in the province of Marinduque. But it does not merely stop at telling the history of this environmental tragedy. Their research article also examines the policies brought about to respond to its long-term disastrous effects and concludes by enumerating various policy recommendations that build on or even address the inadequacies of previous policies. The article illustrates the systemic nature of resolving environmental problems and how cooperation from various sectors is required to implement a truly positive change.

The next article, written by Badua-Oquendo, Beronio, Ferolino, and Rocaberte, highlights a different and oft-neglected (as the article pointed out) problem: the phenomenon of domestic violence directed towards male victims. While there are already optimistic strides towards systematically addressing abuses against women through policies and social initiatives, this provocative article shows that violence against men is also real and requires serious attention and response.

The third article by Bergado-Timbancaya, Arenio, Castillo, Manota, and Vitin brings us back to a worldwide phenomenon that we all faced and painstakingly endured: the COVID-19 pandemic. However, their research article narrows down on the issue of vaccine confidence and vaccine hesitancy among selected residents of Puerto Princesa City, identifying the various reasons that motivate the participants in forming their positive or negative assessment of the vaccine.

The fourth article by Tuquero and Diaz will inspire spirited discussion among environmental scientists and researchers as it concludes that “rubber plantation has better soil erosion control and nutrient cycling capacity than the adjacent natural forest.” With certain caveats in place, the article testifies that a difficult problem with wide-ranging consequences, such as soil erosion, may sometimes be addressed in various and even counter-intuitive ways.

Truly, all these articles accentuate the invaluable contribution of research in identifying neglected problems and exploring novel ways of finding solutions to certain problems. Indeed, while research is theory-driven, it should also be action-oriented, specifically action that seeks out or gestures towards solutions to real-life challenges. Implicit as it is, resilience remains at the heart of this journal's issue. So, as you, our dear reader, continue to confront new challenges ahead, we at the journal hope this issue will enliven your resolve to face those difficulties and become even more resilient.

Wishing everyone a joyful, resilient, and research-immersed year ahead!

***Ian Anthony B. Davatos***  
**Editor-in-Chief**

# Challenges and recommendations for long-term rehabilitation of Boac River, Marinduque, Philippines, 20 years after the Marcopper mining disaster



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## Abstract

For more than twenty years, the province of Marinduque has felt the negative effects brought about by the previous mining operations of the Marcopper Mining Corporation (MMC) and the 1996 Marcopper mining disaster that contaminated the Boac River system. The 1996 Marcopper mining disaster was the most significant in the chain of events that transpired with MMC's operation on the island. Eleven mining and environmental-related policies were examined, exhibiting both critical juncture and path dependence, which could be associated with the mining disasters in Marinduque. The identified challenges in the study were grouped into three main areas: environment, health, and governance — all of which impede the long-term rehabilitation of the Boac River. From the identified challenges, problem-fit programs and policy reform recommendations were formulated that could be utilized in future policy and program creations or revisions. This study assessed the challenges related to the policies and prospects for the long-term rehabilitation of the Boac River with the 1996 Marcopper mining disaster that could serve as a reference for future mining policy reform mechanisms.

## Keywords

*Marcopper, mining, mining disaster, policy analysis, causal loop diagram*

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## 1. Introduction

There needs to be more studies on the Marcopper mining disaster focusing on the country's social and environmental policies. The Marcopper Mining Disaster on the island of Marinduque in 1996 was one of the worst environmental disasters in the Philippines. It wreaked havoc along and within the surrounding areas of the Boac River (Coumans, 2002). It induced a wide-scoping effect on the Boac River system, making it challenging to craft an integrated approach toward rehabilitation. Therefore, a ridge-to-reef approach is essential, providing a holistic intervention by looking at the degradation of the upland environment and its impacts as it goes down to the delta (Panorama, 2019).



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There is a need to address wicked problems such as mining in terms of multiscale and multidimensional approaches in social technology and human ecology. Catastrophes on the same scale as the Marcopper Mine Disasters cannot be addressed by individual disciplines alone and by fragmented policy approaches. A multiscale perspective integrates the different operating factors that cut across global or local scales (Caprotti et al., 2020), while a multidimensional approach combines the cross-level, cross-national, cross-time, and cross-policy areas for a comprehensive policy understanding (Heisler & Peters, 1977). Human Ecology captures the human and environmental interrelationships concerned with the sustainability of the processes involved with change and the social dimensions of present or future arrangements in the system. To obtain such an inquiry, an integrated body of knowledge from various disciplines is necessary (Dyball, 2011). Concurrently, social technology pertains to the provisioning role of the ecosystem, its sustainability, and the value of human stewardship, which ensures human-ecological security that is facilitated by the individual aspects or combination of social processes, roles, functions, and structure (Mendoza, 2021). The topic can be categorized under the Climate Change and Disaster Risk Management (CDRM) thrust of the Social Development Management Program (SDMP) for community-based disaster risk management and social health.

The general objective of this study is to assess the challenges related to the policies and prospects for the long-term rehabilitation of the Boac River 20 years after the Marcopper mining disaster. Specifically, it aims to:

1. discuss the significant events in the Marcopper mining disaster in Marinduque;
2. identify the mining and environmental-related policies in the context of the 1996 disaster;
3. examine the challenges in mining and environmental-related policies and programs implementation toward long-term rehabilitation of mine-affected areas in Boac River, Marinduque, and
4. recommend policy and program mechanisms to facilitate long-term rehabilitation of mined-affected Boac River, Marinduque areas.

This study is a policy analysis of mining and environmental-related policies concerning the Boac River system, which was the site of the 1996 Marcopper mining disaster. Therefore, the insights gathered solely apply to the Boac River system. This study encompasses a ridge-to-reef approach to the geographic characteristics of the entire Boac River system. Moreover, this study did not capture variations in the policies implemented in the nearby Mogpog River and Calancan Bay. The Mogpog River and Calancan Bay are located in different localities not situated along the path of the Boac River, making the policy analysis invalid in their case.

In addition, this study did not conduct any quantitative impact assessment. The study investigated the perceived relationships between the emergent themes aligned with the objectives of the study using a causal loop diagram. There is also a possibility of a recall bias due to the time difference between the occurrence of the disaster and the conduct of this study. A triangulation of data between the key informant interviews (KII) and primary and secondary documents was done to eliminate or reduce the recall bias in this study. Lastly, focus group discussions (FGD) were obtained with permission from the study of Mandia (2023) and incorporated into the results and discussion of the study.

The policy analysis framework on the Marcopper Mining Disaster is adopted from the Cultural Adaptation Template from Dyball and Newell (2014) and the Critical Junctures and Path Dependence Framework from Dangcalan et al. (2020) and Coleman's (1986) Boat Model (See Figure 1). The social and ecological aspects of the policy analysis were captured by combining the three frameworks. The framework color coded the macro, meso, and micro levels from Coleman's Boat Model. Macro refers to the policies and institutions, meso refers to the organizational level, and micro refers to the individuals in the community that deal with development capacity. The feedback mechanisms of the causal loop diagram demonstrate the linkages of the emergent themes in the policy analysis as demonstrated by the Cultural Adaptation

Framework. In addition, the previous and ongoing impacts of the Marcopper mining disaster were analyzed using Critical Juncture and Path Dependence.

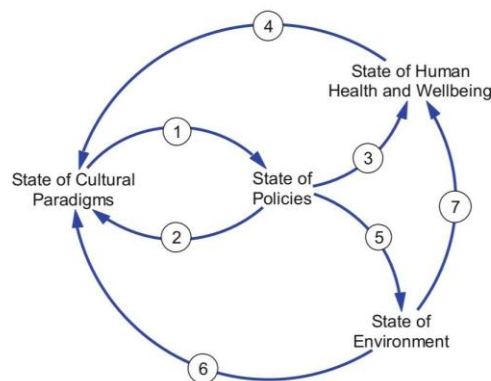


Figure 1. Social-Ecological Policy Analysis Framework on Marcopper Mining Disaster Adopted from Dyball and Newell (2014) and Dangcalan et al. (2020)

## 2. Methodology

### 2.1. Study Area

The province of Marinduque, known as the “heart of the Philippines,” is a part of the Luzon Island group located in the Mindoro-Marinduque-Romblon-Palawan or MIMAROPA Region. Marinduque’s land area spans 952.58 square kilometers with a population of 239 207 according to the 2020 census, wherein the computed population density is 251 inhabitants per square kilometer. The island’s population represents 7.41% of the MIMAROPA Region’s total population, 0.38% of the Luzon Island group, and 0.22% of the Philippine population (PhilAtlas, 2022).

The locale of the study is the Boac River Basin which is situated in Boac, Marinduque, Philippines. It cuts across minor portions of other municipalities in the island province. Boac is a first-class municipality that serves as the provincial capital in the island province of Marinduque. It is a coastal municipality consisting of 61 barangays with a 212.70 square kilometer land area accounting for 22.33% of the total area of Marinduque. The Boac River Basin consists of upstream, midstream, downstream, and coastal areas that run through 11 barangays in the locality (See Figure 2).

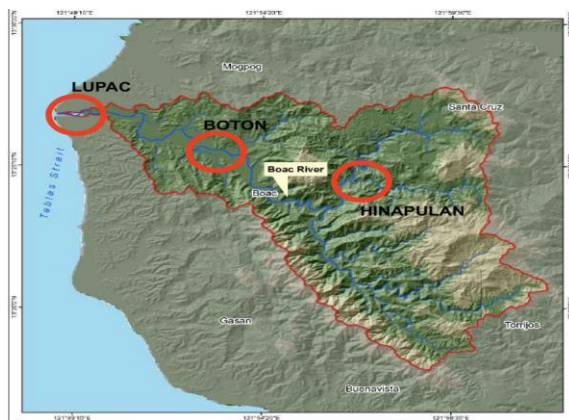


Figure 2. The location of the Boac River Basin taken from the study of Mandia (2023)



## 2.2 Research Design

A qualitative research method design was used in this study as it involved the observations of various facets of causal or descriptive inquiry. These various facets were addressed through fragments of non-comparable observations in which the answers to the inquiry are inferred. This method is appropriate for this research as it addresses the study's objectives using non-comparable observations.

## 2.3 Data Collection Procedures

Key informant interviews were conducted to gather more in-depth and complete answers to the study's objectives. The KIIs were done face-to-face and through the Zoom platform, which was subject to the availability of the informant for a more comprehensive data collection. The informants for the KII were policymakers, experts, and representatives from the academe and non-government organizations who were knowledgeable and provided insights about the history and impacts of the Marcopper mining disaster, and the significant policies related to the disaster and its aftermath.

Primary and secondary data were used to identify the significant events and the mining and environmental policies related to the Marcopper mining disaster. The primary data for the study were identified from the KIIs. Published and publicly available data on different data sources, such as libraries, government records, and legal websites about the Marcopper mining disaster and the mining and environmental policies, served as the secondary data for the study. The FGDs conducted in 2021 by the team of Dr. Evangeline Buella-Mandia of the College of Environmental Studies, Marinduque State College, were used in the study with permission. These were used in triangulating the data from the themes that emerged in the policy and KII.

Ethical considerations were observed in the conduct of this study, including having (1) informed consent, (2) confidentiality, and (3) cultural considerations and sensitivities. In addition, a letter of request seeking participation and a schedule for the most convenient time for the interview was sent to the key informants. Pertinent rules on research ethics for undergraduate thesis of the University of the Philippines Los Baños were followed throughout the research process.

## 2.4 Method of Analysis

Content analysis of policies and thematic analysis for KII and FGD were used for data analysis. To shortlist the mining and environmental policies to be analyzed in the study, those identified by key informants during rapid KII were used to determine the most relevant laws and policies, as more than 300 mining policies were identified yet exhibited replication. These were triangulated with Mandia's (2023) study. Furthermore, a full interview was conducted with the study's key informants to gather more policies and programs for analysis. The repealed or amended policies were included according to their significance to the national mining laws to obtain a chronological component of the policy analysis. The eleven (11) most significant policies for the study were analyzed according to their year of implementation, key provisions, strengths, and weaknesses.

The significant events in the Marcopper mining disaster were identified through a thematic analysis of the data gathered from the KII to determine the cumulative narrative of the key informants. Likewise, thematic analysis was used to analyze the mining and environmental policies related to the Marcopper mining disaster. The policies gathered from the rapid KII and the list of policies from the study of Mandia (2023) were included for analysis with the exclusion criteria to avoid repetition. Moreover, identified policies from the KII were included, and previous relevant mining policies from secondary sources were included for the chronological analysis of the policies enacted. The final list of mining and environmental policies was compared to distinguish the similarities and differences in their key provisions. The strengths and loopholes were also identified parallel to the case of Marcopper Mining Corporation (MMC) and Marinduque to examine the policies further.

The challenges and recommendations were analyzed through thematic analysis. In thematizing the challenges identified for analysis, the research objectives served as the basis for identifying and organizing the themes per objective. Emergent themes were then identified from the raw data in line with the research objectives that were input in a thematic analysis table for the causal loop diagram (CLD). Lastly, the recommendations analyzed through the thematic analysis were patterned with the identified challenges through a gap vs recommendation analysis for more problem-fitted data relevant to the study.

### 3. Results and Discussion

#### 3.1 Significant Events in the Marcopper Mining Disaster

The significant events in the Marcopper mining disaster include the events that led to the 1996 mining disaster and the events that transpired after, encompassing present circumstances in the affected areas (See Figure 3). The discussion is presented chronologically and divided according to the date of the events that transpired, drawn from the narratives of the key informants in Marinduque and environmental and mining experts. The results were framed using the lens of the people and the literature.

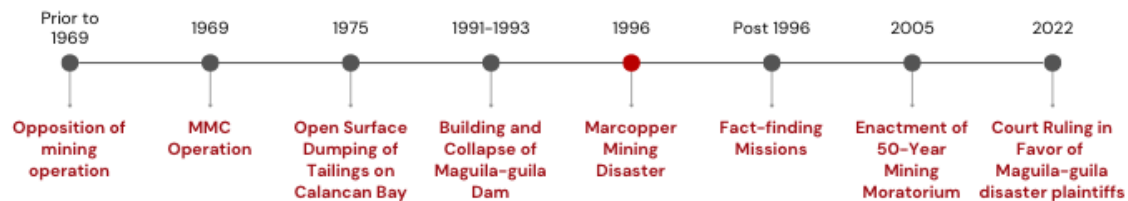


Figure 3. Historical timeline of the significant events in the Marcopper Mining Disaster

##### 3.1.1 Opposition of Mining Operation

Before the Marcopper Mining Corporation (MMC) operation in the province of Marinduque, it was found that some of the residents of Marinduque rejected a mining operation on the island, wherein rallies transpired to try to stop the proposed operation. This sentiment was echoed in the findings of Coumans (2002), in which MMC proceeded with their mining operation despite the lack of permission from the residents.

##### 3.1.2 MMC Operation

The economic benefits that the province might obtain from the mining operation outweighed the disapproval of some residents, which paved the way for the establishment of mining in the province. Along with the operation of MMC came the establishment of boarding houses and eateries for the company's workers around the mine area. The whole industry brought job opportunities to the residents and potential tax gains for the local and provincial government.

This finding illustrates the government's economic priority at that time regardless of the citizens' concerns and the environmental repercussions of mining. Moreover, the continuity of the enforcement of the operation of MMC in the province despite the people's opposition exhibited the unequal power relations that are tilted towards the corporate entities and elites. Enabling the mining operation of MMC would bring



additional economic benefits to the people involved in such power relations, including President Marcos Sr. as the co-owner of the mining company.

### **3.1.3 Open Surface Dumping of Mine Wastes on Calancan Bay**

Another significant event determined before the 1996 disaster was the documented government permission by the Pollution Adjudication Board to let the company conduct open surface dumping of mine wastes on Calancan Bay, which, according to KI003, was approved on November 2, 1975, and began on October 30, 1975. This was documented as the “blanket permit” given to MMC in the study of Tauli-Corpuz (1996). The residents of Calancan did not approve of the dumping method. Therefore, protests erupted as residents disagreed, and many noted the report from the National Pollution Control regarding open surface dumping. At this time, years after the dumping of mine tailing on Calancan Bay, physical illnesses of residents were reported, including cases of death. These were purportedly attributed to the dumping of mine tailings. Despite these events, then President Marcos Sr. signed a letter to continue the dumping of tailings on the Calancan Bay, which was documented by the Marinduque Council for Environmental Concerns (MACEC), an environmental non-government organization in the province. This was also captured by McDonald and Southall (2005), where the authorized dumping method in the blanket permit was through submerged ocean disposal that MMC did not do yet the national government still kept the validation of the permit.

After more than a decade of tailings disposal on Calancan Bay, a coast-way was formed made of piled-up mine tailings that are still visible today, as stated by KI003, which were the sources of heavy metal contamination on the marine life and health of the residents. This further resonates with the government's economic priority by allowing MMC to continue the tailings dumping on the waters of Calancan Bay despite the health implications to the residents and damage to marine life. In addition, the co-ownership of then-president Marcos Sr. to MMC (McDonald & Southall, 2005) indicates a personal interest in the resumption of Marcopper's activities using his executive power over national borders; this was also observed by a few of the key informants in the study. Furthermore, the dumping of mine tailings in Calancan Bay was deemed “legal” with the permission of the national government. This shows the corroboration of the previous Government administrations to the degradation of Calancan Bay. Therefore, the Philippine government was accountable for allowing the dumping of mine tailings in Calancan Bay over two presidential terms.

### **3.1.4 Building and Collapse of Maguila-guila Dam**

After changes in administration and the transfer of tailings dumping to the depleted Tapan Pit (Igual et al., 2018), the next significant events transpired with the building and collapse of the Maguila-guila Dam. According to key informant number 3 (KI003), the building of the Maguila-guila Dam was opposed by the residents of Marinduque, particularly in the surrounding areas of the Mogpog River. However, similar to previous rally initiatives, the building of the Maguila-guila Dam persisted. The dam was constructed to contain the silt from the Tapan Pit to prevent it from flowing to the Mogpog River, but in only a year, the dam could not hold its contents, leading to its collapse in 1993. The documented immediate effects of the collapse gathered from the KII were parallel with the findings of McDonald and Southall (2005), where the houses, livelihood, and livestock of the residents residing along the river were washed away by the flood, including the death of two children all without compensation. Before the disaster, the research findings of KI009 proved that the people already detected visible damages and hints of defects, and no course of action was taken. Until now, the Mogpog River has been declared biologically dead by the Department of Environment and Natural Resources (DENR) due to the disaster of the Maguila-guila Dam collapse in 1993. MMC's inaction to the dam structure's defects hints at their need for responsibility in properly implementing their mining activities in the province. Moreover, a lack of accountability can be observed from the total absence of compensation to the affected residents of both the Maguila-guila Dam incident and the Calancan Bay case.

Before the 1996 disaster, the statements of KI006 and KI007 revealed the release of MMC's wastewater containing heavy metals to the Boac River. This was observed during heavy rain when fish in the river died, and the wastewater was described as 'muddy' and yellowish. The release of wastewater to the Boac River was said to have been done about ten times before the 1996 disaster and may have been due to the company's fear of an overflow or leak in the Tapan Pit. This finding supports the report by De La Cruz (2017) wherein MMC tried to release built-up pressure in the tailings dam because of the design mistakes of the structure. Undeterred by the allegations, MMC denied ever releasing wastewater containing heavy metals to the Boac River despite the observed changes to the water and the sudden death of fish in the river when the incidents happened. However, Lindon et al. (2014) found that river-related industries in Boac had already been negatively affected before the disaster in 1996. Marcopper's rejection of these claims indicated two reasons: the lack of responsibility for their actions and negligence to the affected communities, and the lack of monitoring of their mine structures enabled an overflow of the wastewater during heavy rains. These were both unacceptable, especially in conducting mining operations, whether small or large in scale.

### 3.1.5 Marcopper Mining Disaster

The most significant event based on the answers of the key informants was the 1996 disaster itself, wherein the plug of the drainage pipe in the Tapan Pit ruptured, and the tailings flowed from the source to the mouth of the river. The key informants residing along the river recounted it being full of mud with a bad scent, as KI005 described it as sulfuric or with a hint of ammonia. The Hinapulan area, the first barangay that the spill passed through, was severely isolated, and supplies could only be obtained through air delivery or transport. The muddy description of the floodwater and the isolation of Barangay Hinapulan were like the data of Tauli-Corpuz (1996).

Right after the disaster, KI006 mentioned that fish and even the plants on the river were no longer present for their livelihood and consumption. The residents' water sources near the river were also limited after the disaster as they relied on deep wells for water consumption that became contaminated with heavy metals. De La Cruz (2017) also documented these negative effects, adding the declaration of the Boac River as "dead" by the government. Regarding the residents' water supply, the same key informants answered that MMC provided funds to the water-affected barangays to establish water refilling stations and irrigation systems for farming as a rehabilitation effort of the company. The answers of the key informants regarding the water supply rehabilitation efforts of MMC revealed the company's effort in helping the affected communities as the disaster caused by their mining activity destroyed the river and water sources of the residents.

### 3.1.6 Fact-Finding Missions

A series of fact-finding missions were conducted after the disaster that corrected previous testing and studies that showed normal results concerning the waters and the state of MMC's mine structures. According to KI003 and KI009, the results of these new data showed the presence of heavy metals in the waters of the Boac River and the defects in the structures of the Maguila-guila Dam and Tapan Pit. These called for actions from the Marinduque residents to immediately rehabilitate the mine-affected areas and the existing mine structures of MMC. This was critical since the previous studies were said to have been controlled to prevent the mining company from conducting further efforts to do the rehabilitation. However, without having this information checked, the negative effects on the health of the residents near the river would have been worse than the recorded data at that time.

The proposed river rehabilitation of MMC was through submarine tailings disposal (Coumans, 2002),



which the residents and the local and provincial government did not approve. However, KI003 recounted that the DENR and the provincial government almost agreed to the proposed disposal method, and KI001 supports the statements that the method was preferred because it was the cheapest rehabilitation method but banned in Canada. The local government and MACEC recommended submerging the tailings and containing them underwater beside the beaches on the river mouth for reclamation. This will also increase the land area, which will benefit the municipality. However, this was more expensive than the proposed submarine disposal, so MMC did not acknowledge it as a rehabilitation alternative. According to KI006, this rehabilitation method was not approved by then-Boac Mayor Engr. Madla since he wanted MMC to conduct a permanent rehabilitation effort, and the submarine tailings disposal was not deemed as a viable method for permanent rehabilitation.

The disapproval of the provincial government was also influenced by the rally initiatives of the people headed by MACEC due to the environmental damage that the submarine tailings disposal might pose to the marine ecosystem. This finding was similar to the narratives and documents gathered from previous studies, which show MMC's unwillingness to pay more for rehabilitation, which may include negligence of their mine structures that led to the disasters encountered.

### **3.1.7 Enactment of 50-Year Mining Moratorium**

With the pending status of the promised rehabilitation of MMC, the residents were still left with heavy metals on their rivers and waters. Some key informants stated that they expressed dissatisfaction through a series of rallies. Campaign signatures were also made to ban mining in Marinduque, supported by all 61 barangays in Boac, as mentioned by KI006, KI007, and KI008. The rally initiatives and campaign signatures paved the way for the 50-Year Mining Moratorium exclusively for the province of Marinduque, which states the ban on mining operations on the island. Documents from MACEC also contained different barangay no-mining and no-mining resolutions for several municipalities, including Sta. Cruz, the host municipality of MMC. This was very significant as it shows that the mobilization of people in Marinduque, despite their continuous failed attempts, can still bear successful results in their motion to ban mining in the entire province due to the cumulative negative effects experienced by the residents from the mining operation of MMC.

Impediment to the no-mining moratorium in Marinduque was the lifting of the 50-year Mining Moratorium in 2021 by the previous president, Duterte, before his presidential term ended in 2022, which was mentioned by a few of the key informants. This was objected to by the local government establishing Resolution No. 2021-074: A resolution declaring the protest and opposition of the municipality of Boac to EO No. 130, S. 2021, and reiterating the stand of the people of the Boac, Marinduque against mining. This resolution strengthened the people's stand against mining in Marinduque, securing the 50-year moratorium in the province.

### **3.1.8 Court Ruling in Favor of Maguila-guila Disaster Plaintiffs**

A year after the enactment of the lifting of no mining moratoriums, a significant event happened related to the disasters brought about by MMC. Some of the plaintiffs of the Maguila-guila Dam collapse won their case filed in 2001 through a regional court ruling in Marinduque. Most KIs relayed this as it was perceived as a step forward to the multiple cases filed against the mining company. The victory was a beacon of a long-held hope; however, KI003 mentioned that the court ruling might change in the higher court. Despite the uncertainties with the results of the cases, the plaintiffs and the people of Marinduque will remain hopeful and continue to fight for their long-awaited justice.

### 3.2 Mining and Environmental-Related Policies

The mining and environmental-related policies identified were sourced from the responses of the key informants and from secondary data accessible to the public (See Figure 4). The major policies were listed from the rapid KII and the more than 300 mining and environmental-related policies with the exclusion criteria of repetition. The listed policies were then triangulated with the most relevant policies in the Marcopper mining disaster identified in Mandia's (2023) study. Further triangulation and policy gathering were done through the conducted full KII. The remaining listed mining and environmental policies were obtained from the repealing clauses of the selected policies for the chronological analysis of the enforcement of the laws. This discussion investigated the identified policies, year of implementation, key provisions, strengths, and loopholes for analysis (see Appendix A).

