

Assessment of Flood causes from 2011 and 2021 in Barangay Meysulao calumpit, Bulacan

A Case Study Presented to PRFFWC-PAGASA

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INTRODUCTION

Floods are the most common natural disaster, and they occur when a large amount of water overflows and submerge normally dry areas. In coastal areas, a storm surge from a tropical cyclone or tsunami may be the reason for flooding. But generally, floods are frequently produced by heavy rainfall, quick snowmelt. Floods are becoming more frequent and intense, and extreme precipitation is anticipated to become more frequent and severe as a result of climate change (World Health Organization, 2021).

Meysulao is a barangay in the municipality of Calumpit, in the province of Bulacan, with a population of 4,280 determined by the 2020 Census. It has an elevation of 5 meters or 16.4 feet above sea level. It is located at the right bank of Pampanga River. It is an area easily flooded, affecting the lives of its residents. Prolonged inundation is experienced within the barangay during flood events compared to other Barangays in the municipality, posing risks and damage with regards to public health, livelihood and residential properties. According to the geo-hazard assessment of the Barangays of Municipalities and Cities in Bulacan conducted by Mines and Geosciences Bureau-Regional Office III (MGB-R3), Barangay Meysulao is considered as one of the 9 barangays that are highly susceptible to flooding.

OBJECTIVES

The objective of this study is to gather information regarding as to why flooding events in Barangay Meysulao, Calumpit Bulacan happen. Specifically, this case study aims to:

- To analyze and compare the reasons for flooding in the area from the data obtained
- To identify what changed in terms of the causes of flooding within the Barangay.

SCOPE AND DELIMITATION

The focal point of this study is to analyze and identify the changes in the flooding of barangay Meysulao in Calumpit, Bulacan which is also the location chosen for the study. The limitation will focus on the (a) changes in flooding in the barangay (b) determining the reasons as to why there is an occurrence of flood in the area (c) to analyze and compare the data obtained from the survey and the given data of MDRRMC-Calumpit from the year of 2011. The researchers aim to gather all possible data within the given time. Due to the circumstances (covid-19 pandemic) the researchers were unable to visit the chosen area physically hence there are only limited respondents and limited resources.

IMPORTANCE OF THE STUDY

The study aims to investigate the causes of flood in Barangay Meysulao, Calumpit Bulacan. Its importance and beneficiaries would be the following;

Policymakers - People related in flood control and management especially policymakers can get an information on what good policy to be implemented through the recommendation of the study.

Residents - Residents will become aware of what are the different causes of flood in the area which affects their livelihood. In this way, they can regulate and mitigate the cause and impacts of flood and become prepared in times of it.

Government agency - In the sector of government agencies, they can get additional information about the flooding in their authority. They will become prepared and make the necessary actions to lessen the impact of flooding to the residents in the area.

PRESENTATION OF DATA GATHERED

The following data presented below were obtained from the MDRRMC from the year of 2011 and 2013 in regards to the causes of flood occurrence in the area.

Figure 1

26. Barangay Meysulao			
Location	Landslide Susceptibility Rating	Flood/Flashflood Susceptibility Rating	Geohazards Assessment
Purok 1	none	High	>2 meters flooding is experienced in a some area due to the barangay's natural elevation and location adjacent to the Pampanga River
Purok 2	none	High	
Purok 3	none	High	
Purok 4	none	High	
Purok 5	none	High	
Purok 6 (So. Nabong)	none	High	Mostly under water for a long period of time
Purok 7 (So. Dike)	none	Low	The PRCS dike served as the evacuation area during flood events

Table from MGB Regional Office III (2013). Landslide and Geo-hazard Threat Advisory

According to MGB Region III (2013), the barangays classified with moderate to high flooding susceptibility are generally found in topographically low-lying areas or in proximity to a river system thus, presented with a Geo hazard Threat Advisory.

The Pampanga River and Angat River, the major drainage in the province, contribute to the flooding in the municipality of Calumpit. Another factor that contributes to the flooding is the rising of water from Candaba Swamp. A low-lying swamp that act as a drainage to Pampanga River.

San Marcos Elementary School and Calumpit National High School as well as Pampanga River Control System Dike serve as the Evacuation Site during flooding events.

