

Disaster-Risk Mitigation of Affected Areas of Marcopper Mining Corporation: Basis for Government Intervention

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Abstract—This study focuses on disaster preparedness of affected barangays by the Marcopper Mining incident. The researcher used qualitative and quantitative methods of research employing the descriptive-normative approach aided by survey questionnaire and unstructured interviews. Findings revealed that the respondents are self-prepared although the local government does not have any campaign and information dissemination on the local residents regarding any eventualities that can be brought by disaster rooted on Marcopper. Finally, the researcher offered intervention that would help the people and concerned agencies in doing some programs together with the academe in increasing awareness and provide some technical know-how for the people in case of another mining disaster.

Keywords— Awareness, Crisis management, National Disaster Coordination Council, and Preparedness.

I. INTRODUCTION

For over 30 years, Marcopper Mining Corporation has been operating on Marinduque Island in the Philippines. The launching of this mining site provided more than 1,000 employments mostly for Marinduqueños. The corporation also provided \$30 million a year for local goods and services, as well as the electricity for the province. Still, this island remains one of the poorest parts of the country. The government of the Philippines supports multinational corporations and actively seeks to bring their investments, like mining, into the country (Coomans, 2000).

Hamilton-Paterson (1997), stated that despite these positive outcomes: the leakage of waste from the mine site caused innumerable troubles: serious health and environmental problems have placed the community at risk. The island of Marinduque is a poor area and relies heavily on agriculture and fishing. Mining in the area has polluted waterways, killed fish, and flooded agricultural fields. The mine tailings contaminated rivers and bodies of water surrounding the area resulting to inadequate source of fresh water. People were being poisoned indirectly through the fish and water, but also, workers were dying from direct contact with the mining operations.

At present, the objective of this study is to assess and to quantitatively evaluate the disaster-mitigation of the people along the mining corporation, to help the residents of the areas to become aware of the coming of natural disasters, to assist

them to respond to natural disasters, to involve the area for government intervention, and maximize the capacity of a local community to respond to natural disasters, and to propose a strategy for the dissemination of natural disasters' knowledge while raising public awareness of disaster.

II. BACKGROUND

The Marcopper Mining Corporation (hereafter Marcopper) started its mining operations in Marinduque Island, Philippines in 1969. Placer Dome, a Canadian company, co-owned (40%) and managed the corporation. The Mt. Tapian site was the first mining location where an open pit mining was used to produce copper concentrate. Until 1972, Marcopper disposed of its waste on land. This changed in 1975 when a blanket permit was given to Marcopper, which allowed them to dump mine tailings into the Calanca Bay at the rate of 2.5 tons per second.

It is estimated that a total of no less than 84 million metric tons of mine tailings were discharged into this shallow bay between 1975 and 1988. As a consequence of what is understood to have been a non-negotiable stance by local residents against the continued dumping of mine tailings into Calanca Bay, it was agreed that the old Mt. Tapian open-cut mine site (Tapian Pit) would be used to receive mine tailings from the San Antonio operations on a temporary basis. This disposal method was not discussed in the Environmental Impact Assessment. In spite of the unconventional use of the Tapian Pit as a containment system, no environmental risk assessment and management were carried out. The amount of tailings produced from mines in Marinduque is high because the ore is low grade, containing only 0.44 percent copper. This means a large amount of rock has to be removed and ends up as waste.

The mine waste that is flowing freely into the Mogpog River stems from the notoriously inadequate Maguila-guila dam at the river's headwaters. The people of Mogpog had vehemently opposed the construction of this dam in 1990. In numerous petitions and resolutions they voiced out their concerns that the dam would not protect them from waste and would increase the risk of flooding. But Marcopper went ahead with its plans for the dam, anyway, and began constructing it in 1991. After the completion of the dam in 1992, the villagers started noticing waste flowing into the river as well as the appearance of large quantities of dead fish. Siltation from the waste dump started

building up in the Mogpog River increasing the severity of flooding in the rainy season. The seasonal rains in 1993 caused intense flooding and the dam collapsed altogether. Toxic silt and water flowed down the river and into the town, destroying homes and rice fields, and killing animals. Two people lost their lives because of this accident.