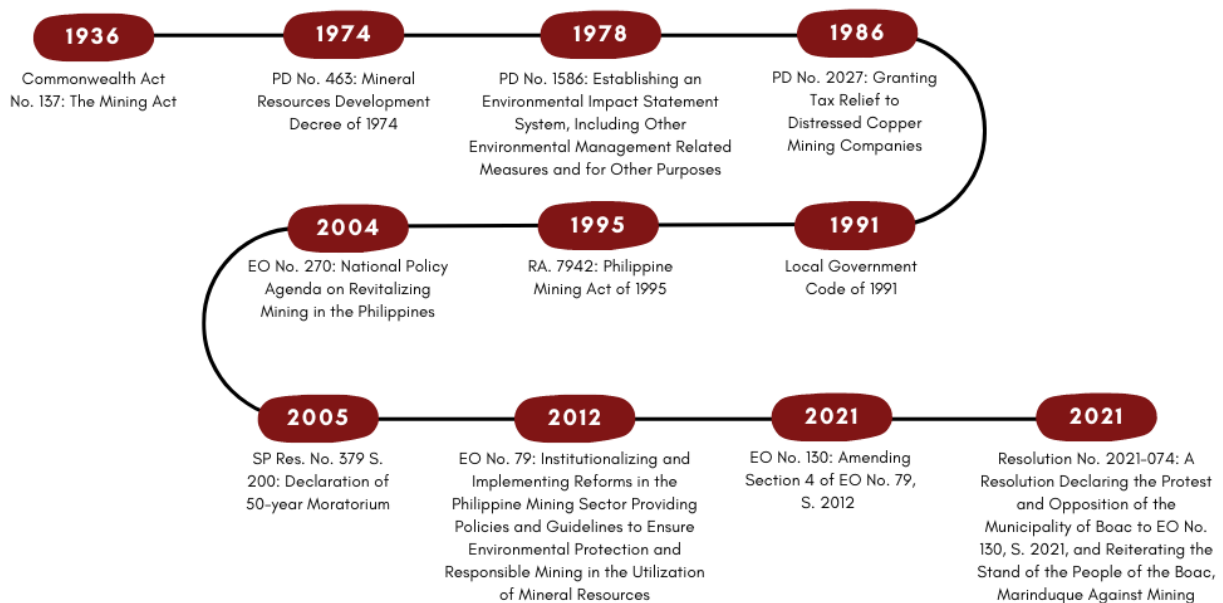


Figure 4. Chronological order of the analyzed mining and environmental-related policies

**Commonwealth Act No. 137: The Mining Act.** The Commonwealth Act No. 137 was enacted in 1936, almost four decades after the Philippines declared independence from the Spanish colonization, but was still during the American colonization. Therefore, this law would still have American influences compared to the other policies discussed under this objective. The Mining Act was deemed relevant in this policy analysis as it is the first mining act of the Philippines, making it the basis of succeeding mining acts wherein it was subsequently repealed by so. In terms of its contents, the First Mining Act was quite primitive as it housed sections that mostly declared mineral land claiming and the processes of securing the lease for mining. Despite its primitiveness as a mining act, its key provision on pronouncing the president's authority in proclaiming land classifications through executive power is still being upheld today.

In addition, mineral ownership is only 40% for foreign partners in the mining operation. However, due to the country's status as an American colony, a weakness of the law was that Americans at that time were given the same rights as Filipinos in acquiring a mineral land lease. The equal opportunities for US citizens in the Philippines in mining may override the paying capacities of normal Filipinos at that time to start their lease agreements. This, in turn, would not benefit Filipinos' economic growth but would benefit the Americans. Further weaknesses of the law include the continuity of the mineral lease even when the mineral lands are proclaimed into reserves and that reserves can be converted into mineral lands when



deemed valuable for mineral extraction. This indicates the government's economic priority in the extractive industry even at the conception of this first mining act. A striking strength of this law is the prohibition of government officials or employees with functions in and related to mineral processes from acquiring mineral land leases, as it somewhat secures the absence of possible political under-the-table agreements in line with mineral extraction. Moreover, the government has the power to regulate the auxiliary rights of leaseholders to ensure that resource supplies are equitably distributed and not monopolized. The rules and regulations on mine sanitation, tailings disposal, and easement drainage in the act make the Mining Act commendable regarding pollution control despite its early formulation.

**PD No. 463: Mineral Resources Development Decree of 1974.** Succeeding The Mining Act almost four decades after is the Mineral Resources Development Decree of 1974, which declares all public and private lands as state-owned and reserves the president the authority to convert reserved lands for mineral extraction purposes. A strength of the policy is introducing safe operation, sanitation, and pollution control laws and regulations for mining contractors' compliance with health and environmental safeguarding, which was not highlighted in the previous act. However, weaknesses of the policy were identified. The government's inclusion in the mineral extractive industry was now enforced as the government could use closed mineral deposits through the operation of selected agencies or contractors. This implies the government's awareness of the profitability of extractive industries that might have paved the way for mineral contractors to operate on more than one mining location in a certain province. However, the weakness of the policy is that it allows a five-year tax exemption for income tax on new mining contracts upon the approval of the mining application. This tax exemption incentive would be observed in the other laws pertinent to mining.

**PD No. 1586: Establishing an Environmental Impact Statement System, Including Other Environmental Management-Related Measures and for Other Purposes.** Following the first presidential decree in mining enacted by President Marcos Sr., PD 1586 exhibited its strength by establishing the Environmental Impact Statement System (EISS) that would monitor the environmental impacts of extractive industries through environmental impact statements. This policy recognizes the importance of balancing socio-economic growth with environmental protection mechanisms compared to the previous presidential decree. The Environmental Compliance Certificate (ECC) was created as a requirement in mining applications in critical areas, projects, and undertakings. However, the main loophole of the law is the non-applicability of the ECC to areas declared as non-critical, which would only partially capture the environmental impacts of mining in the country.

**PD No. 2027: Granting Tax Relief to Distressed Copper Mining Companies.** The third presidential decree of President Marcos Sr. explicitly states the suspension of accumulated taxes and other fees of distressed copper mining companies in the country, which is essentially its weakness. Due to its low market value, the law's intention, its identified strength, was to act as a cushion for copper investment. Therefore, as a mitigating factor in ensuring the continuous operation of distressed copper mines, the accumulated taxes, fees, and other charges to the selected mining companies were waived for an unspecified time. At this time, the president still co-owns Marcopper Mining Corporation in Marinduque, which would also imply some personal interest in enacting the law. However, a loophole in the presidential decree is that it needed to include specific inclusion criteria for the classification of distressed mining companies, making evaluating and certifying distressed companies easier for the Ministry of Trade if a criterion was given.

**Local Government Code of 1991.** Relevant to Marinduque's stance on mining is the Local Government Code of 1991, whose strength stems from the proclamation of the autonomy and jurisdiction of local government units (LGU) in their territories. This policy allows LGUs to implement their own rules and regulations with the guidance of the national government to ensure that they align with existing national policies and interests. This enabled the passing of various no-mining resolutions, ordinances, and the moratorium in Marinduque relevant to their cumulative advocacy on mining.

Aside from its core intent in decentralization, the inclusion of local sustainable development is promoted to secure an ecological balance in local territories; therefore, policies deemed sustainable in this sense

were locally made. Moreover, the Local Government Code of 1991 recognizes the role of non-government organizations as key players in the Government. This recognition paved the way for the active involvement of MACEC as a non-government organization in Marinduque in mining and environmental matters such as the Marcopper mining disasters and the filed legal cases against MMC. Despite the inclusion of sustainable development in this policy, outdated calculations and tax recommendations would impede local economic development as the values are not updated with the increase in inflation, which is the main weakness of the law.

**RA 7942: Philippine Mining Act of 1995.** The Philippine Mining Act of 1995 fully repels its predecessor, The Mining Act, as an updated mining law for mining rules and regulations. It declares all mineral resources as State-owned compared to “Filipino-owned” from the former and that the State is responsible for overhauls in rational processes in mining extractive industries. The strengths of the law include the social and environmental safeguarding mechanisms in place to protect the rights of indigenous cultural communities to their ancestral domains. In addition, such ancestral lands with mineral deposits shall only be opened for mineral agreement upon the approval of the concerned indigenous cultural communities. However, this weakness is that the given process might not secure a fair or unprejudiced agreement as the law does not include specific agreement processes between concerned parties. Upon approval of the mineral agreement, the indigenous cultural communities will be granted royalties and other fees. The amount will be based on their negotiations with the mining company. If disagreements arise between mutual agreements, the final decision will be up to the set Panel of Arbitrators composed of two members from the Philippine Bar and a recommended licensed engineer by the Bureau which is an identified weakness. Bias members toward the mining company will lead to losses for the indigenous cultural communities.

Aside from indigenous cultural domains, areas under the National Integrated Protected Areas System (NIPAS) are prohibited from mining operations and activities. However, another weakness is that mineral resources can be utilized for mining operations through mutual agreements. In addition to the weaknesses of key provisions of the Philippine Mining Act of 1995, the auxiliary mining rights provided to the mining entities were revised to be exclusively used only by the mineral extractors, prohibiting surrounding communities from a shared utility and reducing their access to basic resources. Furthermore, the assignment or transfer of mineral agreement during mine operation cancellation or abandonment is subject to the approval of the DENR Secretary, which would be deemed approved if not signed 30 working days after application. This would enable mining contractors to flee in times of mine disasters or other incidents related to the negative effects of the extractive industry on health and the environment, which is the main weakness of the law.

**EO No. 270: National Policy Agenda on Revitalizing Mining in the Philippines.** With the environmental movement that transpired in the ‘80s to the late ‘90s, President Arroyo enacted a policy to maintain the essence and significance of mining in the economy. Stated is the Government’s promotion of the “responsible exploration, development, and utilization” of mineral resources to enhance economic growth in the country. The strength of the policy is the formulation of a Mineral Action Plan (MAP) as implementing guidance for mineral exploration, development, and utilization to ensure that mineral extractive industries operate responsively and accordingly in line with this policy. However, the law’s weakness is the country’s opening to mining as a key component in economic development.

A different approach in this policy is the stated priority towards the remediation and rehabilitation of abandoned mines to address their negative impacts that might have been influenced by the 1996 Marcopper mining disaster that caught national and international attention and concern. Therefore, the utilization of efficient technologies was promoted in mineral extraction that aims to lessen the



environmental impacts of mining. However, the weakness of mining companies' presence and usage of such technologies is that they cannot be ascertained through policy monitoring mechanisms. Moreover, the provisions of the law were not comprehensive in covering the descriptions or the implementing mechanisms for complete enforcement.

**SP Res. No. 379 S. 2005: Declaration of 50-year Moratorium.** The most significant mining policy in the context of Marinduque, the host province of MMC, as identified by Mandia (2023), is the 50-year moratorium in the province, with its strength in the declaration of Marinduque as a mining-free zone after the 1996 disaster. This was promulgated from several resolutions in the province prohibiting mining operations (Mandia, 2023). The 50-year moratorium was established by the Sangguniang Panlalawigan in 2005 and should be in effect until 2055. However, the weakness of the moratorium is its policy status as a provincial moratorium that does not assure its temporary effectivity, as national laws can overthrow provincial moratoriums in the pursuit of reopening the province for copper extraction. Nevertheless, the 50-year moratorium still holds strong with the support and conviction of the residents of Marinduque.

**EO No. 79: Institutionalizing and Implementing Reforms in the Philippine Mining Sector Providing Policies and Guidelines to Ensure Environmental Protection and Responsible Mining in the Utilization of Mineral Resources.** This mining policy differs from the rest of the identified national policies on mineral extraction in the strength of its provision, as it states the closure of critical, protected tourism areas and prime agricultural lands to mining applications. This is in line with the environmental mechanisms of the provisions of the law. In addition, only existing and active mining corporations in the country were allowed to conduct mining operations. However, this weakness is that mining operations are subject to monitoring and review by the DENR which could be politicized. A public bidding process was also included in the opening of mineral sources and disposition of abandoned ores and mine wastes that would ensure a higher price and information dissemination to the Filipino people. Moreover, the provision of the law encourages public consultation in terms of developing mineral reservations for utilization. Despite these efforts to monitor the mining industry, the weakness of the policy is the establishment of a one-stop shop for all mining applications and procedures that enables a faster and more convenient process. This attracts and encourages existing mining corporations to pursue active operations in the declared open areas for extractive development. This weakness implies that if there are more mining concessions, the number of mining applications will increase. The increase in mining applications corroborated by a corrupt and inefficient government will lead to irresponsible mining practices of mining corporations.

**EO No. 130: Amending Section 4 of EO No. 79, S. 2012.** A recent policy relevant to the previous and the most significant policy of Marinduque is EO 130, which President Duterte enacted. The weakness of this policy is the direct amendment of Section 4 of the previous policy to re-open the country's mining industry to international contractors for economic development. Herein, it is stated that mining moratoriums in the Philippines be put in infectivity according to the new mineral agreement of the Philippine Mining Act of 1995. The inclusion of mine safety and environmental policies in the rules and regulations of this policy secures its intention to ensure environmental protection and responsible mining in the country as its strength. However, the main weakness of this policy is that the lifting of no mining moratoriums conflicts with the local autonomy and jurisdiction stipulated in the Local Government Code of 1991, as it supersedes the jurisdiction of local governments over their territories. This exhibits the wide range of discretion of the president in terms of initializing mining agreements in areas not open to mining for National economic development.

**Resolution No. 2021-074: A Resolution Declaring the Protest and Opposition of the Municipality of Boac to EO No. 130, S. 2021, and Reiterating the Stand of the People of the Boac, Marinduque Against Mining.** As an objection to EO 130, Resolution No. 2021-074 was enacted in Boac, Marinduque, to support the province's no-mining direction. The strength of this policy is its explicit objection to lifting the 50-year mining moratorium that has kept the island free from mineral mining for more than a decade.

This policy is still in effect, as well as the 50-year moratorium of Marinduque. However, the weakness of this policy is its form of a municipal resolution that is not as established as an ordinance that might be

changed in the future. A stronger mining policy is necessary to ensure the continuity of the no-mining direction of the province.

From the voices of the community, it was determined that MMC could contribute positively to the infrastructural aspect. The participants of the FGD answered that MMC built a daycare center, a small market, a Barangay Hall and court, roads, and bridges. This testifies to the social responsibility of MMC during the time of its active operation. However, the findings of this study showed that MMC used the supposed rehabilitation fund in building these infrastructural developments as a responsibility of the mining company toward the development of the mining community. On the other hand, the FGD data also indicated that negative health and environmental changes were shared throughout the operation of MMC in Marinduque. The participants of the FGD answered that during the mining operation, the agricultural yield of farmers decreased, the waters turned greenish, floods occurred from water-letting, and the plants in the rivers died. The iterated health effects were skin diseases and death due to heavy metal poisoning from water contamination through open wounds. This indicates that even with the environmental protection mechanisms and safeguarding provisions of the national mining policies enacted by President Marcos Sr. and the Philippine Mining Act of 1995, mining activities can still present destructive effects on the ecosystem. These effects may be due to problems with the mine structures or the lack of policy enforcement of the existing mining laws.

From the chronology of implementation of the identified mining and environmental-related policies, critical juncture and path dependence were observed with the determined significant events. The enactment of policies like the PD 1586, RA 7942, or the Mining Act of 1995 intends socio-economic development consideration and safeguards the environmental aspect. However, changes in governance affected its strict implementation, policy changes, and translation in local settings, specifically in the case of MMC in Boac, Marinduque. The significant events in the timeline of the Marcopper disaster shaped the people's awareness, local government empowerment, and MACEC as an active civil society in the area to pursue environmental justice. The small wins, such as the Declaration of the 50-year moratorium on mining, have been achieved amidst roadblocks, and policy changes can be considered critical junctures in their fight for justice. Analysis of the 11 policies related to the mining in Boac, Marinduque suggests a path dependence tendency due to policy changes such as the EO no. 130, which the past President Duterte enacted. The latter also suggests the need for a more vigilant watch both at the local government and civil society of Boac, Marinduque to keep their flight for justice, which includes persistent implementation of the Moratorium on No-Mining in Marinduque and rehabilitation of the Boac river system, among others.

The change in the processes of mining applications to the implementing agencies for their subject functions indicates that the present mining laws are still not permanent, and revisions still must be made that could cater to the best interest of the Filipino people. Regardless, the policies enacted by Marinduque signify their objection to mining in their territories, which is evident in the policies that transpired in the latter parts of the discussion; however, their indefinite effectivity due to the nature of the policies still persists.

### **3.3 Challenges in Policy and Program Implementation Toward Long-Term Rehabilitation of Mine-Affected Areas**

The challenges in policy and program implementation toward the long-term rehabilitation of mine-affected areas in Boac River, Marinduque, due to the 1996 Marcopper mining disaster, are identified through a thematic analysis of the answers obtained from the KIIs. The themes were plotted based on their human-environment system, and the variables' linkages were color-coded according to their social structures. From the identified themes, the linkages between three major impact areas were observed:



environmental, health, and governance. The interrelationships of relevant themes from these areas are interlinked through a causal loop diagram in a Cultural Adaptation Template (CAT) that presents the entire problem space for further analysis (See Figure 5).

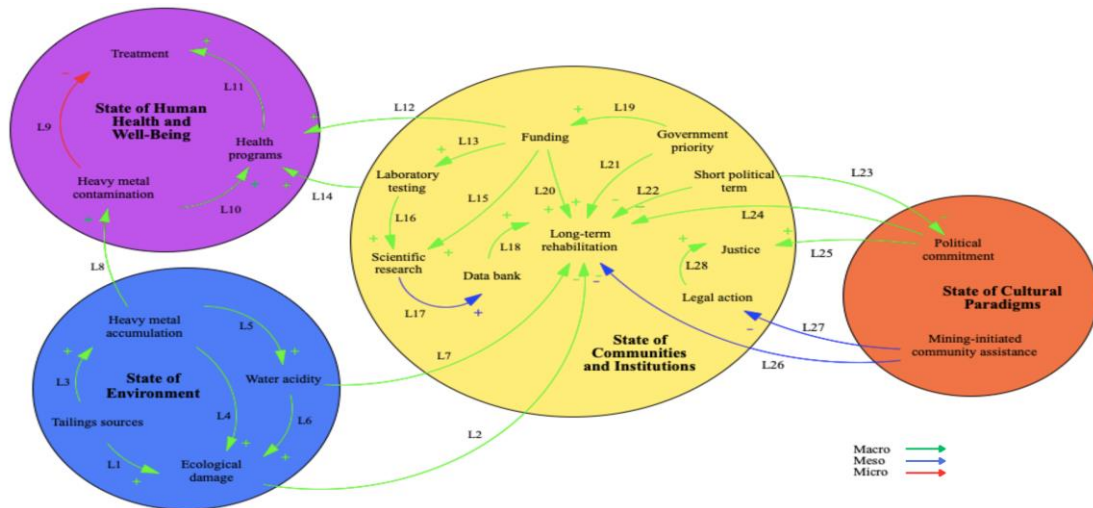


Figure 5. Causal loop diagram of the identified challenges in policy and program implementation toward long-term rehabilitation

The environmental challenges encapsulated in the state of the environment in the CAT are exhibited from links 1 to 8 in the causal loop diagram (See Table 1). The feedback loop trend depends on each variable's direction, wherein reinforcing trends respond similarly while balancing trends exhibit opposite outcomes (Crabolu et al., 2023). The variables include the tailings source, ecological damage, heavy metal accumulation, and water acidity.

Table 1.

Linkages in the Environmental Challenges of Policy and Program Implementation

| Link | V1                           | V2                           | Trend       | Description                                                                                                                                                                                                                                                 |
|------|------------------------------|------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L1   | Tailings sources (+)         | Ecological damage (+)        | Reinforcing | The presence of this tailings source leads to the increasing ecological damage that is being felt by the people in Marinduque (KI006).                                                                                                                      |
| L2   | Ecological damage (+)        | Long-term rehabilitation (-) | Balancing   | The increase in ecological damage to the Boac River would make long-term rehabilitation efforts more difficult due to the rise in destruction to marine life, plants, and sediment deposition (KI010).                                                      |
| L3   | Tailings sources (+)         | Heavy metal accumulation (+) | Reinforcing | Another implication of the existence of the mine tailings source is the continuous heavy metal accumulation in the downstream areas due to the ridge-to-reef nature of the tailings source flowing towards the downstream and coastal areas (KI001, KI004). |
| L4   | Heavy metal accumulation (+) | Ecological damage (+)        | Reinforcing | The heavy metal accumulation in the Boac River leads to persistent ecological damage to the river system (KI001, KI010).                                                                                                                                    |

Table 1 cont.

| Link | V1                           | V2                            | Trend       | Description                                                                                                                                                                                                                                                                 |
|------|------------------------------|-------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L5   | Heavy metal accumulation (+) | Water acidity (+)             | Reinforcing | Heavy metal accumulation, combined with the process of acid mine drainage, makes the river waters acidic (KI010).                                                                                                                                                           |
| L6   | Water acidity (+)            | Ecological damage (+)         | Reinforcing | The acidity of river waters causes ecological damage as freshwater fishes and plants die due to the change in water pH level (KI010).                                                                                                                                       |
| L7   | Water acidity (+)            | Long-term rehabilitation (-)  | Balancing   | The effects of water acidity in the water prohibit long-term environmental and ecological rehabilitation as long as the water remains too acidic for marine life and plants to live in (KI010).                                                                             |
| L8   | Heavy metal accumulation (+) | Heavy metal contamination (+) | Reinforcing | Heavy metal accumulation in rivers leads to heavy metal contamination in the residents living in the area. The accumulation of heavy metals causes contamination in the river water that some residents still use for washing clothes, bathing, and fishing (KI010, KI012). |

The determined root cause of the environmental challenges of the rehabilitation of the Boac River is the source of the 1996 disaster that continues to leak heavy metal-laden tailings into the river system. The Tapián Pit containing the mine tailings from MMC's operation decades ago leads to the increasing ecological damages felt in Marinduque (L1). Almost all the key informants expressed their opinion that contamination would continue if the source of tailings were not contained. This leak in the tailings source has contributed to the lack of fish and plants in the river and water contamination on the island, even in distant areas from the tailings source, and affected river systems (Mandia, 2023), leading to ecological damage.

An increase in ecological damage caused by destroying the naturally existing vegetation in mineral-rich areas due to extensive mining activities exhibits a balancing trend toward long-term rehabilitation (L2). The lack of natural tree species in the mine areas because of the deforestation activities for mining that destroy vegetation covers makes it challenging to conduct reforestation activities (Zambales, 2021) on the source of tailings. The destruction caused by mine activities on vegetation covers lowers the soil quality of the area, causing the soil to become more permeable to water (Murtinah & Komara, 2021), which allows water and tailings seepage into the soil, creating further ecological damage. Reforestation activities would be challenging given the poor soil quality in mined-out areas.

The continuous leak or seepage from the tailings dam leads to heavy metal accumulation (L3) in the downstream areas of the river. Heavy metal accumulation in an area poses various environmental and health risks that become more concentrated when deposited into the sediments, causing these damages (Liu et al., 2018). The high heavy metal concentration along the downstream areas of the Boac River has already been documented by the study of Mandia (2023), even more than two decades after the 1996 disaster. According to the participants of the FGD, MMC enforced dredging activities to remove the tailings



from the river. However, they were only piled at the side of the river and abandoned, which led to the eventual release of the tailings back into the water. The participants noted that the dredging activities disperse the tailings into the river more.

Heavy metal accumulation leads to persistent ecological damage to the Boac River system (L4). Heavy metal accumulation in water causes heavy metal toxicity in fishes, eradicating their presence in affected waters (Mandia, 2023). The lack of fish in the Boac River is observed by the key informants residing in Marinduque until now, as fish used to be present in different parts of the river. The absence of fish also indicates heavy metal accumulation in the waters of the Boac River, as heavy metals settle for hundreds of years in disturbed ecosystems when not acted upon through remediation activities. This was also mentioned by the participants of the FGD, who recounted the eventual disappearance of fish in the river. Moreover, the decline in the agricultural lands in the area and the change in the color of the waters support their observations of heavy metal-induced ecological damage.

There is a high possibility of heavy metal contamination, leaching, and accumulation in areas with acid mine drainage due to acidic conditions (L5). This acidic conversion is caused by acid mine drainage that results in sulfuric acid from the natural process of the reaction of sulfur-bearing minerals with oxygen, acidophilic iron-oxidizing bacteria, and moisture (Skousen & Ziemkiewicz, 1996). The expert key informants in the study have reported the acid mine drainage in the Boac River.

The acidity of the Boac River due to the acid mine drainage leads to ecological damage to the river (L6). The change in the water's pH kills fish and plants in the river. This is validated by the findings of Plumlee et al. (2000) where the acidic nature of the mine tailings led to the death of marine life in the Boac River. Rivers are considered dead with the death of aerobic microorganisms that naturally restore the pH of river waters. Therefore, the increase in acidity of the Boac River hinders environmental and ecological long-term rehabilitation (L7) as damages become more irreversible for rehabilitation efforts.

Lastly, a balancing trend is observed with the effects of heavy metal accumulation on health. Heavy metal accumulation leads to a decline in the health of residents using the river for water sources (L8). Some residents living near the river still use its waters for bathing, washing, and fishing. With continuous use, the body can absorb heavy metals, leaving various skin conditions and other documented health diseases with heavy metal accumulation. The intake of heavy metal-induced fish also leads to bioaccumulation of heavy metals in the body, which would cause future health implications for the residents. The study conducted by Zaynab et al. (2021) validates these findings, whereas the bioaccumulation of heavy metals increases mortality.