Based on the investigation of MDRRMC-CALUMPIT in 2011, the flooding in Barangay Meysulao is caused by the following:

- Flood waters coming from the upper portion river of Lubao, Sta. Rita, Bacolor, Minalin, Sto. Tomas, Guagua River and creeks down to Francis River, Apalit, Pampanga that is located at the North portion of Brgy Meysulao and San Miguel, Calumpit, Bulacan.
- Flood waters coming from the Pantabangan Dam promote the swelling of Pampanga River.
- Ponding caused by prolonged heavy rain during typhoon or monsoon season would result in slow-drying floods, which can be seen especially during high tide.
- While the residents are protected by a road dike that was built to prevent the Pampanga River from rising, the same road dike entraps the flood waters that have gathered within it, prolonging the flooding.

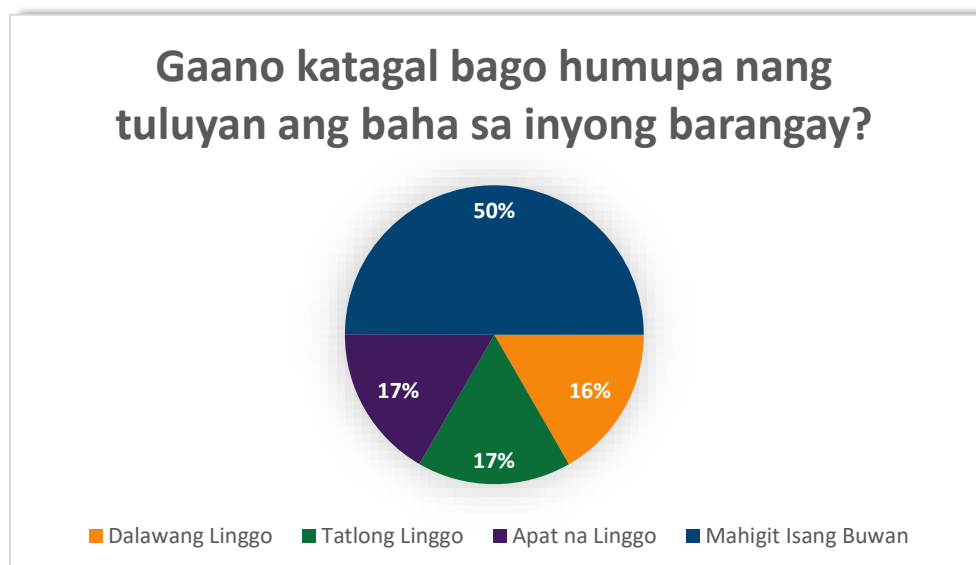
The following data presented below were obtained from the survey conducted by the researchers via Google survey.

Figure 2



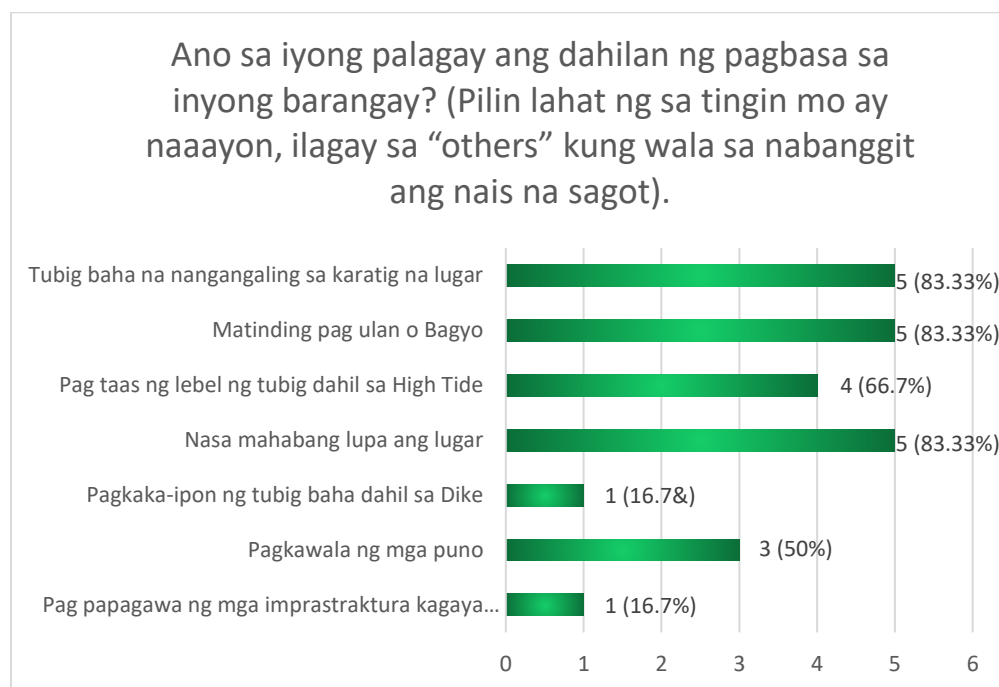
This graph shows the result of the respondents who answered how frequent the occurrence of flood in their area. 50% answered that they experience flood when there is a heavy rainfall present meanwhile the remaining 50% answered that they experience flood even if there is no heavy rainfall present.