Since 1993 it is estimated that about 20 million cubic meters of tailings have been impounded in the Taipan Pit which is 300 meters deep. The estimated capacity of the pit is approximately 69 million cubic meters. In 1995, residents of Bocboc again reported their fear that the dam would burst because of increasing structural damage. A petition was signed by 21 barangay captains of Mogpog and supported by the Social Action Commission of the Church to have the entire waste pond and dam removed. In November that year, the town council passed another resolution stating that the "siltation dam barely serves its purpose".

On March 1996, 2-3 million tons of mine waste leaked into the 26-kilometer long Boac River. The plug that sealed the Tapian pit tunnel to the Boac had fractured, the pit contained around 23 million metric tons of mine waste. The cause of the failure is unknown. While reports vary, between two and three million cubic meters of mine tailings are estimated to have been released into the Makulapnit and Boac River system over the following 4-5 days at a discharge rate of between five and ten cubic meters per second. Subsequently, the flow of mine tailings from the drainage tunnel was reduced without intervention and as a result of undetermined cause (Tauli-Corpuz, undated).

As by the assessment of the UNEP (1999), the immediate effects were disastrous. The Makulapnit and Boac River system has been so significantly degraded as to be considered an environmental disaster; the aquatic life, productivity and beneficial use of the rivers for domestic and agricultural purposes are totally as a result of the physical process of sedimentation; the coastal communities adjacent to the mouth of the Boac River are also significantly degraded as a direct result of smothering by the mine tailings; there is no evidence of acute poisoning in the exposed population due to the mine tailings. There is also an increased health and safety risk due to immersion and flooding as a result of the very large volume and physical properties of the mine tailings. Thus, this should be mobilized during the wet season. However, concentrations of trace metals in the mine tailings were not sufficiently high to represent an immediate toxicological threat.

Despite these findings, Marcopper held on to the claim that the tailings were non-toxic. Residents also complained of skin irritations and respiratory problems, which could have been caused by the poisonous vapors emitted from the tailings

(Tauli-Corpuz, undated).

Certain feared disasters that may happen again in the province includes the damaged dams that can overflow due to earthquakes and heavy storms. Landslides from the denuded mountains and mine wastes that include toxic waste are also being feared that may be affected by heavy rains.

The 1996 accident became known as the "Marcopper Mining Disaster". It brought national and international attention to Marinduque. Experts and scientists flocked to the island province to study the disaster, and eventually learned of the problems that had been occurring for years. Because of the support coming in from outside the community, the people had more power to mobilize (Counmans, 2000).

Today, this accident is a great dread to the province. As preparation for the same tragedy a Disaster-Awareness and Preparedness Seminar Project was formulated by the Marinduque State College, School of Engineering together with the Sangguniang Bayan of Mogpog and Philippine National Red Cross (PNRC) brought accessible knowledge to the affected areas of Marcopper (Nobleza, 2009).

III. METHODOLOGY

This presents the methods and procedures employed by the researcher, the description of respondents, the procedure, the instruments or tools used in gathering data, the research locale, the statistical instrument used in order to analyze and interpret the data gathered through questionnaire.

The survey focuses on people along the Marcopper Mining Site. An open-question questionnaire was formulated to gather information and followed by unstructured interviews. According to Robson (1993), as cited by Zulueta (2008), open-question gives the participants to say anything and in whatever manner they want, which gives the researcher more useful questions rather than closed-questions. Parallel to this, it gives the participants privacy, especially when identity is not required and researcher's direct interaction is minimized, thereby encouraging participants to express themselves freely.

The community used as research locale, the three (3) barangays along the mining site namely: Brgy. Labo, Brgy. Kilo-Kilo, and Brgy. San Antonio in Mogpog with regards to their disaster preparation in Sta. Cruz.