The health challenges are encapsulated in human health and well-being and communities and institutions exhibited in links 9 to 18 (See Table 2). The variables included in human health and well-being are heavy metal contamination, treatment, and health programs.

*Table 2.*

Linkages in the Health Challenges of Policy and Program Implementation

| Link | V1                               | V2               | Trend     | Description                                                                                                                                                                                                                                                                                                                |
|------|----------------------------------|------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L9   | Heavy metal contamination<br>(+) | Treatment<br>(-) | Balancing | Due to the negative health impacts of heavy metal accumulation, the increase in the cases of heavy metal contamination leads to a decrease in the treatments available for the disease. The geographical location of Marinduque makes it somewhat challenging to acquire treatments for heavy metal contamination (KI002). |

Table 2 cont.

| Link | V1                            | V2                      | Trend       | Description                                                                                                                                                                                                                                                         |
|------|-------------------------------|-------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L10  | Heavy metal contamination (+) | Health programs (+)     | Reinforcing | The increase in patients with potential exposure and contamination with heavy metals prohibits immediate access to health programs for all patients upon necessity (KI012).                                                                                         |
| L11  | Health programs (-)           | Treatment (-)           | Reinforcing | With the limited slots, technological issues, and other factors in implementing the available health services for heavy metal contamination, the limitation of access to health services leads to the limitation of treatment access (KI012).                       |
| L12  | Funding (+)                   | Health programs (+)     | Reinforcing | With the necessity of acquiring treatment for contamination-related diseases, increasing government funding in the health sector leads to increased health programs available (KI012).                                                                              |
| L13  | Funding (-)                   | Laboratory testing (-)  | Reinforcing | Lack of government funding for the health sector impedes the establishment of a testing laboratory in the province in which the diagnosis and results of the residents with symptoms of heavy metal contamination will be received later (KI009, KI012).            |
| L14  | Laboratory testing (-)        | Health programs (-)     | Reinforcing | The absence of laboratory testing centers impedes the medical processes of the available health programs because almost all medical processes in line with the diagnosis and treatment of heavy metal contamination are procured in mainland Luzon (KI009; KI0012). |
| L15  | Funding (-)                   | Scientific research (-) | Reinforcing | A decrease in funding prohibits the continuation of research studies and projects that hinder community development (KI011).                                                                                                                                        |
| L16  | Laboratory testing (-)        | Scientific research (-) | Reinforcing | However, the absence of local laboratory testing centers also leads to delays in conducting research, as laboratory testing is pivotal in the data gathering process and data analysis towards more comprehensive results (KI009; KI011).                           |



Table 2 cont.

| Link | V1                         | V2                              | Trend       | Description                                                                                                                                                                                                                                                                                           |
|------|----------------------------|---------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L17  | Scientific research<br>(-) | Data bank<br>(-)                | Reinforcing | The result of the various research conducted in the province leads to the lack of relevant data that should be stored in data banks. The key informants expressed their dismay in not being given the results of the data gathering of researchers in Marinduque (KI001; KI003; KI009; KI011; KI012). |
| L18  | Data bank<br>(-)           | Long-term rehabilitation<br>(-) | Reinforcing | The absence of data banks impedes the long-term rehabilitation of the Boac River. The data banks will contain different research and relevant data that are pivotal in crafting rehabilitation strategies that will be problem-fitted to the case of the affected areas (KI09).                       |

The health impacts of heavy metal contamination have a balancing trend with acquiring treatment. The increase in the number of patients with potential exposure and contamination with heavy metals leads to a decrease in the available treatments available for the patients (L9). Treatments for heavy metal contamination are not widely available and would have to be requested from laboratories in mainland Luzon. With many heavy metal-contaminated patients, treatment would be scarce until supplies are brought to the island, affecting the patient's recovery time from the contamination (KI009; KI012).

In addition to the problems of treatment procurement in Marinduque are the health programs necessary to treat the disease. The increase in the health decline of people due to heavy metal contamination would need more health programs available in the province (L10). When there were persistent cases of heavy metal contamination in Marinduque, the available health program was through Teleconsult services, where the patients would have online consultations with experts in Luzon. There are limited slots per day with the Teleconsult services that impede the number of patients that could receive immediate attention for their illness. The findings of the FGD data indicated health problems such as skin diseases and death from open wound contamination. After the disaster, the included health effects were malnutrition, cancer, and high blood pressure. No details on the health programs present at that time were provided, but the presence of these diseases would entail the need for heavy metal contamination health programs for mining areas.

The limited slots for health services available to patients with heavy metal contamination led to limited treatment access (L11). To receive treatment, patients must first have prescriptions for their indicated condition. However, the overall process of getting a consultation for the procurement of treatment was described to be long due to the unavailability of experts in the province and local sources of treatments.

An increase in government funding for the health sector leads to an increase in the health programs available (L12) that could lessen the waiting time for patients needing treatment. During the prevalence of heavy metal contamination in Marinduque, the health sector was described as reactive as funding was made available but it is now not that reactive because of the low to almost no identified cases with very limited funding. Moreover, increased government funding for the health sector led to establishing a testing laboratory in the province (L13). The presence of a testing laboratory for health would shorten the medical processing time that it would take to acquire treatments, as diagnostics of diseases could be done locally.

On the other hand, the absence of laboratory testing centers leads to a longer medical process for the health programs available (L14). Before the Teleconsult services, the health services would need samples from the island and sent to testing laboratories in Luzon Island before official results could be released for treatment. The enforced health services had long processes because the province needed more human and technological capacity to diagnose heavy metal diseases. This is still relevant in Marinduque today.

Conducting research in disaster-induced areas is critical for the development of strategies for rehabilitation. However, a decrease in funding prohibits the continuation of research studies and projects that hinder community development (L15). The decrease in funding was attributed to the change in funding allocation of the government to cater more directly to the people in need of immediate assistance, which neglected some research initiatives; however, no negative remarks were made as the funds were for the personal development of affected residents. Local laboratory testing centers would also benefit research as the absence of local laboratory testing centers leads to delays in the data gathering process and data analysis in research (L16). This was evident in the first fact-finding missions, wherein results concluded normal results in the state of the river waters; however, this was proven incorrect with the following fact-finding missions. If not tested, more people would have gotten heavy metal contamination from the river.

Various research has already been conducted in Marinduque relating to the Marcopper mining disasters; however, the results still need to be shared or returned to the province. The absence of research results leads to the lack of relevant data that should be stored in data banks (L17). Having no results at hand impeded their ability to enforce faster actions in relevant program implementations. Moreover, the absence of data banks impedes the long-term rehabilitation of the Boac River (L18). Since the locality did not acquire the relevant research data needed due to the lack of a local data bank, they were not able to act immediately to resolve the problems brought about by the disaster, which led to more heavy metal contamination cases and a wide scope of ecological damage restricting long-term rehabilitation efforts (Mandia, 2023).

The identified variables under governance are mostly encapsulated in the state of communities and institutions and span the entire state of cultural paradigms exhibited in links 19 to 28 (See Table 3). The identified variables under governance are government priority, funding, short political term, political commitment, mining-initiated community assistance, long-term rehabilitation, legal action, and justice.

*Table 3.*

Linkages in Governance Challenges of Policy and Program Implementation

| Link | V1                      | V2                           | Trend       | Description                                                                                                                               |
|------|-------------------------|------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| L19  | Government priority (+) | Funding (+)                  | Reinforcing | Government priority determines the funding given to the research or project for implementation (KI011, KI012).                            |
| L20  | Funding (-)             | Long-term rehabilitation (-) | Reinforcing | The lack of government funding leads to the delay in enforcing long-term rehabilitation efforts for the Boac River (KI003, KI009, KI010). |



Table 3 cont.

| Link | V1                                           | V2                              | Trend       | Description                                                                                                                                                                                                         |
|------|----------------------------------------------|---------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L21  | Government priority<br>(-)                   | Long-term rehabilitation<br>(-) | Reinforcing | Lack of government priority leads to the delay in the long-term rehabilitation of the Boac River (KI011).                                                                                                           |
| L22  | Short political term<br>(+)                  | Long-term rehabilitation<br>(-) | Balancing   | Based on the answers gathered from the key informant interview, the short political term of government leaders impedes long-term rehabilitation efforts as short-term rehabilitation efforts are preferred (KI010). |
| L23  | Short political term<br>(+)                  | Political commitment<br>(-)     | Balancing   | The short political term of government leaders leads to their limited commitment per administration or term (KI009).                                                                                                |
| L24  | Political commitment<br>(-)                  | Long-term rehabilitation<br>(-) | Balancing   | The lack of commitment to doing so impedes long-term rehabilitation initiatives. Long-term projects and plans will cease if there is little to no rehabilitation commitment (KI006, KI009).                         |
| L25  | Political commitment<br>(+)                  | Justice<br>(+)                  | Reinforcing | The firm commitment of government leaders and officials leads to the attainment of justice (KI009).                                                                                                                 |
| L26  | Mining-initiated community assistance<br>(+) | Long-term rehabilitation<br>(-) | Balancing   | The increase in community assistance the mining company gives decreases their initiative to conduct a long-term rehabilitation plan for the Boac River (KI001, KI010).                                              |
| L27  | Mining-initiated community assistance<br>(+) | Legal action<br>(-)             | Balancing   | The increase in mining-initiated community assistance has prohibited legal action in the past (KI010).                                                                                                              |
| L28  | Legal action<br>(+)                          | Justice<br>(+)                  | Reinforcing | The initiation of legal actions leads to the attainment of justice (KI003, KI005, KI011).                                                                                                                           |

The significance of funding was articulated in the health challenges that prove its importance in conducting research and projects. The higher the government's priority toward a project or program, the higher funding is distributed (L19). If the government does not prioritize the rehabilitation of mine-affected areas, little to no funding will be given. The lack of government funding leads to the delay in enforcing long-term rehabilitation efforts for the Boac River (L20). Marcopper should be liable for funding the long-term rehabilitation of the Boac River, whereas the government's role is to pressure and negotiate compensation from the company. However, acquiring funding from MMC has been a difficult challenge for the provincial government. Without enough funding, long-term rehabilitation will not be achieved since a huge amount of money is necessary for long-term efforts towards rehabilitation. According to KI003, a previous estimation on the Boac and Mogpog Rivers rehabilitation would amount to 430 million USD. At present, it was mentioned by some of the key informants that the long-term rehabilitation of the Boac River is not at

the top of the priority list due to other social problems that need more attention for interventions. Therefore, the lack of government priority toward long-term rehabilitation efforts prohibits enforcing long-term rehabilitation plans (L21). The government prioritized ensuring people were safe and well during the disaster. Aside from the 1996 disaster, other calamities take up much of the government's funding for human development, impeding environmental aspects.

Another factor that was determined in the enforcement of rehabilitation plans is the short political term of government leaders. The short political term of government leaders impedes long-term rehabilitation plans (L22). Some key informants observed this as government officials would want faster rehabilitation alternatives spanning the entire scope of their term. This impedes long-term rehabilitation efforts due to the prioritization of short-term alternatives. Moreover, the short political term of government leaders leads to limited commitment to enforcing various long-term solutions to problems (L23). Due to the short political term, some politicians might not feel the need to commit to the responsibilities that are asked of them fully. However, if they were to commit fully, it was determined that they would prefer short-term efforts that would span the scope of their administrative term, impeding long-term efforts.

The lack of commitment to implementing programs and projects prohibits long-term rehabilitation initiatives (L24). Lack of commitment may be due to other factors, but officials are expected to fully commit to the best alternatives when it comes to service. In the case of Marinduque, it was deemed that government officials are willing to commit; however, factors such as lack of funding and relevant data in crafting rehabilitation plans rule out their commitment to implementing long-term rehabilitation. Moreover, the firm commitment of government leaders and officials leads to the attainment of justice (L25). In the context of Marinduque, environmental justice and justice for the plaintiffs from the mining disasters are aspired. However, it was found that in previous administrations, a lack of commitment to pursuing the mining corporation led to their escape, and the abandonment of the mine left Marinduque without any human and environmental justice.

Answers from the key informant interview and the FGDs also revealed the various community assistance that MMC provided during their operation. It was found that the increase in community assistance led to a decrease in their initiative to conduct a long-term rehabilitation plan for the Boac River (L26). The community assistance given or enforced during the operation of MMC took up costs from their rehabilitation funds, leaving the company with only a little more to give during the disaster for compensation and rehabilitation, urging them to propose short-term and cheaper alternatives. In addition, some key informants expressed that the increase in mining-initiated community assistance prohibited legal action in the past (L27). This is due to the cultural value of *utang na loob* (debt of value) of the officials and people from MMC's assistance to Marinduque. Due to the infrastructures built by MMC and the economic development they brought to Marinduque, it was shared that the previous administrations found it hard to act against the mining giant as they felt indebted. This impeded the justice of Marinduque.

Despite the pending status of the cases filed against Placer Dome, now BarrickGold, some key informants still hope for Marinduque's attainment of justice for the people and the environment through continuous legal action and proceedings. The initiation of legal actions against the mining company leads to the attainment of justice (L28). Through the help of the provincial government, various cases and claims have already been filed against BarrickGold, but justice remains far from sight even decades after their court filing. Stronger evidence that can be obtained from continuous research is needed. However, the long-term rehabilitation of Boac River should also not be sidelined throughout the legal processes.



### **3.4 Recommendations for Policy and Program Mechanisms for the Facilitation of Long-Term Rehabilitation**

Programs and policy recommendations were crafted from the answers acquired from the key informants of the study, including experts on mining, health, and the environment. The top three challenges identified through the thematic analysis and their relationships presented in the causal loop diagram are matched with the program and policy-fit recommendations that can be used to facilitate the long-term rehabilitation of the Boac River, Marinduque.

Pivotal to the overall environmental recommendation, the National Government should obtain access to the Marcopper mine site to assess the dam structures that were documented to have leakages that continuously allow contained mine tailings to flow to the river. The accumulation of heavy metals in the river should be addressed by containing the tailings sources through the joint initiative of the local government and rehabilitation experts. Upon government's and experts' access and assessment, well-recommended engineering plans should be made to reinforce the dam structures with heavy-duty, durable materials to ensure their strength and reinforcement. The containment of the heavy metals from the reinforcement of the dam structures will suspend the flow of heavy metals to the river, which will halt their accumulation and deposition on the riverbed.

To support government initiatives in controlling and handling heavy metal contamination, the provincial government should establish a provincial health and environmental testing laboratory to address heavy metal-related challenges that provide access to provincial testing and research (Mandia, 2023). A local testing laboratory ensures the validity of the data collected from the experiments. Moreover, it will also provide additional job opportunities to the residents in the testing and maintenance department. Experts are needed in the operation of a testing laboratory. Therefore, the government should partner with the academe and other experts to undertake the laboratory activities and ensure the project's success.

Most of the recommendations prescribed under governance were from the KIIs, as the residents' insights in the study locale provided more accurate views on past and current initiatives related to governance. To attain the long-term rehabilitation of the Boac River, the national government should prioritize the policies and programs in rehabilitating heavy metal-contaminated areas, among other current priorities. This is crucial for the province's development as it will be a step toward a different direction in terms of social-ecological functions on the island. Prioritizing long-term rehabilitation plans would mean creating new opportunities for the people if the recommended health and environmental mechanisms are enforced. Moreover, the elected officials of Marinduque should ensure and strengthen their commitment to their no-mining policies with the continuous reiteration of the 50-year mining moratorium.

Further recommendations from the researcher for the findings in the challenges and policy gaps are presented in the succeeding entries for the policy reform of existing and proposed mining policies. The challenges identified matched the gaps in policy in the environmental, health, and governance areas for creating problem-fit policy reform recommendations (See Appendix B).

The open access to mine sites is not included in the key provision of PD No. 463 with the state ownership of abandoned mine improvements. Free access to mine sites, especially in legacy mines, should be incorporated into the Philippine Mining Act of 1995 as a policy reform. Incorporating the policy reform will enable authorities to examine the mine infrastructures for reinforcement and land area for rehabilitation to contain the mine tailings from leakage or seepage into the surrounding ecosystem.

The identified mining policies lack the inclusion of health aspects concerning the effects of mining, whereas socio-economic and environmental factors are recognized. Access to both health and environmental data and relevant research is still a concern in the policy and program implementation of Marinduque. The Mining Act of 1995 includes research on Section 71, where funding will be gathered from the mining company's mine rehabilitation fund. However, the conduct of scientific research can be assured through its inclusion in a designated section for mine operations monitoring and overall impact

the determination that includes health. This ensures a scientific approach in action plans concerning mining operations and prospects for rehabilitation.

An identified challenge under governance for the long-term rehabilitation of the Boac River is political commitment. The wide range of discretion of the president in the national mining policies determines the implementation of mining operations concerning national development. Given the extensive effects of mining, this may need to be aligned with environmental protection. Therefore, limiting the wide range of discretion only to applicable mineral reserves should be a revision of the key provision to ensure ecological protection in reserves and environmentally critical areas.

The most critical policy alternatives concerning the long-term rehabilitation and contamination in the Boac River are presented below (See Appendix C). These policy alternatives can also address the environmental contamination in other mine-affected areas in the country.

The most critical problem with the ongoing environmental contamination in Marinduque is the existence of mine tailings with continuous leaks and seepage from the abandoned tailings dam of MMC and the widespread mine tailings in groundwater sources. The Abandoned Mines Rehabilitation Act further strengthens this provision as a policy alternative to the provision on the abandoned mine rehabilitation of EO No. 270. The Abandoned Mines Rehabilitation Act focuses on rehabilitating abandoned mines, including health and socio-economic and environmental aspects of mine-affected areas. This includes establishing a local health and environmental testing laboratory for the mine-affected areas to determine the current and future state of the environmental integrity of the mined-out areas, renewable every 10 years after assessing heavy metal accumulation and contamination. The enforcement of local health units in dealing with heavy metal contamination is also an essential provision of the act to ensure the health capacity of the residents. Rehabilitation priority is ranked according to the present ecological damage of the abandoned mines and the scope of impacts of heavy metal contamination in mine-affected areas for a more systematic rehabilitation plan for the numerous legacies and abandoned mines in the country.

To ensure the enforcement of this act, national funding will be allocated to rehabilitating abandoned mines that span the socio-economic, environmental, and health programs to be implemented following the provisions of the law. The act's enforcement will be directed to an established Mine Rehabilitation Agency Task Force composed of experts with specialties in health and the environment to examine and implement various systematic rehabilitation alternatives that are problem-fit to the challenges of the abandoned mines.

The second-ranked challenge in the existing mining policies in addressing heavy metal contamination in mine-affected areas is the wide range of discretion of the president. The policies analyzed exhibit an economic priority of the Government in mining, where the policy commitments on mine safeguards and the environment may be changed accordingly. A policy alternative, "Amending the Key Provisions on Presidential Authority in the Institutionalization of Mineral Agreements," is proposed to ascertain a balanced commitment to economic development and environmental safeguarding. This policy enables the president to establish mineral extraction in the country for economic development but will only be allowed in identified mineral lands. Therefore, proclaimed reserves, critical areas, NIPAS, and small islands in the country will not be open to mineral agreements and are excluded from the president's discretion. This ensures the ecological conservation and preservation of fragile ecosystems that balance the economic priorities with the government's environmental priorities. Moreover, to account for the no-mining moratoriums of some provinces in the Philippines, the act will abide by the provisions of the Local Government Code of 1991. Mineral agreements will not be allowed in provinces with no mining moratoriums, such as Marinduque, and areas without local community consent.



One of the most critical problems in implementing long-term rehabilitation plans for the government to address the ongoing contamination in Marinduque is the lack of funding. With all the social problems in the country that take up some of the national budget, it is not easy to obtain enough funding for long-term rehabilitation as it would take billions of dollars, as estimated by a partner agency of the KI from MACEC. To ensure that funding is attainable for long-term rehabilitation of mine-affected areas, the Multinational Mining Agreements Act is a policy alternative.

This act still retains the provision of a 40% maximum share ownership of multinational mining companies in mineral agreements. The taxation calculation for the mineral agreement in the local government will also be updated following the inflation rate from establishing the Philippine Mining Act of 1995. However, the effectiveness of mineral agreements shall be lessened to 10 years, which could be renewable if the integrity of mined-out areas is ensured for another decade of mining activities and future-proofing of the land area. During entire mining operations, the mining company will continuously enforce land and water rehabilitation efforts to ensure the ecological integrity of the mine areas. Moreover, the auxiliary rights presented in the Philippine Mining Act 1995 will be amended. They will no longer be exclusive to the mining companies as shared equity will be provided to the mining communities.

In ensuring economic development, the tax incentives institutionalized by existing mining policies will be repealed by the no-tax incentive provisions of this law. Given Marinduque's present legal problems with Barrick Gold, accountability and funding are perceived as difficult to achieve. Therefore, it is included in the provision of this act that withdrawal of shares and abandonment from operations shall not be approved unless all financial obligations, including long-term rehabilitation funding and compensation to affected residents, are fully paid. This ensures that funding will be available for implementing and enforcing long-term rehabilitation plans for abandoned mines. In eliminating corruption and bribery attempts of mining companies, the Supreme Court will constitute a national task force under the National Bureau of Investigation (NBI) that deals with reports of corruption in the extractive industry. This national task force will coordinate with the Presidential Commission on Good Governance (PCGG), which will be restructured as the anti-corruption body of the Philippines that focuses on the thematic areas of corruption in mining. Lastly, perpetual responsibility must be recognized by both local and multinational mining companies that will be passed on to companies that will buy or merge with the companies proven guilty of inflicting human and environmental damages on their host countries without any exemptions.

#### **4. Conclusion and Recommendations**

The significant events in the Marcopper mining disaster cannot be separated based on the answers gathered. Each significant event was deemed equally significant with the others in the unfolded chain of events. The most significant event determined was the 1996 disaster itself, followed by the enactment of the 50-Year Mining Moratorium in Marinduque. The identified policies displayed varying government priorities at their establishment, and conflicts of interest were also observed. The disasters resulting from MMC's mining activities were determined to have contributed to establishing the Philippine Mining Act of 1995 as a critical juncture, yet succeeding policies exhibited path dependence from the status quo. Moreover, the continuous effort of the national government to enhance economic development through the establishment of extractive industries persists despite the people's opposition. Lastly, the challenges identified showed the interrelationship between the environment, health, and governance. All variables showed linkages with the long-term rehabilitation of the Boac River. These challenges can be resolved through proper policy and program implementation of long-term rehabilitation efforts with the aid of the proposed recommendations in the discussion problem-fit with the challenges determined in the study.

Given the identified continuous fishing in heavy metal-contaminated areas of the Boac River and the consumption of the caught fish, determining the specific health effects will help enforce policies and programs that will lessen and hopefully eliminate the conduct of such activities. It was determined from the KI that the people are still fishing because no documented health effects through scientific studies are available to the local communities. The conduct of this study will be essential to the health of the people in Boac. The findings of heavy metal seepage in groundwater sources were validated through the

answers of the KIs and the experts' KIs in the study. This is a crucial problem as groundwater is used in drinking, bathing, and other household uses. It is recommended for the academe to conduct continuous monitoring of the groundwater sources which can be in the form of research or laboratory assessment that could be incorporated into the curriculum of MSC-CES. By doing so, the local and provincial governments can be informed of the current state of the groundwater systems to enforce programs that would solve the widespread heavy metal contamination.

A more comprehensive policy analysis could be done using a causal loop diagram. The methods would involve identifying themes from the key provisions of the mining and environmental-related policies to determine the relationships between the identified themes. Plotting the themes in a Cultural Adaptation

Template would also be helpful in the analysis of the interrelationships of the variables in a problem space between the three human-environment systems. This could further guide policy revisions and alternatives in the future. Lastly, a study aiming to identify the local and national government's capacity to address long-term problems will be beneficial for enforcing long-term policy and program mechanisms. This will inform the government of its strengths and weaknesses in enforcing programs geared toward specific problems. The recommendations from this study will help strengthen the capacities of the national and local governments in addressing long-term problems in the country.

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The authors declare that there is no conflict of interest in the conduct of the study.