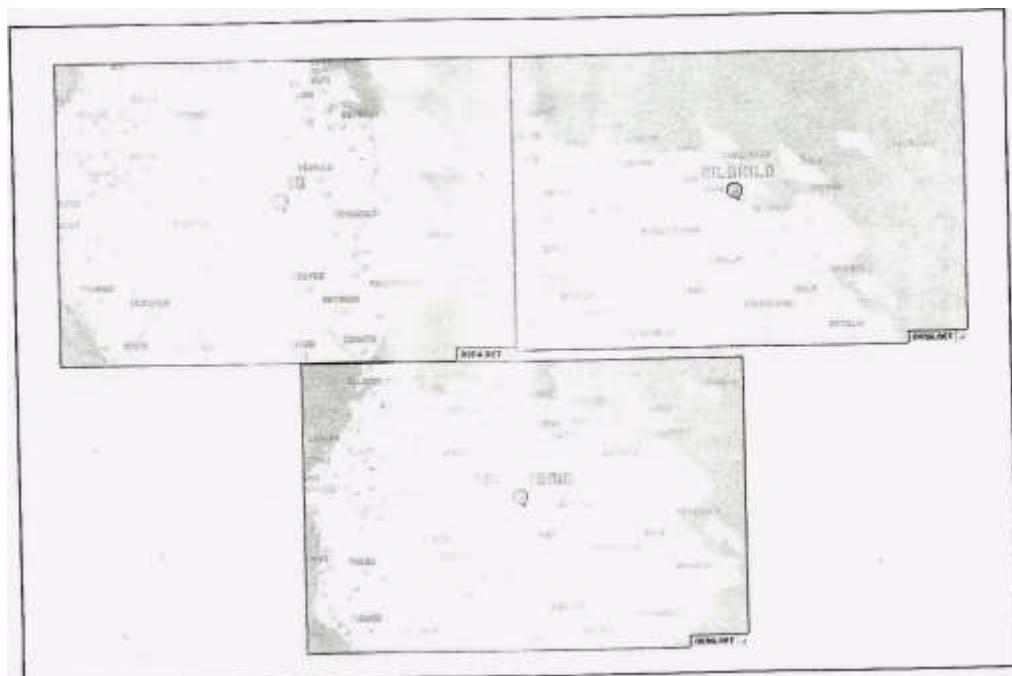


Fig. 1.0 The Research locale, Brgy. Labo, Brgy. Kilo-kilo, and Brgy. San Antonio

Also, interview was done with affected areas during the Mababad, and Magapua. Marcopper mining disaster such as: Brgy. Banto, Mangyan

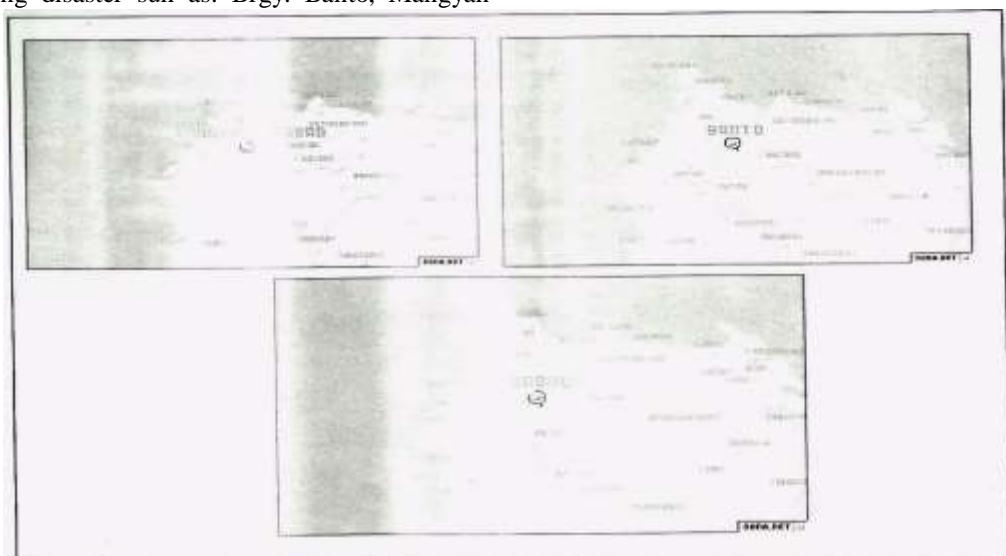


Fig. 2.0 The Research locale, Brgy. Banto, Brgy. Mangyan Mababad, and Brgy. Magapua

In selecting the respondents, simple random sampling was used. 30% of the households from each barangay in Sta. Cruz was randomly selected: the same with the barangays in Mogpog. It consists of both male and female, ages 18 and above. The interview was conducted last March, 2010 which totals 200 households.

Analysis

This is an analysis of the participants' answers to the questionnaire. The questionnaire consists of the following data:

1. Length and legitimacy of living
2. Number of people who worked on the mine site
3. The outlook of people towards the mining industry

4. Importance and opinions about the re-opening of the mine site
5. Environment protection against the site
6. Government project concerning the area's disaster risk management.