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## Appendices

### Appendix A. Mining and environment-related policies relevant to the case of Marcopper mining disaster in Marinduque

| Law/ Policy                              | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Strengths                                                                                                                                                                                                                                                                                                                                                                                                                       | Loopholes                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Commonwealth Act No. 137: The Mining Act | 1936 | <p>All private and government-owned mineral lands for mining purposes are for the utilization of Filipino citizens or with at least 60% ownership in corporations or associations.</p> <p>The President can proclaim lands as mineral reserves, alter the boundaries, and revoke mineral land proclamations.</p> <p>The Secretary of Agriculture and Commerce shall implement the provision of the act with the Director of the Bureau of Mines under his control.</p> | <p>Government officials or employees whose function is related to the processing of mineral resources are kept from possessing mineral lands in the country.</p> <p>The government has the right to regulate the water rights of the lessee and distribute the water supply equitably to prevent water use monopoly.</p> <p>Rules and regulations on mine sanitation, tailings disposal, and easement drainage are present.</p> | <p>When portions of mineral lands become qualified as reserves after being leased, the holders of the location will still have the exclusive right of use over the resources in the proclaimed reserve.</p> <p>Reserved lands not intended for mineral use can be reverted for mineral use when deemed more valuable for their mineral contents.</p> <p>United States citizens have the same benefits as Filipino citizens under the proclamation of the law.</p> |



| Law/ Policy                                              | Year | Key Provisions                                                                                                                                                                                                                                                                                                    | Strengths                                                                                                                                                                                                                                                                                                                                  | Loopholes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PD No. 463: Mineral Resources Development Decree of 1974 | 1974 | <p>All mineral deposits, whether in public or private lands, are owned by the State.</p> <p>Mineral deposits open to location and lease shall be free for utilization.</p> <p>The president has the authority to convert reserved lands to mineral reservations upon validation of valuable mineral contents.</p> | <p>Mineral land deposits are excluded from Rights to Lands.</p> <p>Safe operation, sanitation, and pollution control laws and regulations shall be in compliance with a mining operation.</p> <p>Infrastructural and mining improvements shall be owned by the Government if not removed by the contractor one year after abandonment.</p> | <p>The government can use closed mineral deposits through the operation of selected agencies or contractors.</p> <p>The amount of registration and filing fees are subject to the prescription of the Director of Mines.</p> <p>Contractors can operate on one or more mining locations in a province.</p> <p>The mining lessee may withdraw from the operation once the non-profitability of the mining operation is proven at any time.</p> <p>Tax exemption for five years except for income tax</p> |

| Law/ Policy                                                                                                                                             | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Strengths                                                                   | Loopholes                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| PD No. 1586:<br>Establishing an Environmental Impact Statement System, Including Other Environmental Management-Related Measures and for Other Purposes | 1978 | <p>Establishment of an Environmental Impact Statement System as a requirement for all entities engaged in environment-altering operations.</p> <p>Undertakings or procedures that are critical in critical areas require an Environmental Compliance Certificate as per the Presidential Proclamation of Environmentally Critical Areas and Projects.</p> <p>The administration of the EISS and the processing and evaluation of the environmental impact statements shall be done by the National Environmental Protection Council in addition to the implementation of the rules and regulations of the PD.</p> | Recognizes and balances environmental protection with socio-economic growth | Declared non-critical projects, undertakings, and areas do not require the procurement of an ECC. |



| Law/ Policy                                                                     | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                   | Strengths                                                                                                                                                                                                                                                                                                          | Loopholes                                                                                            |
|---------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| PD No. 2027:<br>Granting Tax Relief<br>to Distressed Copper<br>Mining Companies | 1986 | <p>Suspension of distressed copper mining companies' accumulated taxes, duties, fees, and other charges.</p> <p>The evaluation and certification of copper companies for the vitality of this PD will be done by the Ministry of Trade, as well as promulgating the implementing rules.</p>                                                      | Enacted as a cushion for copper investments                                                                                                                                                                                                                                                                        | Non-inclusion of further or more specific criteria for evaluating distressed copper mining companies |
| Local Government<br>Code of 1991                                                | 1991 | <p>Local autonomy shall be given to territorial and political subdivisions of the State, whereas local government units have control over their resources</p> <p>The responsibility of maintaining and managing the ecological balance of territorial jurisdictions shall be shared by the local government unit and the national government</p> | <p>Recognizes the autonomy of Local Government Units and their responsibility and jurisdiction over their territories</p> <p>Inclusion of local sustainable development in its implementing principles and decentralization</p> <p>Incorporation of non-government organizations as representatives in the LGU</p> | Outdated calculations and tax recommendations for local economic improvement                         |

| Law/ Policy                             | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Loopholes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RA. 7942: Philippine Mining Act of 1995 | 1995 | <p>The State owns all mineral resources in the country and is responsible for promoting “rational exploration, development, utilization, and conservation” to enhance national growth through safeguarding mechanisms and the right protection of affected communities.</p> <p>The Mines and Geosciences Bureau oversees “geological, mining, metallurgical, chemical, and other research as well as geological and mineral exploration surveys.”</p> <p>Any technically and financially capable person can undertake large-scale mining.</p> <p>Anti-pollution technologies and rehabilitation of mined-out and tailings-affected areas are required for operation.</p> <p>Foreign contractors shall have forty percent of the mineral production-sharing agreement.</p> <p>One year shall be given to the contractor to remove mining infrastructures and facilities upon withdrawal or abandonment otherwise, the said properties shall be turned over or donated tax-free to proper national or local government authorities.</p> <p>Technical and biological rehabilitation of mined-out and tailings-covered areas shall be implemented through a designated mine rehabilitation fund.</p> <p>An environmental clearance certificate is required upon application based on an environmental impact assessment and procedures.</p> | <p>Recognition and protection of indigenous cultural communities’ rights to their ancestral lands.</p> <p>Opening of ancestral lands for mining operations shall be upon the jurisdiction of the indigenous cultural community concerned.</p> <p>Mineral agreements shall not be undertaken in “old growth forests, proclaimed watershed forest reserves, wilderness areas and other areas under the National Integrated Protected Areas System (NIPAS)”</p> <p>The mining contractor shall undertake community development of mining communities.</p> | <p>Royalties and other fees with indigenous cultural communities shall be determined by the negotiation of the mining company and the said community.</p> <p>Mineral resources can be utilized for mining operations through mutual agreements.</p> <p>A panel of arbitrators is responsible for resolving disagreements between mineral permittees and private parties.</p> <p>Assignment or transfer of mineral agreement is subject to the approval of the Secretary but is deemed automatically approved 30 working days after application.</p> <p>Auxiliary mining rights shall be provided exclusively for the mining entities.</p> |



| Law/ Policy                                                                  | Year | Key Provisions                                                                                                                                                                                                                                                                                                                               | Strengths                                                                                                                                                                                                                                                                                                                                    | Loopholes                                                                                       |
|------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| EO No. 270: National Policy Agenda on Revitalizing Mining in the Philippines | 2004 | <p>The government shall promote responsible exploration, development, and utilization of mineral resources for economic growth enhancement.</p> <p>Formulation of a Mineral Action Plan (MAP) as an implementing guidance for mineral exploration, development, and utilization.</p> <p>The DENR is the implementing agency for the MAP.</p> | <p>Prioritizing the remediation and rehabilitation of abandoned mines to address their negative impacts.</p> <p>Promotion of the adaptation of efficient technologies for optimum mineral resources</p> <p>Pursues sustainable frameworks that support environmental and social development as equally significant with economic growth.</p> | Lacks in specifying the provisions of the law and its components                                |
| SP Res. No. 379 S. 200: Declaration of 50-year Moratorium                    | 2005 | <p>Declaration of the Province of Marinduque as a mining-free zone wherein mineral extraction is banned except for gravel and sand quarrying</p> <p>Reiteration of the declaration is done every succeeding year to maintain and uphold the moratorium.</p>                                                                                  | <p>Promulgated from several resolutions in the province prohibiting the conduct of mining operations</p> <p>Deemed in Marinduque as the “most significant mining law” (Mandia, 2023)</p>                                                                                                                                                     | Provincial moratoriums can be overthrown by national laws unless enacted as a congressional law |

| Law/ Policy                                                                                                                                                                                                                   | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Strengths                                                                                                                                                                                                                      | Loopholes                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| EO No. 79:<br>Institutionalizing and Implementing Reforms in the Philippine Mining Sector Providing Policies and Guidelines to Ensure Environmental Protection and Responsible Mining in the Utilization of Mineral Resources | 2012 | <p>Closure of critical, protected tourism areas and prime agricultural lands to mining applications.</p> <p>The DENR is the implementing agency of the rules and regulations of the EO.</p> <p>Existing mine corporations can continue to undergo mining operations but are subject to monitoring and review by the DENR.</p> <p>Conduct public bidding for the opening of mineral resources and disposition of abandoned ores and mine wastes.</p> <p>Establishment of a one-stop shop for all mining applications and procedures.</p> | <p>Encourages public consultation with all concerned stakeholders in the development of Mineral Reservations.</p> <p>Acknowledges climate change with the establishment of the Mining Industry Coordination Council (MICC)</p> | Fastens mining application duration through the one-stop shop initiative. |



| Law/ Policy                                                                                                                                                                                                                                                                                                         | Year | Key Provisions                                                                                                                                                                                                                                                                                                                                                          | Strengths                                                                 | Loopholes                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EO No. 130:<br>Amending Section 4<br>of EO No. 79, S.<br>2012,<br>Institutionalizing and<br>Implementing<br>Reforms in the<br>Philippine Mining<br>Sector, Providing<br>Policies and<br>Guidelines to Ensure<br>Environmental<br>Protection and<br>Responsible Mining<br>in the Utilization of<br>Mineral Resources | 2021 | New mineral agreements, subjected<br>to the Philippine Mining Act of<br>1995, may enter with the<br>government.<br><br>The DENR is the implementing<br>agency in formulating terms and<br>conditions, undertaking reviews for<br>negotiations, rationalizing revenue-<br>sharing schemes and mechanisms,<br>and implementing mine safety and<br>environmental policies. | Inclusion of mine safety and<br>environmental policies into<br>the policy | Granting the entire<br>authority and<br>implementation<br>process to only one<br>governing agency<br><br>Disregarding the<br>jurisdiction of local<br>autonomies as<br>prescribed in the<br>Local Government<br>Code of 1991 |
| Resolution No. 2021-<br>074: A Resolution<br>Declaring the Protest<br>and Opposition of the<br>Municipality of Boac<br>to EO No. 130, S.<br>2021, and Reiterating<br>the Stand of the<br>People of the Boac,<br>Marinduque Against<br>Mining                                                                        | 2021 | Objecting to the lifting of the 50-<br>year mining moratorium in<br>Marinduque                                                                                                                                                                                                                                                                                          | Supports the no-mining<br>direction of the province of<br>Marinduque      | Policy in the form<br>of a municipal<br>resolution                                                                                                                                                                           |

## Appendix C. Policy reform recommendations from the challenges and gaps in mining policy

| Findings      |                                                                     |                                                                                                                                                                                                                              | Recommendations                                                                                                                                                                                                                                               |
|---------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Domain / Area | Challenges                                                          | Policy Gaps                                                                                                                                                                                                                  | New Policies / Policy Reforms Recommended                                                                                                                                                                                                                     |
| Environmental | Open access to the mine site to relevant authorities                | PD No. 463 states that abandoned mine improvements shall be owned by the Government. However, it does not include the abandoned mine site, thus limiting authorities' free access to the mine site.                          | Review the Philippine Mining Act of 1995 as the primary mining policy to include provisions where the state should be given free access to legacy mines.                                                                                                      |
| Health        | Access to data and relevant research for health and the environment | The research for “social, technical, and preventive aspects of rehabilitation” is stipulated in the Mining Act of 1995 where the funding will come from the mine rehabilitation fund of the mining company.                  | Inclusion of a designated section for the conduct of research that could be a part of the monitoring process of mining operations and the effects on health and the environment with mine disasters on mining policies.                                       |
| Governance    | Challenges with political commitment to national development        | The identified national mining policies state the wide range of discretion of the President in institutionalizing mining in various state lands regardless of classification when deemed essential for national development. | Mining policies may state the discretion of the President in institutionalizing mining operations; however, the discretion should be limited to the mineral lands that are open to mining, excluding NIPAS and other reserves for environmental safeguarding. |



Appendix D. Most critical policy alternatives to address the ongoing environmental contamination in the Marcopper Mine Disaster

| Rank | Need/Problem                                                                             | Policy Alternative                 | Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | The existence and the widespread of mine tailings on the bodies of water and groundwater | Abandoned Mines Rehabilitation Act | <ul style="list-style-type: none"> <li>• Strengthens the prioritization of abandoned mines rehabilitation stated in EO No. 270.</li> <li>• Rehabilitation of abandoned mines includes the socio-economic, environmental, and health aspects of mine-affected areas.</li> <li>• Criteria for priority ranking abandoned mines for rehabilitation include the present ecological damage and scope of impacts.</li> <li>• Placement of government funding allocation for rehabilitation.</li> <li>• Establishment of a Mine Rehabilitation Agency Task Force that functions as the main rehabilitation governing agency in implementing and enforcing the law.</li> <li>• Inclusion of a local health capacity in mine-affected municipalities through enforcing local health units on heavy metal contamination and establishing a local health and environmental testing laboratory.</li> <li>• Enforcement of long-term rehabilitation plans through the mine rehabilitation agency.</li> </ul> |

| Rank | Need/Problem                                                                                                             | Policy Alternative                                                                                     | Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2    | Wide range of discretion of the President to change policy commitments on mine safeguards and environmental conservation | Amending the Key Provision of Presidential Authority in the Institutionalization of Mineral Agreements | <ul style="list-style-type: none"> <li>• The president may establish mineral extraction in identified mineral lands.</li> <li>• Mineral agreements shall not be undertaken in proclaimed reserves, critical areas, NIPAS, and small islands in the Philippines to conserve and preserve fragile ecosystems.</li> <li>• Mineral extraction is recognized as a source of economic growth balanced with social and environmental safeguarding.</li> <li>• Provinces with no mining moratoriums shall also be included in the prohibited areas for mineral agreements.</li> </ul> |



| Rank | Need/Problem                         | Policy Alternative                  | Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|--------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3    | Funding for long-term rehabilitation | Multinational Mining Agreements Act | <ul style="list-style-type: none"> <li>• Multinational agreements shall account for a maximum of 40% shares to mining ownership.</li> <li>• The high value of minerals is recognized; hence, institutionalized tax suspension incentives in the mineral extraction industry shall be repealed by this act.</li> <li>• Updated taxation calculations on the mining operation of local and multinational mineral agreements will be provided to the corresponding local governments.</li> <li>• Mineral agreements shall be effective for a maximum of 10 years to ensure the environmental integrity of the mined-out areas. They can be renewable every 10 years after the environmental integrity of the mined-out areas is ensured.</li> <li>• Continuous enforcement of land and water rehabilitation efforts in mine-affected areas.</li> <li>• Auxiliary rights of the mining companies will be shared equally with the mining communities.</li> <li>• Withdrawal of shares from and abandonment of the mining operation can only be approved once all financial obligations of the mining company are settled, which encompasses social and rehabilitation funding mechanisms.</li> <li>• Establishment of a national task force component of the NBI that deals with reports of corruption within the extractive industry in coordination with a restructured PCGG.</li> <li>• Perpetual responsibility shall be given to all company shareholders during a mining-induced disaster.</li> </ul> |

# Understanding the lived experiences of Filipino male victims of domestic violence



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## Abstract

The public's understanding of domestic violence has considerably increased over time. Discussion on this social issue tends to focus on the experiences of women victims, particularly in patriarchal societies. For instance, in the Philippines, there is still little research on the experiences of male victims of domestic violence. This present study, conducted in the province of Palawan, Philippines, explored the lived experiences of five (5) male victims of domestic violence. It sought to explore their struggles, coping strategies, and disclosure through phenomenological inquiry. Thematic analysis of the participants' narratives revealed that their experiences involved more emotional (negative self-image, gaslighting, feelings of betrayal, and feelings of abandonment) and social abuse (social discomfort and coercive control) rather than physical violence (physical aggression). Participants also reported experiencing psychological abuse, which eventually led to self-destructive thoughts. They identified various forms of problem-focused coping (spiritual belief, optimism, family, responsibility, and seeking advice) and emotion-focused coping (disregard and avoidance, temperance, indifference, an egotistical attitude, and alcohol and leisure). It helped them deal with the struggles they identified. Confidentiality issues, shame and embarrassment, and financial constraints were the primary barriers to help-seeking. Meanwhile, the disclosure was driven by the desire for reconciliation, establishing evidence, and alleviating emotional burdens. The lived experiences of male victims gave a more comprehensive array of meaning to the concept of domestic violence, providing insights that promote inclusivity to the welfare of male victims.

## Keywords

*intimate partner violence, violence against men, female perpetrators, abused men*

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## 1. Introduction

The United Nations (2021) defined domestic violence as any act committed within a relationship that aims to control or dominate the partner's welfare. It is an act of abuse that compromises the other person's



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physical, emotional, and psychological aspects of well-being. Domestic abuse can be experienced by everyone, regardless of their age, gender identity, sexual orientation, ethnicity or race, and culture (Sous Gant, 2002). However, when we speak of domestic violence in Filipino culture, the victims that come to mind are usually women. The existing cases of domestic violence having male victims have garnered little attention from the public as it was deemed unconventional. Actions such as slaps, punches, and pushes were assumed as shallow antics of their partner, not to be taken seriously (Morgan & Wells, 2016). Furthermore, men are referred to as "under the saya (skirt)," "*takusa*" – short for "*takot sa asawa*" (afraid of wife), or "*asthmatic*" ("*asma*" or ask my wife) if they must obtain permission from their wives first before doing what they want. Due to the Filipino culture's constrained ideas of gender, men are conditioned not to express their sentiments or consider themselves as victims. Men may hesitate to speak out about their problems for fear of dismissal (Morgan & Wells, 2016). Stereotypical insights into masculinity and recurrent cultural stigma associated with domestic violence negatively affect male victims' self-image and hinder help-seeking (Barkhuizen, 2015; Linder & Widh, 2014). Male victims frequently acquire negative and adverse reactions following victimization, with a sense of humiliation afterward (Javaid, 2017). They usually feel that no one will listen to them and that no treatment will help them understand the abuse they experienced (Woodyard, 2019). Due to the internalized stigma, male victims usually suffer in silence with reluctance to seek help.

These cases sparked the fascination of the researchers to study the lived experiences of male victims of domestic violence perpetrated by their female partners. Although there were very few reported cases nationwide, this does not necessarily convey the non-existent plight of the victims. Instead, this fact is a sufficient reason for pursuing studies like this. This study aimed to shed light on issues encountered by male victims that stereotypically lie in the shadows of society. The findings of this study can contribute to bridging the gap from previous literature about domestic violence, which heavily tackles the cases of women. Further, this study will substantially contribute to the dearth of studies about Palaweño male victims of domestic violence. Aside from understanding their experiences, this study hopes to strengthen the resiliency of the male victims and promote healthy coping strategies among them.

## 2. Methods

### 2.1. Study Design

This research study adopted a qualitative, phenomenological approach that is appropriate for describing and interpreting the lived experiences of male victims of domestic abuse. Qualitative research aims to investigate, understand, and analyze social phenomena. It is directed at understanding participants' experiences and perceptions of what worked and did not (Creswell, 2002; Denzin & Lincoln, 1994; Pope & Mays, 1995). Furthermore, a phenomenological study was used to define and decide the facets of a phenomenon to include the participants' thoughts, feelings, and emotions. Moreover, according to contemporary scientists, the term is now used more broadly to denote the study of an individual's perceptions, feelings, and lived experiences (Smith et al., 2009). This design is beneficial for gathering fuller evidence and a detailed picture of issues, instances, or experiences.

### 2.2. Participant Recruitment and Selection

Due to the unique nature of the experience explored in this study, the researchers used purposive sampling to select participants. This type of non-probability sampling is appropriate when looking for subjects that fit a specific set of criteria. This is necessary for a phenomenological study wherein all participants should have similar experiences of the phenomenon being studied (Creswell, 2012). To qualify as a participant, the individual must be at least 25 years old, self-identified as a victim of domestic abuse, and experienced the abuse for at least a year, perpetrated by their current or former female partner (common-law union, girlfriend, spouse, or mother of their children). The basis of the age qualification is the capacity for reflective thinking necessary for this phenomenological study. According to John Dewey's theory on reflective thinking, individuals develop the capacity for reflective thinking at age 20-25. This pertains to logical thinking that involves active and careful evaluation of held beliefs and experiences.

This enabled the person to understand implications and draw inferences from previous experiences. The individual is expected to have already developed this capacity beyond 25. This criterion was based on a study conducted by Joseph-Edwards and Wallace (2020), which studied a similar phenomenon. A total of five male participants were gathered. This number was deemed sufficient for this study as Creswell (2012) stated that in a phenomenological study, the number of participants can be between two and 25.

To gather qualified participants for the study, the researchers primarily utilized social media to call for participants. The researchers also coordinated with agencies like the City Social Welfare and Development Office (CSWDO) and Municipal Social Welfare and Department Office (MSWDO) to identify male victims of domestic violence. Prospects were initially reached through social messaging applications or the contact numbers they provided. Then, the participants affirmed their willingness to participate in the study via email, chat, or text message. Consent forms were sent through their emails for signing. Relevant information was also verbally discussed in the first virtual session.

### 2.3. Data Collection

Data was gathered during the COVID-19 pandemic (September to November 2021). Because of this, several considerations had to be made about the health-related protocols. Although researchers recognize the value of face-to-face interactions, they put the utmost importance on the participants' health and welfare. Participants were informed that they could decide whether the interview session would be conducted face-to-face or virtually. The limitations and possible hindrances with virtual setup were also discussed with them as part of the informed consent process. Overall, four to six sessions (a combination of face-to-face interactions and virtual meetings) were conducted for each participant.

The participants were interviewed based on the validated semi-structured interview guide questionnaire divided into five parts. The validators were composed of registered psychometricians and psychologists. The flexible semi-structured design allowed researchers to ask follow-up questions depending on the participants' narration. The first part explored the participants' profiles, which were used to describe the characteristics of the participants. The second part inquired about the struggles they experienced and their impact on their physical, emotional, psychological, and social well-being. The third part contains questions about their coping strategies, mainly how they handled the impacts of the abuse they experienced. Finally, the last part investigated the factors affecting the disclosure of their experiences. All the questions were written in English with translations in Filipino.

The schedule and duration of the interview entirely relied on the participants' availability. Each session lasted about 45 to 60 minutes. During face-to-face sessions, only two researchers were present in the interview room to avoid overcrowding the participants. One researcher was responsible for notetaking and asking the participants; the other was responsible for recording the interview. The researchers also took turns asking questions and taking notes, considering the natural flow of the conversation.

The participants answered in a language they were comfortable with – English or Filipino. After that, the researchers elaborated on their answers by asking them follow-up questions. In instances wherein the participant continued to share his experiences, the duration ran continuously longer than expected. After each interview, the researchers asked the participants if they had further questions or clarifications for their interviewers.

For additional information, the researchers also consulted Law Enforcement Agencies, such as Barangay Halls, Police Departments, the Department of Social Welfare and Development (DSWD), and City Social Welfare and Development (CSWD), for any documents or reported cases filed by the participants. In



addition, the researchers also visited other family members and neighbors of the participants to ask questions about the participants and validate their narratives. All these supplemental processes were consented to by the participants.

By the end of each interview, the researchers asked the participants if there was any information that they had not yet disclosed. This gave the participant a chance to reflect on the interview sessions and decide whether to provide material that he believed was significant but was not fully addressed by the interview questions. Then, the researchers informed the participants of the subsequent phases in the research process. The participants also underwent a debriefing session to ensure that any emotional distress, if present, was reconciled after the interview. Subsequently, after the data analysis, the researchers conducted post-validation to verify the participants' statements and confirm whether the researchers' interpretation of their answers reflected their authentic experiences.

Sample interview questions for the research question "What are the struggles encountered by the male victims of domestic violence perpetrated by females?" are: Can you tell us something about your experiences with domestic violence? How long have you experienced the abuse? How often do you experience the abuse? What are the effects of the abuse on you? What are the possible reasons or situations that may have caused the abuse? How did you react/respond to the abuse? How did you handle/deal with the abuse? What are your thoughts whenever you are subjected to the abuse?

For the research question "How do men cope with their lived experiences of domestic violence perpetrated by females?" the interview questions are: After the abuse happened, what do you usually do? What did you feel about the abuse? How did you respond to that feeling? How did you handle the aftermath of the abuse?

For the research question "What are the factors affecting the process of disclosure among male victims of domestic violence in terms of (a) barriers in help-seeking and (b) interventions and support?" the interview questions are: Have you decided to seek help from other people outside your relationship? If yes, whom and how did you share your experience? If it is your family or friends, how did they react to your experience? What encouraged you to seek help? If not, why? If not, how would they react to you being the victim instead of the female party involved? What are the reasons why you did not disclose it to anyone? Did you report your victimization to any law enforcement agencies? If yes, what is the reason why you decided to seek help or support? If yes, how did you experience their reaction? If not, why?

## 2.4. Data Analysis

The initial step in data analysis involved extracting transcriptions of participants' narratives from the audio recordings. The data was transcribed in a document format. The analytical process was divided into two phases: thematic analysis and narrative analysis. First, narratives discussing the same topic are organized in a table. This process revealed the initial subthemes that emerged from the data. Researchers then developed shorthand labels or codes to describe each emerging subtheme. Subthemes were organized under the major themes of the study through deductive-oriented thematic analysis. This thematic analysis approach allows researchers to dissect data according to the research problems or theoretical interests being investigated (Braun & Clarke, 2006). This process was suitable for organizing data corresponding to the participants' struggles, coping, and factors affecting disclosure. Since this study utilized a phenomenological approach, narrative analysis was valuable in uncovering the underlying ideologies embedded in the participants' narratives. The combination of thematic and narrative analysis was valuable in seeking out the reality from the participants' narratives of their experiences and feelings and producing an in-depth description of the phenomenon under inquiry. In presenting the data, researchers used verbatim statements of the participants to support the findings. The narratives that give the best picture of the discussed subtheme were chosen accordingly. Also, the researchers considered choosing narratives from different participants – not to use one participant's statements repeatedly – to ensure representation. The statements were also translated into English.

### 3. Results and Discussion

#### 3.1. Profile of the Participants

Table 1 shows the profile of the participants, concealing their real names to ensure confidentiality. The participants were identified with code names they had chosen for themselves, their age, sex, and a brief narrative about their lives.

*Table 1.*  
Demographic Profile of the Participants

| Participant          | Age | Employment Situation | Housing Loc. | Civil Status (with the perpetrator) | Relationship Length | Number of Children |
|----------------------|-----|----------------------|--------------|-------------------------------------|---------------------|--------------------|
| Bhoe Thae Khao (BTK) | 38  | Employed             | City         | Married                             | 17 years            | 2                  |
| June                 | 47  | Employed             | City         | Cohabitation                        | 17 years            | 5                  |
| Piolo                | 58  | Employed             | Taytay       | Married                             | 18 years            | 5                  |
| Kris                 | 48  | Employed             | Taytay       | Married                             | 22 years            | 4                  |
| Rawi                 | 68  | Employed             | City         | Married                             | 24 years            | 5                  |

The table above lists relevant information regarding the five male participants of the study. Their identities are concealed through a codename. Their age ranges from 38-68 years old. All of them are currently employed. Three of the five participants reside in the city proper of Puerto Princesa, while two others live in Taytay, three to four hours away from the city. Only one among the participants is not married. Their relationships with their respective partners range from 17-24 years. All of them are fathers to several children.

**Bhoe Thae Khao (BTK)** is a 38-year-old married man. He is a resident of Puerto Princesa City, Palawan, and is currently working as a police officer. He is married to his partner, but they have been separated for almost two years and three months after living together for 17 years. His two children are all now in the custody of his partner. BTK experienced repeated and persistent verbal abuse from her wife when they were still living together. He also reported being hit or slapped at least once a year.

**June** is 47 years old, unmarried, and a resident of Puerto Princesa City, Palawan. June has been cohabiting with his live-in partner for 17 years. They have five children. He worked for almost 12 years and eventually ventured into a food-cart business. His partner and their children now manage their small business. He experienced being hit, slapped, or kicked once a year and endured verbal abuse from his partner.

**Piolo** is a 58-year-old converted Muslim and a resident of Taytay, Palawan. Piolo was with his abusive wife for 18 years and had five children. He married his wife through a civil wedding. Still, the Registrar's Office of the Municipality of Taytay did not formally recognize it because of the conflict with his wife's former marriage. Piolo experienced two years of emotional violence and later ended his relationship with his wife because of the psychological abuse he experienced from her and his friend in the form of adultery. He is an ambulance driver in a public hospital and is happily married to his second wife in Islam.



**Kris** is 48 years old, married, and a resident of Taytay, Palawan. He lived together with his wife for 22 years. He experienced emotional and psychological violence from his wife for two years before she ended their relationship to “find herself.” His wife eventually found a new partner, leaving Kris a single parent to his three children, his grandchild, and his wife’s child with another man.

**Rawi** is 68 years old, married, and a resident of Puerto Princesa City. He lived together with his former wife for 24 years. They have five children. He endured two years of emotional abuse before marking an end to their marriage due to his wife’s infidelity. He struggled with his vices after their separation but later found another partner in life with whom he currently lives with. He now works in Aborlan, Palawan, without any connection with his children and former wife.

### 3.2. Theme 1: Struggles Experienced

Physical violence is a common issue in domestic violence. In this study, male victims also reported experiencing physical aggression perpetrated by their female partners. This included striking them with objects in the household, such as scissors. These experiences of physical abuse undermined not only their physical but also their emotional well-being, leading them to experience a negative self-image characterized by feelings of humiliation, low self-esteem, emotional pain, betrayal, and gaslighting, as shown by the findings of this study. This is congruent with the study of Javaid (2017), which stated that male victims frequently acquire negative and adverse reactions following victimization of physical and emotional abuse. Those experiences cause them to feel alienated and ashamed in society. They eventually degrade themselves, questioning the purpose of their lives. However, unlike women, males who have been through traumatic situations tend to limit their emotionality (Levant & Wong, 2017). This means that the impacts of domestic violence on their well-being are usually covert. Lysova et al. (2010) also found that male victims experience domestic violence in varied ways. Apart from the physical violence, they also suffer mentally due to victim-blaming, financial exploitation, seclusion, and intimidation by their partners. Being threatened with losing contact with their children is also a common experience among them. This study presented the struggles encountered by the male victims in the physical, emotional, social, and psychological aspects.

*Table 2.*  
Struggles Experienced by the Participants

| Struggles Experienced |                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------|
| Physical              | Physical aggression                                                                   |
| Emotional             | Negative self-image<br>Gaslighting<br>Feelings of betrayal<br>Feelings of abandonment |
| Social                | Social discomfort<br>Coercive control behavior                                        |
| Psychological         | Self-destructive thoughts                                                             |

Table 2 shows the emergent themes from the participants’ narratives. This is based on the theoretical premise that domestic violence has physical, emotional, social, and psychological aspects. According to the participants’ narratives, emotional struggles were the most prevalent among these aspects.

#### Subtheme 1.1: Physical Struggles

Male victims suffered from physical violence in the form of physical aggression perpetrated by their female partners.

## Physical aggression

Participants in this study revealed they were slapped, punched, kicked, and thrown with scissors. Some instances resulted in minor injuries that needed medical treatment.

*Tapos 'pag nag-away kami, kalmot ng likod, kalmot ng leeg, palo ang likod... Mag-inom ako papaluin nang biglaan.* [Then 'when we fight, she would scrape my back, my neck, and strike my back ... If I drink, she will beat me suddenly.] – June

Actually, *marami eh. Nandoon yung, pinaka-worst na lang siguro yung binato ako ng gunting at natusok ako sa likod. Maliban sa mga pasimpleng sampal, mga suntok, yun (pagbato sa akin ng gunting) na yung pinaka-worst.* [Actually, there were a lot of those. Aside from slaps, punches, the worst was when she threw scissors at me, which wounded my back.] – BTK

These narratives reveal that men also experience physical violence within the home. However, most of them tend to endure and deflate these experiences. Participants focused more on the emotional aspect of the abuse they experienced.

## Subtheme 1.2: Emotional Struggles

Male victims typically experience unfavorable emotional reactions due to their experience of being a victim of domestic violence. Results show that negative self-image, feelings of betrayal, gaslighting, and feelings of abandonment contribute to the emotional abuse experienced by male victims.

### Negative self-image

The domestic violence committed by their female partners made them feel explicitly humiliated. It affected the way they view themselves as a man and a professional. Some of the participants shared how shameful those experiences were for them.

*Nakaka-degrade siya ('yung pang-aabuso) ng propesyon.* [It is degrading (the domestic violence) towards my profession.] – BTK

*Minsan tingin ko sa sarili ko, iniisip ko sa sarili ko, 'Ano ba tong nag-asawa ako para saktan ako? Nanay ko parang hindi ako nasaktan nung maliit pa ako ha.'* [Sometimes I think 'Did I get married just to get trounced like that?' I never experienced that from my mom when I was a kid.] - June

*Una, parang nawalan ako ng pag-asa sa buhay kasi siya ang inaasahan kong katuwang ng aking mga anak kapag wala ako diba?* [First of all, it was like I lost my hope in life, because I trust that I could rely on her in helping my children if I am not around.] - Kris

*Sasabihan nya ako na wala akong pakinabang. Ano daw klaseng ama ako.* [She told me that I am worthless and questioned my father role.] – Rawi



## Gaslighting

Participants also shared how difficult it was to express their feelings about the situation. They felt voiceless during arguments because their partners claimed to be more rational. Their pleas were often blocked, and they were blamed for their reactions.

*Yung 'pag tinutuwid ko ba sya, parang galit pa sya sa'yo. Kasi hindi sya magpatalo eh. Kung kanya, kanya. Kahit mali sya, sya pa rin ang tama. [She gets mad every time I correct her. She does not want to lose an argument. She is quite persistent even if she's wrong, she still believes she's right.] – Kris*

## Feelings of betrayal

Some of the participants also discovered that their partners were having an affair with another man. Despite this, they opted to avoid any confrontation regarding the matter. This experience of betrayal led to their difficulty trusting new partners and forming new relationships later on.

*Kasi masakit din sa sarili ko na parang niloloko na lang ako. Hindi ko na pinaalam kasi nahiya ako kasi kwan...Eh kaibigan ko rin yon, yung lalaki, yung lalaki nya, kaya napakasakit. [It really hurt that I was being deceived. And I didn't tell anyone because I was embarrassed; because he (wife's other man) was a friend. It was very painful.] – Piolo*

## Feeling of abandonment

Participants of this study also felt abandoned by their partners. This led them to worry about their parental responsibilities with their children.

*Painful because in that certain circumstance, we have to live apart. Solo ko na lang. Ako na yung nanay, ako na yung tatay. Minsan nagigising na lang ako 'paano na lang kaya itong mga anak ko?' [Being a solo parent, I carry all the responsibilities. I am a mother and a father to my children. Sometimes I would wake up in the middle of the night and think about my kids.] – Kris*

*Pero, sa ganong pagkakataon nararamdaman ko talaga na wala na sya. Kumbaga sabihin na natin, straight-in na natin, wala na syang pagmamahal sa akin. [But, at that time I really feel that she's gone. Let's just say straightaway that she doesn't love me anymore] – Rawi*

Going through all these emotional struggles is challenging enough for the participants. However, facing their social world while covertly dealing with the emotional tolls of domestic violence aggravates their predicament.

## Subtheme 1.3: Social Struggles

Existing social constructs complicate adaptation to new notions, such as the idea that a male can be a victim of domestic violence. Participants of this study shared their shameful experiences when other people learned about their situation since it opposed the more socially accepted concept of hegemonic masculinity. It also affected their interactions and performance in their workplace. Social impacts of domestic violence include social discomfort and coercive control behavior.

## Social discomfort

Some of the participants felt ashamed of the fact that they experienced domestic violence from their female partners. They viewed it as a shameful situation in a society where males are regarded as the dominant partners in the relationship. They became subjects of gossip within their neighborhood and workplace.

*De napapahiya ka na lang sa kasama mo naga-inom, diba? Mahirap yun. Mahirap yung pinagdaanan ko sa mga ganong bagay. [It's so embarrassing with my drinking partner, right? It was hard for me to go through such things.] – June*

*Yung pakikipagsalamuha mo sa tao. Kasi, unang-una marami kang kaibigan, mga kakilala. Para kang nagkakaroon ng, 'yung nahihiya ka diba?' Kasi ganoon ang nangyari sa buhay mo. [The way you interact with people. You have a lot of friends, acquaintances, and it's like you feel embarrassed, right? Because that is what happened in your life]. – Kris*

## Coercive control behavior

Participants revealed that their female partners actively controlled their interpersonal relationships to the point that it was intimidating. Various aspects of their social lives became more constrained, causing them to be isolated from their society.

*Malaki kasi (naging) pigil na pigil ang kilos mo. Dahil natatakot ka nga na kung gawin mo yung ganoon, sasaktan ka or may mararanasan kang, syempre pisikal na pananakit, maliban (pa) sa mga salita. [It's too much because it limits me. Because you are afraid that if you do that, you will be hurt or you will experience, of course physical violence, not only verbal.] – BTK*

Verbal, emotional, and mental abuse has affected me. In fact, *nakakasira ng diskarte sa buhay*. [In fact, it is ruining my approach to life.] – Kris

The statements of BTK and Kris reveal that the experience of domestic violence affected their social behavior. Apart from this, it also affected them psychologically.

## Subtheme 1.4: Psychological Struggles

Some studies provided varying evidence and outcomes on how male victims of domestic violence accepted or dealt with their predicament. In this research, the researchers examined how male victims perceived their situation. It was found that most of them developed self-destructive thoughts. The following statements shared by the participants demonstrated how their experiences affected them psychologically.

### Self-destructive thoughts

The participants' experiences led to depressive and suicidal thoughts. For BTK, thoughts of ending his life came up when he felt too distressed about his situation. Despite this, his children were his primary motivation to continue his life.



*Parang kung hindi mo iniisip na meron kang anak, meron kang mga kaibigan, talagang worse na maisip mo (ko) ay magpakamatay. [It's like if you do not think about your children and that you have friends, the worst thing you'll think is wanting to die.] – BTK*

It gives (me) anxiety and depression. I always think it is serious and depressing.  
-Kris

Domestic violence affected the participants in physical, emotional, social, and psychological aspects. Despite this, participants also shared what helped them deal with their struggles. It is noteworthy how they dealt with their difficulties using different coping strategies.

### 3.3. Theme 2: Coping Strategies

Faith and spiritual belief primarily helped male victims of domestic violence deal with their experiences. They also received valuable advice from their family and friends. Having a positive outlook was also instrumental in dealing with their situation. They focused on their fatherly responsibilities, diverting more focus toward their children.

In addition, participants also disregarded their experiences and avoided confrontations mainly because they thought about their children's welfare. They viewed their experience as typical among married couples, thereby denying that they experienced domestic violence at first. Surprisingly, most participants became more patient and understanding towards their partners because they wanted to prevent the situation from worsening. On the other hand, some of them counter their partners by posing an egotistical attitude towards them. This refers to expressing more dominance and self-centered attitude towards their female partners. This study also found that men rely on heavy drinking and leisure to ease their burden from the abuse. Those who previously turned away from their vices due to family duties returned to their unhealthy lifestyles after the abuse they experienced. Under the coping strategies of male victims, two sub-themes are recognized: problem-focused coping and emotion-focused coping.

*Table 3.*  
Coping Strategies

| Coping Strategies      |                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|
| Problem-focused coping | Spiritual belief<br>Family and responsibility<br>Optimism<br>Seeking advice                           |
| Emotion-focused coping | Disregard and avoidance<br>Temperance<br>Indifference and egotistical attitude<br>Alcohol and leisure |

Table 3 lists the subthemes under the main theme of coping strategies. This is based on the theoretical premise that coping strategies may be problem-focused or emotion-focused. The findings of this study reveal that participants tend to utilize problem-focused rather than emotion-focused coping strategies.

#### Subtheme 2.1: Problem-Focused Coping

Problem-focused coping is a method that entails confronting stress directly and taking steps to address the root cause. This coping strategy makes the victims feel they can handle the stress and has long-term positive effects on the individual (Nes & Segerstrom, 2006). This sub-theme includes spiritual belief, family and responsibility, optimism, and seeking advice from family and friends.

## Spiritual belief

In this study, two participants who admitted they experienced physical violence emphasized the importance of clinging to their faith in God. This is aligned with the study of Goldberg-Looney et al. (2016), suggesting that men who suffered intimate partner abuse that resulted in injury were more inclined to use adaptive coping, notably religious coping. Moreover, participants believed trusting their problems with God was much better than sharing them with others.

*Doon (kay Lord) ako lumalapit. Oo kung saan, sabi ko, 'Lord, kung anong pagsubok ito malalampasan ko rin.' Uh awa ng Diyos nalampasan ko rin. Nakalaya rin nang maayos. Yung magahingi ako sa ibang tao? Ng sa problema? Ay hindi ako naga-ano. Ang (...) ko lang sa sarili ko, tingin ka sa taas. manalangin ka kung anong dapat gawin. [I don't share my struggles to other people. I instead look up and pray to God to ask Him what to do and how to overcome them. Eventually, with the grace of God I was able to surpass all those challenges.]*  
- June

Through prayer. - Kris

*Syempre dasal.* [With prayer, of course.] - BTK

## Family and responsibility

Participants who were separated from their former spouses because of infidelity were left with their children. They had to carry the responsibility of raising them alone. It may appear challenging to undertake all the responsibilities of being a single parent. However, participants stated that focusing on their work and their children's future saved them. Focusing on fatherly responsibilities significantly helped them endure the adverse effects of the abuse. This was aligned with the findings of O'Leary and Gould (2010), stating that reframing the abuse tends to be associated with more positive outcomes. Participants felt that dealing with the abuse was considered endurable if it was for the sake of the children's future. Hence, they saw that redirecting their focus and working hard to provide for their family was significantly beneficial. This was also consistent with the study of Andre-Petersson et al. (2006), stating that the ability to cope with stress effectively can help prevent severe psychological illnesses triggered by abuse.

*Nag-alaga ng mga bata. Tapos nag-focus lang talaga ako sa trabaho. Buti na lang may trabaho ako nung mga panahon na yon. Kung wala, baka kung napaano rin ako. [I only focused on my work and in taking care of my children. It was a good thing that I had work that time. Otherwise, I would not know what will happen to me.]* - Piolo

*Ahh nag-focus lang ako sa trabaho para sa mga problemang naranasan ko.* [When I encountered that problem, I just focused on my work.] - Kris

*Pero naaawa ako sa mga anak ko eh. Sa isip-isip ko, 'hiwalayan ko na lang kayo to', pero (kawawa ang mga anak).* [Whenever I think of separation, I feel sorry for my children. The children will suffer.] - June

*Kibit-balikat. Tinitii alang-alang sa mga bata.* [I just shrug it off, for my kids.]  
- BTK



## Optimism

Optimism refers to participants staying positive despite all the hardships they experienced in the relationship. Participants claimed that optimism in difficulties had made them more productive and less likely to overthink. This was in contrast with Gentry et al. (2007), who claimed that men only use maladaptive coping strategies. One of the participants revealed that he strived to stay optimistic by firmly believing that his situation was only a temporary phase in his life.

I cope by always looking at the positive side of the situation, and despite everything, I know we can make it through. Moreover, having a positive mindset *sabi ko 'kaya ko pa.'* *Sabi ko ma...* *'lilipas din ito eh. Wala mang problema na walang solusyon eh.'* [I told myself that I could still do it and that it too shall pass. There is no problem without a solution.] - Kris

## Seeking advice

Relying on friends and family was also a valuable means of coping with domestic violence. Most participants emphasized how social support from friends and family helped them during their most challenging times. Their genuine care and understanding of the situation remarkably uplifted the participants' spirits. This was strongly correlated to the survey of Andre-Petersson et al. (2006), recognizing the adaptive coping strategy of men, including talking with friends and family, exercising, praying, or actively addressing the causes of stress that may enhance their overall well-being.

It (the whole experience) teaches me to be more connected to my family. *Dito mo talaga ma-rerealize kung gaano ka-importante ang pamilya (mga anak) at mga tunay na kaibigan.* [During those circumstances, I realized the importance of my family and true friends.] - Kris

*Ah wala, naga (hingi lang ako ng payo) kay Ma'am Taj kung ano ang dapat gawin.* [I only ask Ma'am Taj as to what to do.] - June

*Payo ng kapamilya at saka mga kaibigan. Kinakausap ko mga pinaka-close ko sa pamilya. Tsaka yung mga kaibigan ko na nakakaintindi rin.* [I only rely on my family and friends. I talk to my closest relatives and those friends who truly understands.] - BTK

Data revealed that participants recognized the problem and actively dealt with the aftermath. They diverted their focus to other things and held on to social support. Aside from this, other means of coping also helped them manage their emotions.

## Subtheme 2.2: Emotion-Focused Coping

Coping with domestic violence also involved managing one's feelings and emotional response rather than dealing directly with the problem. This coping approach delays the person's response but may not offer a long-term solution (Penley et al., 2012). This includes disregard, avoidance, temperance, indifference, egotistical attitude, and alcohol and leisure.

### Disregard and avoidance

As much as the participants did not want to prolong disagreements with their female partners, they tended to disregard and avoid confrontations. This was congruent with O'Leary and Gould's (2010) study, stating that suppression and denial were part of men's coping strategies when confronted with stressful circumstances. Another reason found as to why they ignored the situation was that participants did not

want to aggravate the conflict further because it was deemed embarrassing. According to the participants, they wanted to avoid further misunderstandings and unfavorable outcomes. This was consistent with another study done by Kumar in 2012, stating that men who ignore or tolerate the abuse also fear losing social respect.

*Yung sinasabi nilang nagkibit-balikat. Yung tiniis mo na (lang) alang-alang sa mga bata ganon. [I just shrugged it off. I endured it for my children's sake.]*  
- BTK

*Kung minsan tumatalikod na lang ako. Pag sobra nang maingay takpan ko na lang tainga ko ng ano headphone. [When she gets too loud, sometimes I just turned my back from her and cover my ears with headphone.]* - June

## Temperance

Despite the unfortunate experience, participants reported they opted to extend patience and understanding regarding their situation. This is driven by their desire to prevent the situation from worsening. Another participant also revealed that his wife repeatedly threatened to commit suicide when confronted about his extramarital affair. This would make him feel bad, so he would remain quiet and avoid talking back. A study by Kumar (2012) supports this, stating that most males cope by keeping silent. Unfortunately, men who could not express their thoughts and emotions ended up with depression and high feelings of loneliness, sadness, and distress (Bryant-Bedell & Waite, 2010).

*Parang every time na nag-aaway o nag-diskusyon kami, hindi mo sya, hindi mo sya ma-confront na halimbawa yung ginawa nya, hindi mo sya mapagsabihan. Kasi alam nya sa sarili nya na mali sya. Tapos yung way nya na para daw maging masaya na daw kami, kasi daw nagkasala sya, magpapakamatay na lang daw sya. Ganon. So, ang tendency, ako minsan hindi na lang kumikibo. Kasi nga syempre, yan si Jia (not her real name), panganay nya na anak, na-witness nya yang mama nya kung papano nag-laslas. So, ayaw naman namin ng ganon. Nagkahiwalay na nga, tapos may magkakasakitan pa. Kaya ako naging mapagpasensya talaga ako. [Every time we had fights or arguments; I could not confront her about her cheating. She knew about her mistakes, but she would threaten to kill herself. Her child Jia (not her real name) once witnessed her slashing her wrist. We never wanted that to happen again. So, I tend to be silent and patient, because I am frightened that she might hurt herself again.]* - Kris

*Pahabain mo ang... kung sa nylon, pahabain mo pa yung nylon doon ka kung saan ka makarating. Ganun, adjustment. [You must adjust. Like a nylon, lengthen your patience if you can.]* - June

## Indifference and egotistical attitude

Indifference and egotistical attitudes refer to men caring less about their partners. They turned passive towards their partners and diverted their focus on building their self-worth. Participants believed they could avenge what their wives did to them since they were males. This is strongly correlated with the findings of Ridge et al. in 2011, stating that men's coping strategy is highly constrained around masculinity. Participants who got separated due to the incident said they did not bother checking on their former



partners after their separation.

*Kung sasabihan nya na papalitan nya ako, kaya ko rin syang palitan. Kung sa isip nya hindi lang ako ang lalaki, iisipin ko din na hindi lang sya ang babae. Ganoon. [If she is telling me that she can replace me with another man, I can also replace her with another woman.] - Rawi*

*Ang banta nya sa akin, hiwalay, hindi kami kasal, wala raw ako pakialam sa kanya. Hindi kami kasal. wala raw ako karapatan pumigil sa kanya pag naghanap sya ng iba. Sabi ko sa kanya, 'bahala ka.' [She threatens me that she will leave me. She said, 'after all, we're not married.' She said that I have no right to stop her. I told her that it's up to her.] - June*

*Sabi ko sa kanya, 'wala mang problema kung maghanap ka ng ibang lalaki, hindi ko na rin kwan yan... hindi ko na yan saklaw yang buhay mo. Bahala ka na sa buhay mo kung mag-aasawa ka ulit.' [I told her that I got no problem if she ever goes and finds another man. That's out of my control. It's up to her if she will remarry.] - Piolo*

### Alcohol and leisure

Alcohol and leisure were known to be a temporary aid for forgetting painful circumstances. Males frequently use alcohol and other drugs as a kind of self-medication to dull the agony of current or previous domestic violence (O'Leary & Gould, 2010). Participants in this study revealed they resorted to drinking alcohol and doing other leisure activities to help them cope with their struggles. This confirms the claims of Misigo (2015), who argued that male victims of domestic violence utilized negative coping strategies.

*Inom-inum nang konti para maalis ang kwan, yung kalungkutan, pagod, ganyan. Wala lang, minsan naga-punta ako ng sing along, kanta-kanta, sabay uwi. Para ma ano lang ba, maalis lang yung sakit ng kalooban. Yun lang. [I drink alcohol to get rid of loneliness and fatigue from work. Sometimes, I also go to the KTV bars to entertain myself and ease the pain I feel inside.] - Piolo*

*Nililibang ko lang sarili ko. Inom ako isang gin. Patugtog ka dyan, o nood ng TV. [I entertain myself by drinking a bottle of gin, listening to music, and watching TV.] - June*

*Dati hindi na ako umiinom, pero nagbalik ako sa ganyan. [I already stopped drinking before. But after experiencing domestic violence, I returned to it.] - Rawi*

Coping with domestic violence entails a lot of active efforts and external support. The participants' narratives picture a transition from covert efforts to more overt ones, such as seeking advice from family and friends. Hence, the need to cope sometimes pushed them to disclose their experiences. However, the complicated disclosure process is influenced by several factors, as discussed in the following section.

### 3.4 Theme 3: Factors Affecting Disclosure

Barriers to help-seeking experiences of male victims may look complex but overlap with each other, shame and embarrassment being the focal point. Men were ashamed of disclosing their experiences. They wanted to deal with it privately, worried that other people may demean their inability to manage or fix their problem. Several factors surround male victims' disclosure because they are usually unwilling to share their experiences (Joseph-Edwards & Wallace, 2020). As mentioned in an article by HelpGuide (2021), men are hesitant to disclose the violence because it makes them feel humiliated. Because of this, they instead keep their experience in secrecy. This would cause the problem to be underreported because they hide their victimization (Carmo et al., 2011).