IV. RESULTS AND DISCUSSION

The data gathered from 200 respondents of the research locale were tabulated and interpreted as follows:

TABLE 1: THE NUMBER OF LEGITIMATE RESIDENTS ALONG THE MINING SITE

Legitimate Residents	Immigrant
104	96

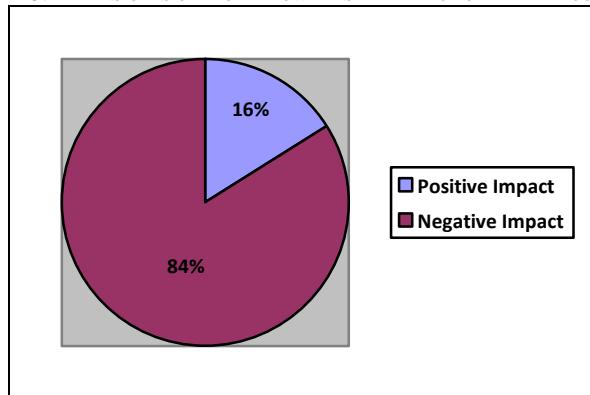
Table 1 reveals that among the 200 respondents, most of them are legitimate residents along the Marcopper Site.

TABLE 2: THE NUMBER OF PEOPLE WHO WORKED IN THE MINING SITE

Type of Work	Number
Contractual	32
Permanent	32
With relative who worked	32
Did not work	104

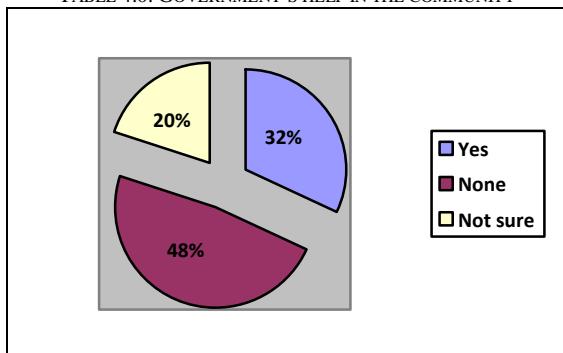
Table 2 shows that most of the respondents interviewed did not experience working on the mining site. This number of respondents was further subject to the basis of the results.

TABLE 3: THE INSIGHTS OF PEOPLE TOWARDS THE EFFECT OF THE MARCOPPER



The chart reveals that the Marcopper mining incident has a negative effect on the community based on the respondents. This data shows that the Marcopper Mining disaster has brought negative effects such as health hazards, pollution and has affected other commercial activities which lessen the economic development of the province. Landscapes, agricultural and farming areas, fisheries and poultry industry have downgraded so the livelihood development of the province. On the other hand, 16% said that Marcopper has positive effects in the province, this is due to its additional income it gives to the people and to Marinduque as a whole.

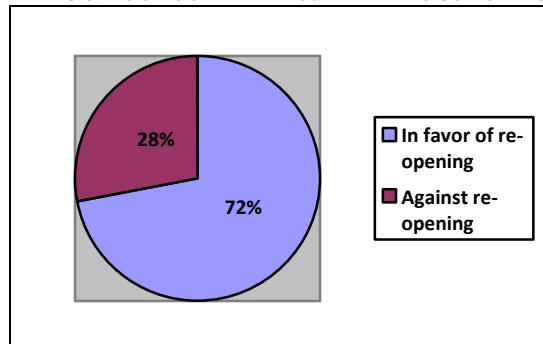
TABLE 4.0: GOVERNMENT'S HELP IN THE COMMUNITY



The chart reveals that most people were not affected by the government's help in the Marcopper disaster. It also shows that most people affected have received support from the government after the disastrous event until today. At the least part, many were not affected by the government's help. In

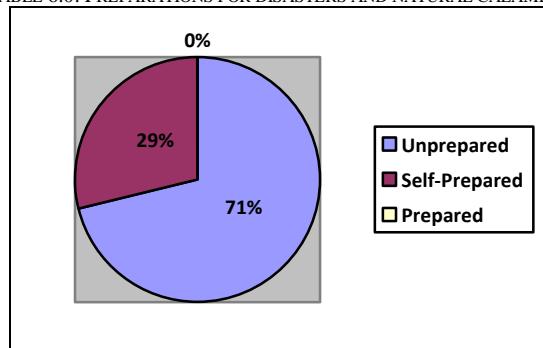
regards to the government help, it comprises the road ways going to Marcopper, health services given to persons affected with the disease caused by the chemicals, food and basic supply given after calamity, jobs after the closure of Mining industry and the disaster-preparedness of the affected areas.