This study also found that financial constraints contributed to their reluctance to report the incident to authorities or seek legal help. Meanwhile, some deliberately chose to report to authorities to establish a record or evidence in case their partners reported them instead. This study discovered that men are reporting their experiences to formal institutions because they are afraid that their partner will someday reverse the situation and sue them, knowing that there is an anti-VAWC law that protects women. This concern relates to research findings that gender bias influences legal response to domestic violence. There are differences in the treatment of men and women regarding the help provided by the legal system (Machado et al., 2016). The said study also mentioned that men claimed to only seek help because of their children's predilections. Their children urged them to reconcile with their partners for the sake of their families. This also led them to snub the abuse. Finally, disclosure was also compelled by their desire to alleviate their emotional burden. Participants reported their experiences because they felt it was beyond their emotional control.

Their emotional state was compromised, and they sought professional help to alleviate it. Seeking help resulted in a positive response. This contrasts with what most of the studies say that men were further victimized from reporting their incidents (Campbell, 2005; Hine et al., 2020; Vogel et al., 2011). This study yielded two sub-themes in exploring the factors affecting the disclosure of male victims of domestic violence perpetrated by their female partners: barriers in help-seeking experiences and experiences of intervention and support.

**Table 4.**  
Factors Affecting Disclosure

| Factors Affecting Disclosure            |                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------|
| Barriers to help-seeking                | Confidentiality<br>Shame and Embarrassment<br>Financial Constraints                |
| Experiences of intervention and support | Desire for reconciliation<br>Establishing evidence<br>Alleviating emotional burden |

Table 4 shows two subthemes that explore factors affecting disclosure. As part of the goals of this study, factors that prevent male victims from help-seeking were investigated. Since some participants had already disclosed their experiences to authorities, the study also outlined their experiences of intervention or support.

### **Subtheme 3.1: Barriers to Help-Seeking**

Male victims are usually reluctant to share their experiences as they are not familiar with expressing their emotions and feelings. A study revealed that men are less likely to seek care for issues that their community considers odd or for problems that they believe they should be able to handle or control independently (Addis & Mahalik, 2003). Results of this study revealed that they were reluctant to share their experiences due to concerns regarding confidentiality, shame and embarrassment, and financial constraints.

### **Confidentiality**

Participants shared that they initially wanted to keep their experiences private. They did not want to report



it publicly as they were concerned for the welfare of their children and their family's privacy. They were worried about how it would affect their children if it were ever disclosed. Also, they were hopeful that the situation would eventually become better.

I want my family matters or issues to stay in private. I want privacy. *Ako, hindi pa agad nagdesisyon. Kasi, kung sa akin (lang), kung kaya pa bang ayusin, pag-uusapan namin*, [I did not decide immediately because for me, if it can still be fixed, we can still work on it.] - Kris

*Ayaw ko rin mabulgar sa lahat 'yung problema namin. Baka maapektuhan 'yung mga bata.* [I don't want our problem to go public. It will affect the children.] - Rawi

### Shame and embarrassment

Two participants reasoned they would feel embarrassed if other people knew their experiences. They were ashamed if it had gone out in public. They also wanted to protect their established name and their family.

*Wala po kasi, unang-una, nahihiya ako eh. Kasi kasiraan din ng pamilya namin'yun eh. Ayaw ko rin na (ipagbigay-alam) kasi kilalang-kilala rin ako (dito) eh. Ayaw ko rin sana masira 'yung pangalan ko. Sabi ko, 'hindi na, sakit lang sa ulo 'yan eh'. Kasi isipin mo, kung magrereport ka diba, wala rin eh. Problema lang 'yan. Pero ayaw ko talaga. Ayaw ko na kasi kakahiya talaga na kung makakarating pa kung kanino.* [No, because, first, I am ashamed. It will ruin our family. I don't want that because I am quite known in our municipality. I don't want my name to be tarnished. So, I told them no (referring to reporting the abuse). It will just be a pain in the neck. Because think of this, if I report it, nothing will happen. It will just be another problem. Still, I don't want to do it, I am ashamed if other people will know.] - Kris

*Kasi ('yung) problema ng mag-asawa (ay) hindi nila problema 'yun. Nakakahiya pa. Kahit ganito ako, may hiya pa rin ako.* [Because it is the couple's problem and not theirs. It's an embarrassment. Even if I am like this, I have still my shame.] - June

### Financial constraints

Another reason why they did not report their experience was their lack of finances to fund their reporting. They thought it would cost them much money; hence, they chose to endure their struggles.

*Oo. Kasi, ganoon na lang, kasi kung magpapa-annul ka, pera din 'yung kailangan.* [Yes, I just let it be. Because it would be costly to have an annulment.] - Kris

*Walang annulment kasi. Kuhanan (sana) namin 'yan ng annulment (pero) mahal man. (Nasa) P150,000.00 pa noon eh. Sabi nung DSWD, 'wala tayong pambayad dyan sir.'* [No annulment. Before we wanted to annul our marriage. But, according to the DSWD, it would cost us P150,000.00. They also said that we do not have the money to proceed with the annulment.] - Piolo

Several studies have already established that disclosing experiences of domestic violence is hindered by many factors. The participants' statements confirm the complicated nature of disclosure also experienced by male victims.

The participants' experiences reflect the discrepancy strain, dysfunction strain, and trauma strain described in Pleck's Gender Role Strain Paradigm. The discrepancy strain is the idea of failing to live up to masculinity. This strain expresses the experiences of male victims being abused by their female partners as a failure of the concept of masculinity. Consequently, the dysfunction strain led the male victims to keep their thoughts and feelings to themselves, unlike most women victims (Levant & Wong, 2017). Instead, victims usually suppress their emotions, which is identified as the trauma strain (Levant & Wong, 2017). Nonetheless, three out of five participants in this study had disclosed their experience to other parties. It is equally interesting to know why they decided to seek intervention and support.

### Subtheme 3.2: Experiences of Intervention and Support

Participants shared that they were initially reluctant to report their experiences because their children opposed it. Eventually, their decision to report was affected by several factors, including a desire for reconciliation, establishing evidence, and alleviating emotional burdens.

#### Desire for reconciliation

Participants shared how they prioritized their children's welfare despite their situation. They valued their opinion as much as possible, including their desire to keep their family intact. This led the participants to seek help reconciling with their partners for the sake of their children. They eventually sought intervention and support on how to settle their relationship.

My love for my children is what encouraged me to seek help. - Kris

*Gusto ko nga makipagbalikan sana kay nakiusap ang mga bata na ayaw kami magkahiwalay nang tuluyan. Sigeng, kuwan yang mga bata sa akin, paalala na gusto pa nila kami magkabalikan.* [I want us to be together again because the children begged us not to separate. Our children always tell me that they want us to be together again.] – Piolo

#### Establishing evidence

FGAD reported in 2012 that male victims choose to be silent because they are afraid to be sued by their partners. In contrast, this study revealed that their fear of being sued compelled them to report their experience. They feared their partner or her family would take revenge against them. The participants admitted that reporting their experience was, for them, a cautionary step to record their side of the story. They were worried that their partner's family would later file a case against them, and they would not have sufficient evidence to defend themselves.

*Kumbaga para hindi ako balikan ng mga magulang ng babae.* [So that her parents would not take revenge on me.] - Piolo

*Para kung sakaling hablahin niya ako o ako naman ang hablahin niya, may pangtapat ako sa kanya.* [I have evidence in case she would confront me.] - Rawi



*Oo. Sa opisina namin. Nakablotter 'yan actually. Ayun, sinuportahan nila ako. Hindi naman sa kinampihan nila ako pero dahil sinabi ko rin sa kanila. Alam naman nila na ganoon 'yung attitude nung babae, so binigyan nila ako ng proteksyon.* [Yes, there is a police blotter about it in our office. They (colleagues) had supported me. They sided with me because I told them my situation. They know about her attitude, so they had given me protection against her.] - BTK

### Alleviating emotional burden

Like women, men also experience a wide variety of emotions. They usually try to endure it initially by denying and ignoring the emotion. Until such time, they cannot control it anymore and decide to seek intervention. Two participants disclosed their experiences because they wanted to be relieved from their emotional burden after enduring it for so long.

*Para mabawasan 'yung bigat na nararamdaman ko. Kapag nabigyan ka ng advice, medyo nababawasan 'yung iniisip mo na hindi maganda. Kumbaga naliliwanagan ka na instead na ganoon ang gawin mo, iba na lang.* [To ease my pain which weighs a lot. If you were given some advice, it lessens your negative thinking. It's like you are enlightened to do the positive, instead of the negative one.] - BTK

*Nakakagaan ng pakiramdam* [It soothes my feelings.] knowing that someone is living to help you. - Kris

Contrary to the popular belief that males deal with disharmonious relationships by forming new relationships with another partner, the participants' narratives revealed otherwise. They exerted efforts to reconcile with their partners for the sake of their children. They desired to fix their relationship to avoid ruining their family. Interestingly, the participants sought intervention and support for record purposes. They wanted evidence that they did not maltreat their partners in any way in case their partners filed a case against them. They also received appropriate action when they sought help. Furthermore, male victims sought help to alleviate their emotional burden. These factors were the reason behind the intention of the male victims to report their circumstances.

## 4. Conclusion

The fundamental aim of this research was to describe the experiences of male victims of domestic violence in Palawan. The researchers used the descriptive phenomenological inquiry and obtained sufficient data to answer the research questions. It was revealed in this study that participants mainly reported emotional, psychological, and social violence. Only two participants disclosed having experienced physical violence. This finding may be associated with how participants interpret physical violence. They tend to be more passive and tolerant towards physicality, unlike female victims. This study supported the premise that the experiences of male victims of domestic violence, whether physical, emotional, psychological, or social, had a substantial influence on their well-being.

In addition, the researchers acquired detailed information on the participants' coping strategies. This study discovered eight emergent themes about coping mechanisms: spiritual belief, temperance, disregard and avoidance, indifference and egotistical attitude, seeking advice, optimism, alcohol and leisure, and family and responsibility. Lazarus' Cognitive Motivational Rational Theory of Coping was utilized to explain male victims' coping techniques. It was found that male victims employ both problem-focused and emotion-focused coping strategies. Furthermore, factors influencing the barriers to help-seeking behaviors were also identified. The researchers concluded that most men refused to report the abuse due to confidentiality issues, shame and embarrassment, and lack of finances to fund the annulment.

Help-seeking was also hindered by factors associated with the concept of Hegemonic Masculinity. Participants felt that they did not fit the character of a socially dominant gender. Due to this internalized stigma, they kept their experiences in secrecy instead. Nevertheless, some men deliberately chose to disclose or seek intervention due to three significant factors: desire for reconciliation, establishing evidence, and alleviating emotional burden.

The results of this study provide a wider perspective on the lived experiences of male victims of domestic violence. Although our participants do not represent the entire population of male victims of domestic violence, the findings speak of their existent plight, which may be further explored in future studies.

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## Declaration of Conflict of Interest

The researchers declare that there is no conflict of interest in this study.

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# Some psychological factors affecting the COVID-19 vaccine confidence of selected residents from Puerto Princesa City



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## Abstract

In the Philippines, vaccine hesitancy became apparent in the early stages of the COVID-19 vaccination campaign. Research on this matter has produced diverse perspectives, with some studies confirming the presence of vaccine hesitancy while others argue that it is not a significant concern. Researchers conducted a qualitative study to explore this matter in-depth, specifically utilizing a survey method. The research aimed to understand how individuals' willingness influenced their confidence in the vaccine and the vaccination process, considering the identified psychological factors. Using purposive sampling, the researchers administered an online survey to 29 unvaccinated residents from barangays San Pedro, San Miguel, San Jose, Tiniguiban, and Macarascas. The semi-structured survey questionnaire consisted of 24 questions related to the participants' perceptions of the COVID-19 vaccination program. Thematic factor analysis, based on the adapted SAGE 3C model of vaccine hesitancy, was employed to identify the underlying psychological factors. The findings revealed that more than half of the participants were willing to be vaccinated, which is associated with their vaccine confidence. The identified psychological factors included anxiety, disinclination, distrust, responsibility, and security. Anxiety, disinclination, and distrust were found to have a negative impact, contributing to hesitancy in receiving a COVID-19 vaccine. In contrast, responsibility and security had a positive influence, contributing to the participants' willingness to get vaccinated. These results suggest that these five psychological factors significantly affect the participants' level of COVID-19 vaccine confidence.

## Keywords

*COVID-19, vaccine confidence determinants, SAGE 3C model, thematic analysis, vaccine hesitancy*

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## 1. Introduction

Scientists have been actively pursuing a cure for Coronavirus Disease 2019 (COVID-19) for over a year since the global outbreak. Among the most promising preventive measures is immunization, provided by various global companies. Despite the World Health Organization's (WHO) measures to ensure vaccine safety and efficacy.

According to Sallam (2021), numerous studies on COVID-19 have reported acceptance rates below 60% in many countries, which, as they point out, could pose a challenge in achieving herd immunity. Similarly, the Proceedings of the National Academy of Sciences of the United States of America (PNAS) (2021) reported a global survey on vaccination trust across 67 countries, indicating an average suspicion level of 5.8% regarding the value of vaccines. In certain countries, this suspicion exceeded 15%.

Furthermore, Browne et al. (2015) investigated vaccine confidence and hesitancy in Brazil, revealing a notable correlation between lower confidence levels and increased vaccine hesitancy among the Brazilian population. The study indicated an overall vaccine hesitancy rate of 16.5%, with a refusal rate of 4.5% (n=43) in a sample of 157 individuals. Among 352 parents of children under five years old, 21.3% had reservations about the vaccine, with 1.7% outright refusing it. However, a separate study focusing on pregnant women noted higher vaccine acceptance rates in India, the Philippines, and all Latin American countries. Conducted through an online survey by Prehistory between October 28 and November 18, 2020, this study collected data from 16 countries, amassing 17,871 survey responses. The results revealed an overall COVID-19 vaccine efficacy rate of 90%, with 52.0% of pregnant women and 73.4% of non-pregnant women expressing willingness to receive the vaccine (Skjefte et al., 2021).

Meanwhile, Baclig (2021) reported that the Philippines ranked lowest in COVID-19 vaccine willingness among 21 countries. A Pulse Asia poll revealed that nearly half Filipinos cited safety concerns for refusing the COVID-19 vaccine. Bautista et al. (2021) suggested that males and individuals with higher educational attainment were more willing to be vaccinated. Another Pulse Asia survey highlighted that despite vaccine availability, 47% of 2,400 Filipino adults expressed unwillingness to be vaccinated. Additionally, 32% were willing, while 21% remained unsure (CNN Philippines Staff, 2020).

Vaccine hesitancy or willingness is largely affected by vaccine confidence and influencing factors. In Brazil, Browne et al. (2015) found that issues in vaccine confidence are the most common reason for vaccine hesitancy. Confidence in vaccines is affected by various influences that may encompass more than just knowledge about the risks and benefits of vaccines. Emotional, cultural, religious, political, social, and cognitive dynamics play significant roles (Badur et al., 2020; Dubé et al., 2013). For example, in a study of Browne et al. (2015), psychosocial factors associated with complementary and alternative medicine (CAM) were examined. These factors included aspects of spirituality, intuitive thinking styles, and the personality trait of openness to experience. The study suggests that vaccination skepticism appears to be the product of a certain cultural and psychological orientation, leading to reluctance to engage with the scientific evidence of vaccination.

According to the World Health Organization COVID-19 data tracker (2021), as of February 18, there have been 176,693,988 confirmed cases, 3,830,304 deaths, and 2,377,780,590 vaccine doses administered worldwide. In the Philippines, the Office of the Presidential Spokesperson (2021) has reported the arrival of 14,205,870 vaccine doses. However, a news report by Sabillo (2021) highlighted the results of an online survey conducted by University of Santo Tomas (UST) professors on October 8, 2020, involving 15,600 Filipinos residing in the Philippines. When asked, "If a vaccine is available in the Philippines, would you use it?" the responses were as follows: 23.7% of participants said they were "yes and confident," 32.1% said "probably yes," 34% were unsure, 6.7% said "probably not," and 3.5% would not take any vaccine.

According to the Department of Health (DOH) MIMAROPA (2021), Palawan received 55,960 vaccine doses between June 08 and 22. Out of this, 144 doses were allocated to Puerto Princesa City, which has a population of 300,346 (Population, 2021). However, as of the time of writing, only 5,042 individuals in Puerto Princesa has received the second or complete dose of the vaccine.

Locally, data from the Philippine DOH COVID-19 tracker (2021) indicates approximately 800 active cases in the province of Palawan in February. More specifically, as of May 28, 2021, the Department of Health reported 2,308 confirmed cases of COVID-19 in Puerto Princesa City as of April 03, 2020. Additionally, the Incident Management Team (IMT) of Puerto Princesa City (2021) disclosed in their May 05 report that 447 confirmed active COVID-19 cases and 140 suspected cases in Puerto Princesa City, Palawan.

Meanwhile, an article in the *Inquirer* (2021) reported that on March 08, the first batch of COVAX vaccines, donated by the Chinese government, arrived in Palawan. These vaccines were intended for the immunization of health frontline workers in the province. However, out of 698 Ospital ng Palawan (ONP) health workers, only 180 received the free vaccine. Others chose to wait for the arrival of the AstraZeneca vaccine, indicating a preference to adopt a wait-and-see approach (Miranda, 2021). This suggests that vaccine hesitancy may be influenced by factors such as the vaccine brand and manufacturer, affecting the COVID-19 vaccine confidence of individuals. Therefore, it is imperative to investigate the factors influencing COVID-19 vaccine confidence, not only among health frontline workers but also among the broader population, especially those residing in areas of Puerto Princesa City with a high incidence of COVID-19 cases.

As COVID-19 cases continue to rise, vaccines have become available in Puerto Princesa City. Survey results reveal that many people are hesitant to receive the vaccine. As a result, the researchers have embarked on a study to explore the COVID-19 vaccine confidence and the underlying psychological factors that impact the confidence among selected residents in Puerto Princesa City. Furthermore, the researchers aim to elucidate how these psychological factors affect the COVID-19 vaccine confidence in the selected residents.

The findings of this research may lay the foundation for future local studies on the role of psychological factors in influencing vaccination campaigns against specific illnesses, particularly COVID-19. Additionally, the results of this study may guide the local government of Puerto Princesa in developing strategies to encourage its citizens to avail themselves of COVID-19 or other vaccines as the world continues to combat this and other health crises.

This study represents the first local research conducted in the City of Puerto Princesa, investigating the psychological factors that influence the acceptance or refusal of vaccines, particularly focusing on determining the level of COVID-19 willingness or hesitancy among selected participants and examining how identified psychological factors shape this. The research framework was guided by the model of vaccine hesitancy provided by the Strategic Advisory Group of Experts (SAGE) on Immunization (2014). According to this model, confidence in vaccines is defined by trust in three critical aspects: 1) their effectiveness and safety; 2) the system responsible for their delivery, encompassing the reliability and competence of health services and professionals; and 3) the motivations of policymakers who determine the necessary vaccines. Vaccine confidence is believed to be interrelated with both vaccine hesitancy and vaccine acceptance.



The SAGE 3C Model of Vaccine Hesitancy views vaccine confidence as one of its determinants and a specific component within a broader framework. This conceptual model investigates the reasons for the delay in vaccine acceptance or refusal, despite the availability of vaccination services—called vaccine hesitancy. It categorizes contributing factors into three main areas: confidence, complacency, and convenience.

Since this study focuses on COVID-19 vaccine hesitancy among selected residents of Puerto Princesa City, the researchers have agreed on these definitions and aimed to narrow their focus to one of the determinants of vaccine hesitancy, which is vaccine confidence. By adopting SAGE's 3C vaccine hesitancy model, researchers could categorize the insights of selected residents of Puerto Princesa City based on contextual, individual, social, and vaccine-specific influences. This classification guided them in exploring the underlying psychological factors that affect the COVID-19 vaccine confidence of selected residents.

## 2. Method

### 2.1. Research Design

This study employed a quantitative and qualitative research design, specifically utilizing the survey method and thematic analysis. The researchers adopted the WHO-SAGE Working Group Model of Vaccine Hesitancy as their framework. This model served as a guide to assess the following aspects: the COVID-19 vaccine confidence among selected residents of Puerto Princesa; the psychological factors influencing their COVID-19 vaccine confidence, which are shaped by contextual, individual, social, and vaccine-specific influences; and how these psychological factors impact their COVID-19 vaccine confidence.

### 2.2 Participant Recruitment and Selection

*Table 1.*

Profile of Selected Residents of Puerto Princesa City

| Barangay of Residence | Frequency | Male | Female |
|-----------------------|-----------|------|--------|
| Tiniguiban            | 6         | 2    | 4      |
| San Pedro             | 6         | 3    | 3      |
| San Jose              | 6         | 4    | 2      |
| San Miguel            | 5         | 3    | 2      |
| Macarascas            | 6         | 0    | 6      |
| Total                 | 29        | 12   | 17     |

Due to the limitations imposed by the COVID-19 pandemic, the researchers deliberately selected adult participants who did not belong to priority groups defined by the Department of Health (DOH), such as front liners, minors, and senior citizens. This decision was motivated by the greater accessibility of adults, particularly during intermittent lockdowns, and their proficiency in using digital platforms for data collection.

Furthermore, participants were required to be bona fide residents of the top five barangays with the highest recorded cases of COVID-19 infections. This selection aimed to narrow the study's focus to the COVID-19 vaccine confidence among participants from these barangays, potentially shedding light on the increased number of COVID-19 infections in the locality.

The study's participants included 29 Puerto Princesa City residents aged between 21 and 52, within the criteria of 21-59 years. Most were female, comprising 17 out of the 29 participants, or 58.6%. In addition, an equal number of participants were drawn from all barangays, except for Barangay San Miguel, which had five participants compared to the six from the other barangays. Table 1 displays the frequency distribution of participants according to their barangay of residence and gender.

The study employed an online written survey to comply with minimum public health standards. Twenty-nine selected residents from Puerto Princesa were surveyed using purposive sampling. These residents were specifically chosen from Barangay Tiniguiban, San Pedro, San Jose, San Miguel, and Macarascas — the top five barangays with the highest number of COVID-19 cases recorded from May 03 to May 05, 2021, according to the report from the City Incident Management Team. The inclusion criteria encompassed individuals aged 21-59, unvaccinated against COVID-19, and verified as genuine residents of the mentioned barangays.

### 2.3 Data Collection

The selected residents responded to a 24-item semi-structured survey questionnaire. This questionnaire was designed to align with the problem statement presented in the earlier sections of the paper. The questions begin with whether the participants wished to receive the COVID-19 vaccine. Subsequently, participants were prompted to elaborate on the reasons behind their decisions. They were also asked if they desired their loved ones to be vaccinated and how they believed such vaccinations might impact themselves and the community.

The survey questionnaire underwent content validation and received approval from various experts. Subsequently, instrument validation was conducted through pilot testing. Tagalog translations of the questions were included to ensure that the questions were easily understandable to the selected residents.

The researchers administered the questionnaire to a smaller sample of selected residents from Puerto Princesa, who were excluded from the actual participants. The pilot study yielded promising results, as the questionnaires were comprehensible to the participants and provided the necessary answers.

Adhering to local health protocols, the researchers coordinated with barangay officials online and submitted a letter requesting their assistance in inviting potential participants. This was complemented by promotional materials posted by the researchers on the Facebook page they had established to attract more participants. Upon identifying and selecting potential participants, the researchers contacted them and presented the approved letter, informed consent form, and the code of ethics. After obtaining approval, the researchers discussed the necessary instructions and provided information.

The primary survey platform used was Google Forms. However, some residents participated via Facebook Messenger, which was also acceptable. This study adhered to the precautions implemented during the pandemic.

Furthermore, the study's ethical considerations were reviewed by the in-house technical reviewer of the Palawan State University Research Office; however, it did not undergo deliberation by a research ethics committee (REC).



## 2.4 Data Analysis

This is a qualitative study that utilizes a survey method. However, to gauge the COVID-19 vaccine hesitancy or willingness among selected residents, percentages were utilized to determine how many participants were willing, unwilling, or undecided.

In examining psychological factors and their effects on COVID-19 vaccine confidence among selected residents, thematic and factor analyses were employed. Thematic analysis was conducted using QDA Miner Lite, a qualitative data organizer, with an adaptation of the SAGE 3C model of vaccine hesitancy. The SAGE 3C model of vaccine hesitancy postulates that vaccine uptake is influenced by confidence, convenience, and complacency determinants. This paper primarily focused on the confidence pillar.

## 3. Findings

*Table 2.*

COVID-19 Vaccine Willingness of Selected Participants of Puerto Princesa City

| COVID-19 Vaccine Willingness of Selected Participants | Frequency | Percentage |
|-------------------------------------------------------|-----------|------------|
| Willing                                               | 15        | 51.7       |
| Unwilling                                             | 6         | 20.6       |
| Undecided                                             | 8         | 27.5       |
| Total                                                 | 29        | 100%       |

The table illustrates that most selected participants, specifically 15 out of 29 (51.7%), are willing to receive a COVID-19 vaccine. In contrast, 20.6% of the participants (six individuals) expressed unwillingness to get vaccinated, while 27.5% (eight participants) remained undecided at the time of the survey. Most selected residents demonstrate confidence in vaccinating against COVID-19, as evidenced by their willingness and positive attitudes regarding its benefits. Furthermore, the findings highlight a sense of responsibility for the community's welfare and a personal sense of security as the primary psychological factors influencing this confidence.

*Table 3.*

Psychological Factors Affecting the COVID-19 Vaccine Confidence of Selected Residents and its Determinants

| Psychological Factor    | Influences |            |        |                  |
|-------------------------|------------|------------|--------|------------------|
|                         | Contextual | Individual | Social | Vaccine-specific |
| Anxiety                 | /          | /          | /      | -                |
| Disinclination          | -          | /          | -      | /                |
| Distrust                | /          | /          | -      | /                |
| Sense of Responsibility | -          | /          | /      | -                |
| Sense of Security       | /          | /          | /      | /                |

Note: The use of '/' signifies that anxiety is influenced by the following factors, whereas '-' indicates the absence of anxiety within those specific influences

The SAGE working group on vaccine hesitancy defines vaccine confidence as trust in these three key aspects: 1) the effectiveness and safety of vaccines; 2) the system responsible for delivering them, including the reliability and competence of health services and professionals; and 3) the motivations of policymakers who determine the necessary vaccines. In addition to this definition, this paper incorporates the influences outlined in the SAGE 3C model of vaccine hesitancy, which encompasses contextual, individual, social, and vaccine-specific influences. Contextual influences can stem from health and institutional systems, as well as historical, sociocultural, environmental, economic, and political factors. Individual and social influences pertain to perceptions and beliefs shaped by personal viewpoints or peer and group influences. Lastly, vaccine-specific influences relate directly to vaccines and the vaccination rollout. These influences serve as the foundation from which psychological factors affecting the COVID-19 vaccine confidence of selected residents emerge. A combination of factors analysis and thematic analysis was employed to analyze these factors, revealing five primary psychological factors: anxiety, disinclination, distrust, sense of responsibility, and sense of security. Table 3 summarizes these psychological factors and their corresponding determinants influencing the COVID-19 vaccine confidence of selected residents.

#### a. Anxiety

Anxiety is commonly observed in human cultures worldwide and in several animal species (Damasio & Carvalho, 2013). It is a psychological factor that manifests as a sense of dread and uneasiness when contemplating receiving the COVID-19 vaccine, as exhibited by selected residents. Contextual, individual, and social factors influence anxiety.

##### 3.1.1 Contextual Influence: Communication and Media Environment

Among the contextual influences outlined in the SAGE 3C model, the communication and media environment primarily impact anxiety. The news and information that selected residents receive from various media and social platforms significantly affect their confidence in getting vaccinated. This influence may stem from the negative information that tends to induce anxiety. Reports about vaccine-related deaths and adverse reactions to the COVID-19 vaccine generate feelings of dread among selected residents. These individuals express concerns about the prospect of death following vaccination and anxiety regarding potential adverse effects influenced by the information they encounter. As the participant expressed,

*Nakakatakot kasi baka kapag nagpabakuna ka baka mamatay ka bigla.* [It's scary because you may die after getting vaccinated.] - Participant 1

*Nakakakaba po pag may narinig o nabalitaan pong masama patungkol sa bakuna. Yung sa mga balita po na naririnig ko na negatibong epekto ng bakuna lalo na sa aming may mga edad na.* [It's nerve-racking whenever I hear, or I find out bad things about vaccine. I've heard news reports regarding vaccine side effects, particularly to elderly people.] - Participant 16

Furthermore, the media's alarming reports of increasing infections contribute to anxiety among selected residents, leading to their indifference toward COVID-19 vaccines and their effectiveness. This sentiment is evident in the following statements:



*Kinakabahan po ako pag meron akong nakikitang balita na may issue sa vaccine. Kasi po, kahit may mga nagpabakuna na nag-papositive pa rin po. Tsaka may mga balita po akong nakikita sa social media tungkol sa side effects ng bakuna. [I am worried whenever I see news that vaccines have issues. It is because there is no assurance after getting vaccinated. Some also got their dose and yet tested positive. Moreover, I also hear news on social media about the vaccine's side effects.] - Participant 6*

*Dumadami na ang cases sa Palawan at nakakakaba masyado kapag nagkakaroon ng sakit (ubo, sipon etc na related sa symptoms ng COVID. Media kasi yung source of information natin, lalo na sa ngayon. Madaming fake news about vaccines so mas nakakagulo ng desisyon sa buhay. [The number of cases in Palawan is increasing and it is very scary when there is an illness (cough, cold, etc. that is related to covid symptoms.) Media is our source of information, especially right now. There is a lot of fake news about vaccines that make life decisions even more confusing.] – Participant 28*

### 3.1.2 Individual Influences: Beliefs, Attitudes About Health and Prevention

Beliefs and attitudes about health and prevention, categorized as individual influences in the SAGE 3C model, are crucial in influencing anxiety among selected residents. Specifically, individual beliefs and health-related attitudes, such as the fear of needles and personal health concerns, contribute to feelings of dread and unease regarding vaccination. This uneasiness negatively impacts them as it hinders them from pursuing vaccination despite their trust in health professionals and the vaccines themselves. The selected residents fear potential adverse effects on their bodies, even though they acknowledge the vaccine's importance and may know individuals who have already received it.

For example, one participant shared her experience with vaccinations, expressing trust in the available COVID-19 vaccine brands and those responsible for its administration. When questioned about how she would fare if she declined the COVID-19 vaccine, she responded:

*Madaling mahahawa ng COVID. [I may easily contract COVID.] - Participant 12*

However, she remains undecided about receiving the vaccine due to concerns about her health, given her underlying medical condition.

### 3.1.3 Social Influence: Community Members' Experience with Vaccination

The SAGE 3C model's social influences encompass the experiences of community members with vaccination. The findings of this study align with this aspect, as anxiety is shown to be influenced by the knowledge of selected residents regarding their peers' past experiences with COVID-19 vaccination. Instances where community members had negative experiences with the COVID-19 vaccine tend to instill anxiety in selected residents, subsequently affecting their confidence in getting vaccinated.

For instance, one participant mentioned knowing someone who passed away after allegedly developing an illness following the COVID-19 vaccine, which has left her uncertain about whether to receive the vaccine. Another participant shared:

*May kakilala akong namatay dahil nagkasakit mula nang mabakunahan kaya natatakot akong mangyari sa akin iyon. [I know someone who died because of illness developed after vaccination. That is why I am afraid it might happen to me.] - Participant 12*

## 3.2 Disinclination

Disinclination, a psychological factor, refers to the reluctance to receive the COVID-19 vaccine due to a lack of enthusiasm. It is influenced by the individual's knowledge and awareness of vaccination details and attitude toward the vaccine delivery method. Both individual and vaccine-specific factors influence disinclination.

### 3.2.1 Individual Influence: Knowledge and Awareness About the Vaccines

Disinclination is a psychological factor influenced by the personal choices of selected residents, primarily stemming from a lack of knowledge or awareness about vaccination. One participant, who also exhibited anxiety, reported that she is not inclined to get vaccinated due to her limited awareness and knowledge about the vaccines. As expressed below:

*Hindi pa po ako makapili. Di ko pa po masyadong alam yung tungkol sa bakuna.*  
[No, I cannot choose yet since I know little about vaccines.] - Participant 6

### 3.2.2 Vaccine-Specific Influence: Attitude About the Vaccine Mode of Delivery

Apart from personal preference, disinclination is also influenced by the attitude of selected residents towards the mode of vaccine delivery, including feelings of laziness evoked by the vaccination process. Participants' attitudes toward administering vaccines affect their willingness to get vaccinated. Participant 2 expressed his willingness to get vaccinated but noted that it was hindered by the inconvenience of waiting in line at the vaccination site, which he perceived as a waste of time. This sentiment is reflected in the statements below:

*Oo, mayroon akong balak magpabakuna pero tinatamad pa ako. Tinatamad po ako pumila.* [I am willing to be vaccinated but I am too lazy to do it. I feel lazy to wait in line.] Waste of time. I am a busy person. - Participant 2

## 3.3 Distrust

Findings reveal that distrust is one of the psychological factors negatively impacting the COVID-19 vaccine confidence of selected residents. This distrust arises from misinformation received by participants, skepticism regarding the vaccine's effectiveness, and controversies surrounding its potential risks. The lack of trust in COVID-19 vaccines diminishes the willingness of selected participants to get vaccinated. Contextual, individual, and vaccine-specific influences primarily shape distrust.

### 3.3.1 Contextual Influence: Skepticism About the Government's Policies

The primary sources of distrust are skepticism about the government's policies regarding the vaccination program and a lack of trust in the government's preventive measures against COVID-19. For instance, an undecided selected resident expressed disbelief in the government's handling of the pandemic response, stating:

I do not trust any government on the planet. I do not pay attention. The Government will use lockdowns as control measures for as long as possible. This has very little to do with public health. - Participant 12



In another account, a selected resident recounted how her willingness to get vaccinated was affected when her trust in the vaccination process decreased. This occurred when she heard that their barangay officials offered money to incentivize people to vaccinate. She felt that this initiative by the local government reduced the value of their lives and safety to a monetary incentive. As stated by one participant:

*Meron dahil magbigay sila ng 500 pesos bawat isa. Sa akin lang po, yun lang po ba ang halaga ng buhay ng tao? Kung magbigay po ng magandang serbisyo ang gobyerno tungkol sa COVID-19, sana wag naman pong lantaran na magbigay sila ng pera. Dahil sa hirap po ng buhay ngayon, papatusin po nila yan, may pambili lang ng bigas.* [There is. Because they are giving 500 pesos each. In my opinion, does that equate with the value of life of a person? If the government is giving good service regarding COVID-19, I hope they do not give money openly like that. Because of how poor life is nowadays, the people will accept it for food.] - Participant 20

### 3.3.2 Individual Influences: Lack of Trust in Health Providers

Distrust influenced by individual factors arises from suspicions regarding the health providers, the efficacy, and potential risks of the vaccine. This highlights the importance of instilling confidence in individuals that the vaccine is effective and safe without endangering their lives. One participant wrote:

*Hindi ako sumasang-ayon dahil sa hindi natin alam ang magiging epekto sa ating katawan. Kahit sabihin pa ng doctor na wala po tayong sakit, hindi kami kasiguraduhan na 100% ligtas kami sa pagpapabakuna.* [I do not agree (to be vaccinated) because we don't know the effect of the vaccine on our body even if doctors say that we are/will be fine, no, because we are not sure if getting a vaccine is 100% safe.] - Participant 20

### 3.3.3 Vaccine-Specific Influences: Risk

Vaccine-specific influences, as outlined in the SAGE 3C model, encompass health risks and vaccine side effects. The selected residents' primary reasons for their unwillingness to vaccinate are concerns related to the vaccine's efficacy and potential health risks. These concerns significantly contribute to their distrust, as they are apprehensive about jeopardizing their lives through vaccination. Participant 7, an undecided participant, said

I have been vaccinated all my life. I do not see any point in a vaccine that does not work. Other countries still have severe cases, with over 50% vaccinated.  
– Participant 7

Aside from concerns about the vaccine's efficacy, the distrust among selected residents regarding COVID-19 can also be linked to suspicions about the motives behind the vaccine's development. An unwilling participant expressed these concerns, stating:

*Isa itong pasimula na madali na lang tayo i-manipulate kung ito ay naka-program na sa nanotechnology.* [If it is programmed nanotechnology, it is the beginning of manipulation.] - Participant 13

## 3.4 Sense of Responsibility

Sense of responsibility is a psychological factor that refers to the awareness and perception of an obligation to society to vaccinate against COVID-19. Personal and collective beliefs and attitudes about health and prevention primarily influence it. Individual and social influences shape responsibility.

### 3.4.1 Individual Influences: Beliefs, Attitudes About Health and Prevention

The individual sense of responsibility selected residents hold regarding health and prevention, such as their belief in "contributing to society" and the perception that "getting vaccinated is the right thing to do," enhances their willingness to accept COVID-19 vaccines.

I am willing to be vaccinated against COVID-19 because it is the right thing to do and to contribute to our country/society and front liners. I always look forward to either positive or negative results. At least I tried to be responsible; vaccination is the key to returning to normal life. - Participant 10

### 3.4.2 Social Influence: Peers' Experience With Vaccination

A socially influenced sense of responsibility has also impacted the COVID-19 vaccine confidence among selected residents. Notably, the vaccination requirements imposed by peers at work tend to influence how these residents perceive vaccination. For instance, even though one selected resident is initially unwilling to get vaccinated, she remains hopeful that life can return to normal because of the COVID-19 vaccination. When asked if any events influenced her willingness to get vaccinated, she shared that her friends have already been vaccinated because it is required for their jobs. Thus, they consider it their responsibility to ensure they all receive the vaccine.

## 3.5 Sense of Security

Sense of security is a psychological factor defined as the feeling of emotional assurance brought about by the perceived positive and comforting effects of getting vaccinated against COVID-19. This psychological factor emanates from various contextual, individual, social, and vaccine-specific influences.

### 3.5.1 Contextual Influence: Media and Governance

On the flip side, the media, as one of the tools for disseminating information to the public, positively impacted COVID-19 vaccine confidence among selected residents. Some participants viewed the media as helpful in informing the public about the vaccine's benefits, which in turn boosted their COVID-19 vaccine confidence. As stated below,

*Oo, gusto ko magpabakuna kasi sabi sa balita ito ay para maprotektahan ko ang aking sarili at ang tao sa aking paligid kontra sa virus. Mayroon ding testimonya na okay naman sila pagkatapos magpabakuna* [Yes, I am willing to be vaccinated, because based on the news it can protect me and the people around from the virus. More so, some testimonials stated that they did not experience anything after being vaccinated.] - Participant 4

Similarly, the government also influences the sense of security among selected residents. Governmental policies have been instrumental in increasing confidence in getting vaccinated. As implied by a participant, the COVID-19 vaccination program plays a crucial role in preventing the spread of the virus. One participant said,



*Malaking tulong ito (government vaccination program) na makaiwas tayo tamaan ng COVID-19. Dahil sila ang mas nakakaalam kung ano ang dapat gawin sa mga tinamaan ng COVID.* [Government vaccination program is helpful in preventing acquiring the virus. Government is aware of what to do if you acquire the virus.]

- Participant 26

### 3.5.2 Individual Influence: Benefit

Sense of security is most evident in individual influences and is linked to the implied reason of "being safe and protected" from the virus. Selected residents believe vaccinating will protect their bodies and provide immunity against COVID-19. Participant 2's statement is like Participant 4's reflected below.

*Para na rin sa aking sarili at mga mahal sa buhay. At para na rin sa kaligtasan para maprotektahan at maging immune laban sa COVID-19.* [For myself and my family. For our safety and to be protected and immune against COVID-19.]

- Participant 4

Moreover, selected residents believe that getting vaccinated will protect them and provide them with comfort in returning to normal, as stated below.

*Sumasang-ayon akong magpabakuna upang maging ligtas at di basta-bastang makakapitan ng sakit na COVID-19 at mapanatag ang loob kung saan man magpunta.* [I agree to be vaccinated to be safe and have immunity against COVID-19 and comfortable everywhere I go.] - Participant 21

If people are willing to be vaccinated, it could be the way for us to return to normal lives. Nevertheless, that is their decision, and I respect that. - Participant 10

### 3.5.3 Social Influences: Peer Experience and Trust on Healthcare Providers

A socially influenced sense of security is derived from the experiences of community members who have previously been vaccinated against COVID-19. Selected residents express their willingness to get vaccinated because their peers have done so and had no adverse effects, recognizing its necessity for public safety. As mentioned by a participant:

*Oo dahil wala namang masamang nangyari sa mga kasama ko. Dahil kailangan nila ito at para sa kaligtasan. Para na rin sa mamamayang kanilang nasasakupan. Gayun pang wala namang masamang nangyari sa kakilala ko.* [Yes, because nothing bad has happened to people I know have been vaccinated. For the safety and for the sake of the people in the community. More so, those individuals who got their shots are still fine.] - Participant 2

In addition, family, as part of social influences, bolsters the willingness of selected residents to get vaccinated. They want to receive the vaccine to ensure the safety of their families and are encouraged by their neighbors and relatives. This is evident in the statement below:

*Oo, gusto kung magpabakuna para na rin sa safety ng pamilya ko kontra sa virus. Ang pamilya at kapitbahay namin ang nag-udyok sa akin magpabakuna dahil maganda ang epekto nito sa kanila.* [I am willing to be vaccinated not only for my safety but also for my family's protection. My family and neighborhood encouraged me to get vaccinated as it has good effects to their health.] - Participant 4

Trust in health workers is evident in the socially influenced sense of security among selected residents who express willingness to get vaccinated. They are acquainted with health workers and believe they are experts in COVID-19 vaccination, as mentioned below:

*Oo, marami akong kaibigan na propesyunal at ginawa naman nila ang makakaya nila para sa publiko. Base sa aking karanasan, mayroong mga survivors na nag-share ng story na nanghikayat sa aking magpabakuna.* [Yes, I have a lot of friends who are working in this field, and I know they are doing their best for the public. Based on my experience, some survivors shared their stories which encouraged me to get vaccinated.] - Participant 5

*Opo, para maligtas sa COVID. Opo nagtitiwala po ako kasi po inaral po nila iyon.* [Yes, to be safe from COVID-19. Yes, I trust them because they studied it.] - Participant 6

### 3.5.4 Vaccine-Specific Influence: Benefit

A sense of security influenced by concerns about the efficacy of the vaccines, particularly their benefits, tends to increase the confidence among selected residents to get vaccinated against COVID-19. Specific components of the vaccine that offer protection to one's health are explicitly cited as a major motivation. Selected residents are willing to be vaccinated because they believe antibodies will provide them with protection and reduce the risk of contracting the virus, as reflected by the statements below:

I am willing to be vaccinated against COVID-19 because these antibodies will protect me. Vaccines continue to reduce a person's risk of contracting the virus that causes COVID-19, including this variant. - Participant 11

Table 4.

Frequency of Selected Residents Who Exhibited the Psychological Factors Concerning Their Willingness to Get Vaccinated Against COVID-19

| Psychological Factors   | Willingness of Selected Residents Who Exhibited it |           |           |
|-------------------------|----------------------------------------------------|-----------|-----------|
|                         | Willing                                            | Unwilling | Undecided |
| Anxiety                 | 4                                                  | 5         | 5         |
| Disinclination          | 1                                                  | -         | 1         |
| Distrust                | -                                                  | 3         | 1         |
| Sense of Responsibility | 8                                                  | 1         | -         |
| Sense of Security       | 2                                                  | -         | -         |

Note: The use of '-' indicates no response recorded.

The effect of the determined psychological factors on the COVID-19 vaccine confidence (in terms of willingness) among selected residents was analyzed using the roster of participants who exhibited them concerning their reported COVID-19 vaccine confidence. Table 4 provides a summary of these findings. Psychological factors predominantly exhibited by those willing to be vaccinated against COVID-19 among



selected residents were considered to affect their COVID-19 vaccine confidence positively. Conversely, psychological factors predominantly exhibited by selected residents who were hesitant and undecided to get vaccinated were considered to impact their COVID-19 vaccine confidence.

#### **4.1 Anxiety: Negative**

Out of the 14 participants who displayed anxiety, five were unwilling, five were undecided, and four were willing to be vaccinated. This suggests that anxiety negatively affects the COVID-19 vaccine confidence of selected residents, as most participants who exhibited it were not complacent about getting vaccinated. This aligns with the idea that anxiety is manifested as selected residents' feelings of dread and uneasiness at the thought of getting vaccinated against COVID-19.

#### **4.2 Disinclination: Negative**

Two participants who displayed disinclination were willing and unwilling, respectively. Despite having confidence among the selected residents who exhibited it, disinclination tends to negatively affect the COVID-19 vaccine confidence of selected residents. This is because the participant who is willing but disinclined to get vaccinated reports being hesitant to undertake it, resulting in the same negative effect—a hindrance to vaccination.

#### **4.3 Distrust: Negative**

Three participants who exhibited distrust are unwilling to get vaccinated against COVID-19, and one is undecided. This explains why distrust negatively affects the COVID-19 vaccine confidence of selected residents. Distrust hinders the participants from getting vaccinated as they are skeptical about the vaccines, the vaccination scheme, and the information they receive.

#### **4.4 Sense of Responsibility: Positive**

Two participants who displayed a sense of responsibility reported being willing to vaccinate against COVID-19. This is precisely why it falls into the positive dimension. A sense of responsibility prompts selected residents to become aware of their obligation to society and public health, making them realize the importance of vaccination.

#### **4.5 Sense of Security: Positive**

Eight out of nine selected residents who exhibited a sense of security expressed willingness to get vaccinated. Only one participant refused to get inoculated. Nonetheless, this participant acknowledged that it is necessary to get vaccinated as it will provide security. Therefore, the sense of security positively affects the confidence of selected residents of Puerto Princesa, as it gives them hope that COVID-19 vaccines provide benefits that can help them feel safe and comfortable.

### **5. Discussion**

Local and international research indicates that most people are willing to be vaccinated against COVID-19 (Bautista et al., 2021; Danabal et al., 2021; Yoda & Katsuyama, 2021). This paper supports these findings, as a majority of 51.7% of selected residents report being willing to get vaccinated against COVID-19. This figure may increase to 82% if participants become convinced that COVID-19 vaccines are effective (Bautista et al., 2021).

Psychological factors affecting the COVID-19 vaccine confidence of selected residents in Puerto Princesa are anxiety, distrust, and disinclination. These three factors tend to negatively impact COVID-19 vaccine confidence. Anxiety refers to the uneasiness that selected residents feel about the idea of getting vaccinated against COVID-19. In contrast to Bendau et al. (2021), this study found that anxiety related to vaccination

has a negative effect on COVID-19 vaccine confidence. Fear of side effects is the primary reason for vaccine refusal, and an overemphasizing of COVID-19 vaccine side effects in media could lead to a lower vaccination rate (Yoda & Katsuyama, 2021).

Distrust relates to selected residents' lack of trust in the vaccines and the system responsible for their delivery. Low trust in the government, skepticism about the efficiency of implemented measures, and doubts about the accuracy of information regarding COVID-19 are associated with a higher likelihood of vaccine refusal (Roberts et al., 2021; Soares et al., 2021). Despite vaccines' relatively low risk, people may still believe otherwise (Fefferman & Naumova., 2015).

Disinclination signifies the disinterest of selected residents in getting vaccinated against COVID-19. Unlike the findings of Robledo et al. (2021), whose participants favored receiving the free COVID-19 vaccine, selected residents expressed disinterest, primarily due to waiting in line. In another study, some individuals who do not consider COVID-19 a significant risk believe they can protect themselves naturally (İkişik et al., 2021).

However, a sense of security and responsibility are psychological factors found in this study to impact COVID-19 vaccine confidence among selected residents positively. Those willing to be vaccinated against COVID-19 cited personal protection and communal responsibility as reasons for their willingness (Roberts et al., 2021). Attitudes toward COVID-19 vaccines are shaped by individuals' lived experiences aligned with their personal and communal interests (Paul et al., 2022). Building vaccine confidence is essential to reach the required vaccine levels and significantly reduce the risks of COVID-19 infection in communities (Kaufman et al., 2021, p. 16). Vaccines are effective for populations that accept them, but they can also have negative effects and outcomes in populations with high levels of rejection (Fefferman & Naumova, 2015). Addressing psychological factors such as anxiety, distrust, and disinclination is crucial to increasing vaccine confidence and acceptance.

An account by the Organization for Economic Co-operation and Development (2021) highlighted the pivotal role of the government in shaping constituents' trust and acceptance of vaccines. Furthermore, the government can devise tailored approaches to alleviate the distrust among specific residents regarding the vaccine, its delivery system, and its efficacy. Addressing anxiety related to potential COVID-19 vaccine side effects is also imperative. Browne et al. (2015) discovered that enhancing vaccination compliance is achievable by fostering general confidence in evidence-based medicine or leveraging associated attributes. Effective vaccination strategies should adopt participatory methods, foster trust, engage communities, and implement communication campaigns on vaccine advancements (Fadda et al., 2021). By relying on evidence-based medicine, targeted residents' anxiety and distrust may be alleviated, fostering a sense of security and responsibility. Moreover, instilling greater trust in healthcare professionals rather than relying on one's social circle can bolster vaccine confidence and uptake (Mannan & Farhana, 2021).

Therefore, given that vaccine hesitancy correlates with vaccine confidence, we can infer that participants' willingness to receive vaccination reflects their confidence level, influenced by various factors. A closer examination reveals that negative factors contribute to hesitancy among participants, resulting in a lower confidence level. These negative effects stem from four psychological factors: contextual, individual, social, and vaccine-specific. Conversely, positive psychological factors motivate individuals to seek vaccination as they shape their confidence in getting vaccinated.



The findings of this study provide insights into the underlying psychological factors affecting COVID-19 vaccine confidence among selected residents in Puerto Princesa. This study is a foundational assessment of COVID-19 vaccine confidence within this population, guiding local intervention strategies to bolster confidence. The study suggests a divergence in participants' attitudes: while some are willing to be vaccinated, others display low confidence. This discrepancy could be attributed to misinformation and isolated cases of adverse effects post-vaccination. Notably, psychological factors such as anxiety, disinclination, distrust, sense of responsibility, and security exert both negative and positive influences on vaccine acceptance.

Overall, the researchers have considered the study's discrepancies and limitations, encompassing variations in sample sizes, constructs, and demographic locations. The study's findings and evidence from other studies demonstrate diversified levels of COVID-19 vaccine confidence globally.