TABLE 5.0: INSIGHTS ON THE MARCOPPER MINING CORPORATION



In connection to the effects of Marcopper, another data was collected whether the people would agree and disagree for the re-opening of the Marcopper industry. Of the 200 respondents, 72 percent were still hoping for the re-opening; this is because of their chances of having another job placement since most of the respondents are related to the Marcopper operation (either they have worked or family-related stay). This is also due to the benefits they are to receive if the industry will be opened again. However, figure also reveals that more than 25% is against the re-opening of the mining industry. Afraid that the same or worse than before the calamity might happen again. This data also reveals the significance of the re-opening of the mining site. Due to the high benefits of Marcopper, it is efficient to re-open the mining site however with proper security and sanitation exercises.

TABLE 6.0: PREPARATIONS FOR DISASTERS AND NATURAL CALAMITIES



The graph shows that most of the residents are not disaster-prepared. Most of them are self-prepared but without proper orientation from the locality, government institution and agencies of what to do in times of calamity. There is also lack of evacuation areas and medical teams. With regard to the unprepared households this includes families whom are unaware of the possible effects because they are immigrants.

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

Based from the findings of the study, the following conclusions were drawn:

1. The disaster awareness is very evident in the people living along the mining area but the information to be able to respond to any disaster is not sufficient since there is little assistance coming from their government agencies such as the Philippine National Red Cross (PNRC), Marinduque State College, School of Engineering and the Sangguniang Bayan ng Mogpog.

2. As the mining area continued to be affected by natural disasters, continuous heavy rains and strong winds, in particular, the structural problems of the Tapian dam, there is a need for the residents to receive trainings and programs on natural disaster preparation and how to cope with such disasters.

3. Overall, it has been found out that the residents along mining area are not well prepared to deal with the disasters that may cause and root from the Marcopper industry. Not only are most not well prepared to deal with the disasters they face but they also are not trained on using resources and they lack coordination with the local community and other government agencies such as the local government and National Disaster Coordinating Council.

B. Recommendations

Based from the findings of the questionnaire and interview surveys, the following recommendations are proposed for disseminating knowledge and raising public awareness of the possible effects if another Marcopper-mining incident happens again:

1. Promote disaster education at the school level;
2. Implement community-level public awareness programs when;
3. Proper government intervention should be given like installation of safety houses, evacuation areas, and proper break waters;
4. Improve coordination mechanisms within the disaster management system;
5. Coordinate with other government agencies.

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APPENDIX

Questionnaire	
Demographic Profile:	
Name:	
Age:	
Address:	
Sex:	
Interviewee no:	
1. How long have you been living here?	
_ Below to 1 year	
_ 1 year – 3 years	
_ 4 years – 6 years	
_ 7 years – 9 years	
_ 10 years to above	
2. Did you work with the Marcopper Mining Corporation?	
_ Yes _ No	
3. Is your family rooted in this town? (Nakaugat ba ditto ang inyong angkan?)	
_ Yes	
_ No, (If no, proceed to the next question.)	
_ Undetermined	
4. Are you immigrants here, working with the Marcopper Mining Corporation?	
_ Yes	
_ No	
_ Undetermined	
5. Since the Marcopper mining site has been closed, how come you are still staying here?	
_ I have already built and started my family here	
_ I've started my business here	
_ No choice / place to go	
6. Are you still hoping for the reopening of the site?	
_ Yes	
_ No	
_ Undetermined	
7. Are you in favor of the reopening of the mining site?	
_ Yes	
_ No	
_ Undetermined	
8. Is there any project/s concerning preservation of the environment?	
_ Yes, from the government and other agencies	
_ Yes, Brgy. Projects	
_ Yes, but these projects are done individually	
_ None	
9. In case of any accidents/disaster or any repetition of the mining disaster, are you prepared?	
_ Yes _ No _ Self-prepared	
10. Do you think the government has done actions in order to prepare you in case of emergency?	
_ Yes	
_ No	
_ Undetermined	