## **6. Conclusion**

Generally, most selected residents showed willingness to be vaccinated against COVID-19, with 51.7% expressing their willingness for a COVID-19 vaccination. As supported by literature, this inclination is associated with their confidence. However, various psychological factors influence vaccine confidence among these residents. Anxiety, disinclination, and distrust have adverse effects on their willingness to get vaccinated. Conversely, a sense of responsibility and security positively encourage selected residents to receive the vaccine.

After examining the impact of these psychological factors, they significantly affect the participants' willingness or hesitancy towards vaccination, which correlates to their vaccine confidence. These factors act as either hindrances or facilitators to their confidence in the vaccine. Consequently, vaccination strategies should prioritize trust-building through evidence-based medicine, community engagement, and public education campaigns emphasizing the importance of COVID-19 vaccination.

## **7. Recommendations**

The researchers acknowledge the limitations observed in conducting this study and offer the following recommendations:

1. To the local government of Puerto Princesa: Implement information dissemination initiatives through programs, posters, and public commercials (infomercials) to address the findings of this study. These efforts can help increase community awareness, which could affect their vaccine confidence.
2. To students and teachers: Encourage further research and the organization of programs to raise community awareness about COVID-19 vaccination. Additional studies are needed to yield more robust and conclusive results that support the findings of this study.
3. To researchers and future researchers: Recognize that the sample size in this study was limited, and therefore, the results may not be generalized to the entire population. It is recommended to involve a larger and more diverse group of participants in future research to enhance result generalizability. Moreover, consider utilizing various sampling techniques to ensure a representative sample. Replicating this research with larger samples and employing more advanced sampling and data-gathering methods is essential for obtaining broadly applicable outcomes.

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## Declaration of Conflict of Interest

The researchers declare that no conflict of interest is involved in this study.

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# Soil erosion control and nutrient cycling capacity of Palawan State University rubber plantation in Rizal, Palawan, Philippines



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## Abstract

The study determined the capacity of the ten-year-old rubber plantation (*Hevea brasiliensis*) of Palawan State University (PalawanSU) and the adjacent natural forest to control soil erosion and cycle nutrients. This was done by collecting eroded soils from these sampling sites every two weeks from February to May 2018. Results of the study show that the PalawanSU rubber plantation has better soil erosion control and nutrient cycling capacity than the adjacent natural forest. There was a significant difference ( $p < 0.05$ ) in the amount of eroded soils in the rubber plantation at 24.34 kg ha<sup>-1</sup> yr<sup>-1</sup> and the natural forest at 47.69 kg ha<sup>-1</sup> yr<sup>-1</sup>. This means that the plantation's capacity to hold soil in place is almost twice as high. Phosphorus was found to be significantly higher in the rubber plantation soils. Together with potassium, it was also higher in its leaf litter. Additionally, its nutrient conservation mechanism can further increase its value as an essential economic crop that can accommodate seasonal drought stresses in Palawan and elsewhere in the country.

## Keywords

*rubber plantation, soil erosion, nutrient cycling, rehabilitation of denuded lands, re-translocation of nutrients, nutrient conservation mechanism*

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## 1. Introduction

### 1.1 Farming as the Main Livelihood of the Palaw'ans Residing in Mount Matalingahan Protected Landscape

There used to be a serious concern for Palawan's highest mountain, Mt. Mantalingahan, standing at 2,072.64 m above sea level and said to be the largest source of income for 98% of the indigenous people (IP) in the Province of Palawan (Docto, 2015). This is because the IP communities living within and near the mountain consider the conventional method and indigenous knowledge in farming and gathering forest products as their primary means of livelihood. Among these IP communities are the Palaw'ans. Like many other IPs residing in Mount Matalingahan Protected Landscape (MMPL), this tribe relies heavily on farming, poaching, and gathering forest products. Docto (2015) reported that among the indigenous people in the province, the Palaw'ans, constituted the majority, 84.2%. In his study describing this tribe's agricultural practices, he cited farming as the area's primary source of Palaw'ans' livelihood. "Nine percent



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of the residents are using the traditional or labor-intensive methods of farming, while the majority (84.8%) are practicing the slash-and-burn or *kaingin* method” (Docto, 2015, p.8). The DENR-Biodiversity Management Bureau (2016) supports the above findings by reporting that the IPs within the MMPL employ the conventional method and indigenous knowledge in farming and gathering forest products as their primary means of livelihood. These conventional means of living include shifting cultivation, locally known as *kaingin* (slash and burn), which is described as a farming method that involves cutting down trees, burning them, and plowing the ashes as fertilizer (DENR-Biodiversity Management Bureau, 2016).

## 1.2 Palawan State University’s Initiative to Conserve MMPL

Among the government institutions that offered to help conserve MMPL was Palawan State University, which established a 50-ha rubber plantation (*Hevea brasiliensis*) (along the boundary of the villages of Candawaga and Culasian in Rizal, Palawan, Philippines). The plantation was established in sloping areas (at 18% slope) at the foot of the mountain that is dominated by shrubs and grasses and, hence, vulnerable to erosion (Josefsson, 2016; Siswanto & Sule, 2019). Other than protecting the soil from further degradation, the project was to help relieve the mountains from degradation pressures from forest-destructive means of livelihood of the communities living near it. By giving the Palaw’an an alternative means of livelihood and diverting their interests to rubber farming, the proponents of the rubber plantation establishment project aimed to help rehabilitate denuded lands through reforestation and reduce illegal forest activities, particularly *kaingin*. The Development Bank of the Philippines (DBP) Forest Development Program also supported the project to primarily enhance the protection of the environment by selecting open forest areas for planting trees to reduce soil erosion.

## 1.3 Rubber Plantations’ Significant Contributions to Nutrient Cycling and Soil Erosion Control

However, the problem with establishing a rubber plantation in the past 10 to 15 years was that while the purpose is to rehabilitate and reforest denuded lands, plantations have been viewed negatively by the majority. This is because in some areas of the country and other parts of the world, increasing demands for this high-value crop rubber has led to the massive land conversion of forest lands to rubber plantations, causing biodiversity loss, soil erosion, and other environmental damages (Josefsson, 2016; Lan et al., 2017; Li et al. 2016; Roy et al., 2014). Studies have also shown that the leading cause of the ecological adversities of rubber plantations is their monoculture nature, as cited by Chakraborty et al. (2018), He and Martin (2015), and Ziegler et al. (2009). Monoculture plantations, as explained by these authors, are less capable of nurturing understory vegetation, a significant control of soil erosion.

Contrary to the opposing views about rubber plantation establishment being detrimental to the environment and amid rising issues about soil loss along with soil nutrient depletion due to land conversions from natural forests to rubber plantations, research conducted by Josefsson (2016), Lan et al. (2017), Li et al. (2016), and Roy et al. (2014) suggested that rubber plantations have significant ecological contributions. Among these ecological functions are nutrient cycling and soil erosion control. Rubber trees have the nutrient conservation process of re-translocation of nutrients, which distributes nutrients to the different parts of their system. This process reduces the trees’ reliance on soil nutrients and enhances soil nutrients through the trees’ leaf litter, where nutrients have been re-translocated (Li et al., 2016).

## 1.4 Need to Determine PalawanSU Rubber Plantation’s Ecological Contribution

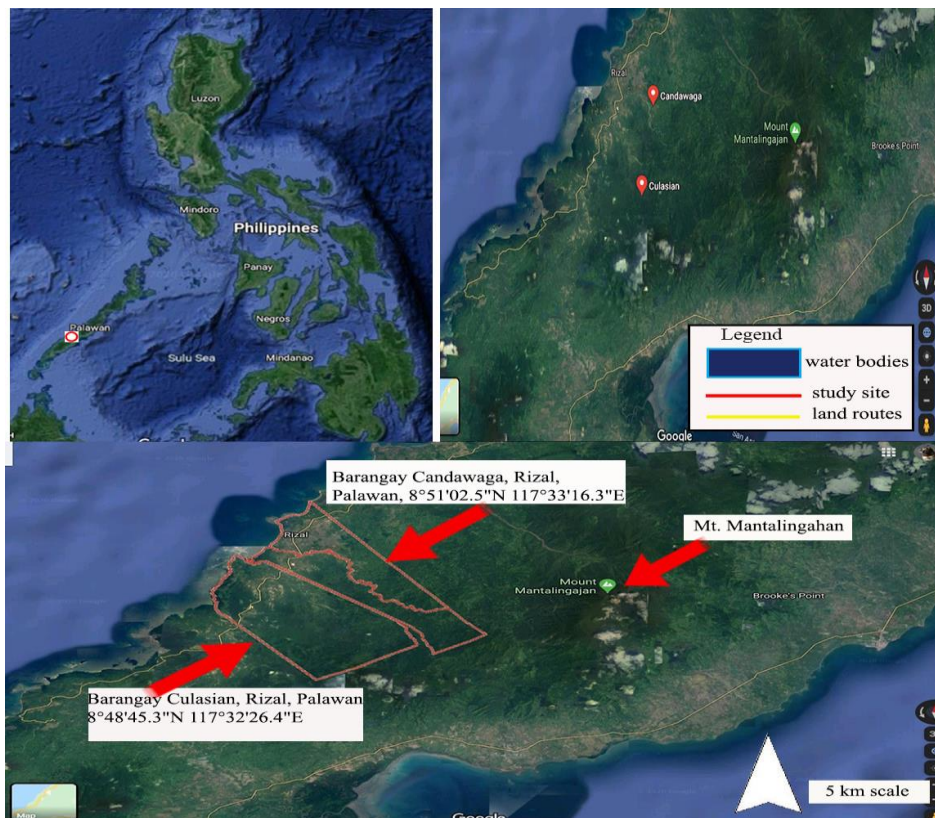
This rubber plantation project of Palawan State University has been instrumental in raising family income among indigenous people beneficiaries. It was generally perceived by the project recipients to be moderately successful based on a survey conducted by Tuquero and Pulanco in 2017. However, 10 years after the establishment of the plantation, no scientific study has yet been conducted to determine the project’s ecological contribution, which is one of the main objectives of its establishment. This study determined the PalawanSU rubber plantation’s capacity to control soil erosion and restore soil nutrients by describing the capacities of the rubber plantation and an adjacent undisturbed natural forest in nutrient cycling and soil erosion control.

Generally, the study sought to determine whether the PalawanSU rubber plantation has a significant environmental contribution to soil erosion control and nutrient cycling capacity. Specifically, it determined the following:

- 1) amount of soil eroded (in grams) from PalawanSU rubber plantation and an adjacent natural forest land;
- 2) amount of nutrients present in the soil and leaf litter of PalawanSU rubber plantation and in the natural forest, specifically nitrogen, potassium, and phosphorus; and
- 3) significant difference in capacities of both forests in controlling soil erosion and nutrient cycling.

## 2. Methodology

The study area is at the Socialized Industrial Forest Management Agreement (SIFMA) project site located in the boundary of Barangays Culasian ( $8^{\circ}48'45.3''$  N  $117^{\circ}32'26.4''$  E) and Candawaga ( $8^{\circ}51'02.5''$  N  $117^{\circ}33'16.3''$  E) at the foot of Mount Mantalingahan in the Municipality of Rizal, Palawan, Philippines (Figure 1). The said project site is part of the 321.92 ha ancestral land granted to the Department of Environment and Natural Resources (DENR) to Palawan State University in 2006 and through the issuance of SIFMA by the Department. Under Executive Order No. 263 dated 19th of July 1995, PD No. 705, and as amended to Executive Order No. 278 dated 25th of July 1987. The PalawanSU “SIFMA project” was developed to ensure the equitable access and sharing of rights to natural resources development utilization by providing opportunities to the people to participate actively in forest plantation development. On the part of PalawanSU, the project was conceived to primarily serve as a demo farm to motivate and capacitate the IP farmers to engage in rubber production in their farms through technology transfer.



*Figure 1.* The SIFMA project site lying in the boundary of Barangay Culasian and Candawaga at the foot of Mount Mantalingahan in the Municipality of Rizal, Palawan, Philippines (Source: <https://www.google.com/maps/search/Barangay>)



Two experimental areas were set up in the study, namely, in the 50-ha rubber plantation established in 2008 encompassing the two villages of Culasian and Candawaga, Rizal, Palawan, Philippines, and in the adjacent undisturbed natural forest located around 150-meter away from the plantation. An experimental site was installed in these ecosystems to measure their capacity for soil erosion control and nutrient cycling. An independent T-test was used to analyze the data statistically.

## 2.1 Materials and Methods for Soil Erosion Control Capacity

The sampling area for rubber plantations and natural forests measured 20 m<sup>2</sup>. Within this sampling area, a 2-m-long fine net was installed at the bottom of a 10-m-long sloping area of the rubber plantation and the natural forest. The net was to catch the eroded soils. Two trials were done for each of the ecosystems. A small sample plot of 20 m<sup>2</sup> was used to simplify the process and minimize spatial scale uncertainties (Moosavi & Sadeghi, 2021). Small plots to assess soil erosion were also used by studies of Anache et al. (2017), Bagarello et al. (2018), Du et al. (2020), Gholami et al. (2018), Sadeghi et al. (2013), and Zhang et al. (2019).

The steep parts of the plantation were selected as sampling areas to collect eroded soils with an estimated slope of 18%. Eroded soils were collected every two weeks, with eight collections from February to May 2018. Stones and visible debris were removed from the collected fresh soil sample, after which the sample was sieved and oven-dried at 103°C to remove the moisture. The weight of samples from the catchments was then averaged and used to estimate the eroded soil in kg ha<sup>-1</sup> yr<sup>-1</sup> in the rubber plantation and the natural forest (Jain & Singh, 2003; Olivares et al., 2016). Independent T-test was used in the statistical analysis.

## 2.2 Materials and Methods for Nutrient Cycling

The nutrients in the soil and leaf litter collected from the rubber plantation and the natural forest were accounted for to determine the nutrient concentration in both ecosystems. The soil was sampled using a W pattern, measuring 12 x 16 m. Within this W pattern, 15 spots were identified, and 1 kilogram of soil was collected from each spot (Peters et al., 2022). The collected soil from 15 spots was mixed thoroughly. From this mixture, four soil samples weighing 1 kg each were obtained for analysis of pH level and the presence of elements deemed crucial for the growth and development of plants, namely, nitrogen (N), phosphorus (P), and potassium (K). Laboratory analysis results were obtained by sending the samples to the National Institute of Biotechnology and Molecular Biology Analytical Laboratory of the University of the Philippines Los Baños.

To measure the amount of nutrients in the leaf litter, a fine net measuring 7 x 2 m with a mesh size of 0.8mm was used to trap the leaves falling from the trees. Two plots were established both in the rubber plantation and in the adjacent natural forest. Fallen leaf collection was done every two weeks from February to May 2018 for eight collections. The leaf litter samples from each of the rubber plantations and natural forests were then ground and analyzed for significant nutrient contents, namely, nitrogen (N), phosphorus (P), and potassium (K). Results were expressed in kg ha<sup>-1</sup> yr<sup>-1</sup> and analyzed using descriptive and inferential statistics.

## 3. Findings on Soil Erosion and Nutrient Cycling Capacities

### 3.1 Soil Erosion Between the PalawanSU Rubber Plantation and its Adjacent Natural Forest

Eroded soils from the rubber plantation were only more than half of that of the natural forest. The estimated value of eroded soils for one year from the rubber plantation and natural forest was 24.34 kg ha<sup>-1</sup> yr<sup>-1</sup>, while that of the natural forest is 47.69 kg ha<sup>-1</sup> yr<sup>-1</sup> (Table 1). This shows that the rubber plantation established by Palawan State University in 2008, encompassing barangays Candawaga and Culasian in Rizal, Palawan, has a significant holding capacity to keep soil from erosion.

This is adequately supported by the studies of Jacob (2000), Philip et al. (1996), and Sethuraj (1996), which said that rubber as a plant can play a role in soil erosion because the root concentration in rubber plantations occurs in top 0.18 m of the soil, and horizontally spread to two meters from the plant base. Rahman (1994) also emphasized that once the trees have established a complete canopy, the rate of runoff generally differs little from that in similar areas with natural forests. When water runoff decreases, soil moisture status is improved, and soil erosion is prevented. This is consistent with the explanation of Sethuraj (1996), who mentioned in his study that being a surface feeder, rubber trees afford good soil binding and hence reduce the erodibility of soil considerably. Another study corroborating the above finding was conducted in Xishuangbana, China, in 2011 by Zheng-Hong et al., which states that the annual run-off of rubber plantation was only 65 % of that in the rainforest, improving soil moisture status and preventing soil erosion. However, the study on soil health impacts of rubber farming conducted by Nguyen et al. in Quang Tri Province, Vietnam, in 2020 somehow contradicts this finding as results of the authors' study revealed that soil health was higher in natural forests than in rubber plantations with higher values in higher biomass forests (Nguyen et al., 2020).

*Table 1.*

Amounts of eroded soils collected from February-May 2018 from the 50-ha Palawan State University rubber plantation and adjacent natural forest of Candawaga and Culasian in the Municipality of Rizal, Palawan, Philippines

| Area    | Weight of eroded soil (kg) |         | Estimated erosion<br>(kg ha <sup>-1</sup> yr <sup>-1</sup> ) |
|---------|----------------------------|---------|--------------------------------------------------------------|
|         | Trial 1                    | Trial 2 |                                                              |
| RP 1    | 0.000                      | 0.039   |                                                              |
| RP 2    | 0.001                      | 0.024   | 24.338                                                       |
| Average | 0.001                      | 0.032   |                                                              |
| NF 1    | 0.008                      | 0.051   | 47.685                                                       |
| NF 2    | 0.008                      | 0.060   |                                                              |
| Average | 0.008                      | 0.056   |                                                              |

Note: RP = Rubber Plantation; NF = Natural Forest

It was also worth noting that abundant understory vegetation was observed in the PalawanSU rubber plantation. (Figure 2). The understory vegetation of the rubber plantation was observably thicker than that of the natural forest because rubber trees are purposely planted distant from each other, thus allowing the penetration of rainfall and sunlight. The rubber plantation provides a favorable environment for vegetation growth. According to Josefsson (2016), this helps control erosion because the protective understory vegetation outweighs the erosive power of rainfall compared to an area where vegetation growth is inhibited. Liu et al. (2016) similarly accentuate the importance of an intact layer in rubber plantations to protect the soil against splash erosion.

Other studies, like those conducted by Josefsson (2016) and Zhao-Lu et al. (2001), described rubber plantations as having caused a high rate of soil erosion, leading to adverse environmental effects. However, the high erosion rate in these studies is mainly attributed to land-use change and the



monoculture approach of plantations. The PalawanSU rubber plantation is more agroforestry-based than monoculture being used to be intercropped with abaca, which could explain the minimal soil erosion in the area. High-value fruit trees like mangosteen, *lanzones*, *rambutan*, pineapple, and indigenous tree species like *apitong* and *balayong* are also planted in specific patches within the rubber plantation. As Brown et al. (2018) mentioned, agroforestry can improve the agricultural systems' resiliency and mitigate the impacts of climate change.



*Figure 2.* The sampled understory vegetation of the PalawanSU rubber plantation (pictures at the left) shows that there was visibly more abundant understory vegetation compared with the sampled adjacent natural forest (pictures at the right) in Candawaga and Culasian, in the Municipality of Rizal, Palawan, Philippines

### 3.2 Nutrient Cycling Between the PalawanSU Rubber Plantation and its Adjacent Natural Forest

Table 2 below presents the nutrient content of the soil of the rubber plantation and that of the adjacent natural forest, particularly nitrogen (N), phosphorus (P), and potassium (K), the primary nutrients needed by plants to grow. Results showed that the rubber plantation had an estimated N, P, and K contents of 117.19 parts-per-million (ppm) ha<sup>-1</sup>, 2630 ppm ha<sup>-1</sup>, and 3072.9 ppm ha<sup>-1</sup>, respectively. Meanwhile, the natural forest had an N, P, and K contents of 130.21 ppm ha<sup>-1</sup>, 2083.33 ppm ha<sup>-1</sup>, and 6718.75 ppm ha<sup>-1</sup>, respectively. Results showed that soils in both ecosystems are within the neutral and acceptable pH levels of 5.6 and 5.5, respectively.

Table 2.

Nutrient content of soil samples collected from February-May 2018 from the 50-ha PalawanSU rubber plantation and adjacent natural forest of Candawaga and Culasian in the Municipality of Rizal, Palawan, Philippines

| Soil Sample | Nitrogen<br>(% Organic Matter) | Phosphorus (P)<br>(ppm) | Potassium (K)<br>(ppm) |
|-------------|--------------------------------|-------------------------|------------------------|
| RP 1        | 3.0                            | 86.0                    | 60.0                   |
| RP 2        | 2.0                            | 68.0                    | 56.0                   |
| RP 3        | 2.0                            | 38.0                    | 56.0                   |
| RP 4        | 2.0                            | 10.0                    | 64.0                   |
| Average     | 2.25                           | 50.5                    | 59.0                   |
| NF 1        | 2.5                            | 42.0                    | 132.0                  |
| NF 2        | 2.5                            | 46.0                    | 128.0                  |
| NF 3        | 2.5                            | 36.0                    | 128.0                  |
| NF 4        | 2.5                            | 36.0                    | 128.0                  |
| Average     | 2.5                            | 40.0                    | 129.0                  |

Nitrogen (N) and potassium (K) were higher in the soil of the natural forest, while phosphorus (P) was higher in the soil of the rubber plantation. While there is not much difference in terms of nitrogen content in the soils of both ecosystems, phosphorus was found to be higher in the rubber plantation. At the same time, potassium was higher in the natural forest soils.

Table 3.

Macronutrient content of litterfall samples collected from February-May 2018 from the 50-ha PalawanSU rubber plantation and adjacent natural forest of Candawaga and Culasian in the Municipality of Rizal, Palawan in the rubber plantation and the adjacent natural forest.

| Ecosystem         | % Nitrogen (N)<br>(weight by weight) | Phosphorus (P)<br>(ppm) | Potassium (K)<br>(ppm) |
|-------------------|--------------------------------------|-------------------------|------------------------|
| Rubber Plantation | 0.99                                 | 1244                    | 6290                   |
| Natural Forest    | 1.02                                 | 363                     | 5895                   |



While a slightly lower level of nitrogen (0.99 weight by weight) was obtained in the leaf litter of the rubber plantation, the phosphorus and potassium contents in the latter's leaf litter were higher than those of the natural forest.

The higher phosphorus content in the soils of the rubber plantation in this study is similarly attributed to the rubber tree's re-translocation mechanism, which, based on Li et al.'s (2016) study, moves 42.77 % of its leaf phosphorus to its leaf litter and returns 57.23 % of the same element to its tree body. As rubber trees are deciduous trees that shed leaves annually, phosphorus could be one of the elements that accumulate in the plantation's soil due to the greater volume of litterfall that returns nutrients to the soil through decomposition and nutrient mineralization.

The same mechanism explains why, despite the natural forest's probably higher organic buildup, there was only a very slight difference at 0.25 % organic matter (OM) in terms of nitrogen content in the soils of both ecosystems. Li et al. (2016) explained that while rubber returns 40.77 % of its leaf nitrogen to the tree body before leaf shedding, it retains 59.23 % of its leaf nitrogen on the leaves that are transferred to the soil through litterfall.

Potassium in the soil of the rubber plantation turns out to be the highest among the macro-elements considered in the study. Like leaf phosphorus of rubber, which is usually returned to the tree body, 52.78 % of potassium is also returned to the body before litterfall, and only 47.22 % of the leaf potassium will go to the soil through its leaf litter (Li et al., 2016). However, due to the greater volume of litterfall shed annually, much of this element could have been accumulated in the soil through the years. Moreover, since the rooting system of rubber holds the soil better, much of this nutrient is prevented from being leached away. This result will be verified through further studies, which will consider other variables like varieties or clones and the health of the rubber trees.

The soil collected from both experimental areas was also examined for physical properties, particularly texture and color. The soil collected from the rubber plantation was clay loam, brown, and porous. The soil in the natural forest was clayish, aggregated, and had a reddish color.

Results of the study show that rubber can be used to rehabilitate areas stripped of vegetation. It is not only to prevent near-to-absolute pressure of natural forests from people who depend on it for a living or to divert a community from a more forest-destructive means of livelihood. Rubber can also purposely prevent the soil from eroding and restore soil quality. This is especially considering that rubber, due to its nutrient re-translocation efficiency, can withstand survival in nutrient-poor surroundings and areas prone to cold or drought, as mentioned earlier.

#### **4. Conclusions and Recommendations**

Considering the results of the study that the PalawanSU rubber plantation does have soil erosion control and nutrient cycling capacity comparable with that of the adjacent natural forest, this study gives some basic information that could be useful for taking any onward attempt to establish a rubber plantation to rehabilitate denuded lands. The nutrient conservation strategy rubber trees possess further increases their importance as industrial crops that can survive in a nutrient-poor environment and withstand drought stresses in Palawan and elsewhere in the country.

The authors recommend replicating the study in rubber plantations established in sloping areas in Palawan or any part of the country to verify the findings. A study that considers factors like species and edaphoclimatic conditions, rubber clones, management and plant health, and timing in data collection may be conducted. Similarly, a study comparing the status of the soil in terms of nutrients present and the amount of erosion before and after the establishment of a rubber plantation will also strengthen the finding that rubber plantations can offer a better option for rehabilitating denuded lands.

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## Declaration of Conflict of Interest

The researchers declare that there is no conflict of interest in this study.

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