Figure 3



This graph shows the result of the respondents who answered “How long does the flood stays in the area”. 50% answered that the flood stays in area for more than a month, 17% answered that the flood stays for 4 weeks, 17% answered that the flood stays for 3 weeks and lastly 16% answered for 2 weeks.

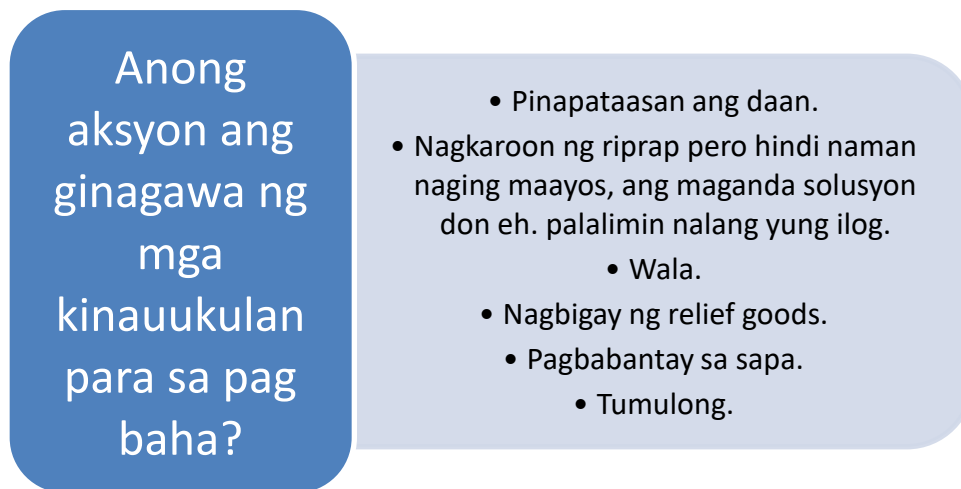
Figure 4



The figure above shows the result of the respondents who answered on what are the reasons as to why there is an occurrence of flood in their area. 83.33% answered that the flood waters came from nearby areas and the barangay of Meysulao became the catch basin of the flood, 83.33 % answered that the flood are caused by a heavy rainfall from a tropical cyclone, 83.33% answered that the area was located on a low-land hence flood easily occur in the area, 66% answered that flooding were also caused by the high tide, 50% answered that the flood were

caused by the disappearance of trees in the area, 16.7% answered the flood water accumulates on the dikes and lastly 16.7% answered that the construction of different infrastructures such as road and buildings were the cause of the flood.

Figure 5



The figure represents the responds of the people in the barangay about the activities that the government official in their barangay initiates for the Typhoon and Flooding in their community. The respondents have different answers into the matter such as raising the road, handling relief goods to those who are in need, creek monitoring and construction of riprap but according to the respondents it is still not enough to solve the problem on the flooding of the community hence they suggested to increase the depth of the river in order to at least mitigate flood occurrence during high tide or heavy rainfall.

Figure 6

Anong lugar ang
nagisislbing
evacuational
center sa
panahon ng
pag-baha sa
inyong
barangay?

- Multi purpose building
- Yung Multi Purpose Building
- Macedonia UMC at Evac. Building
- Meysulao, evacuation center
- Multi-purpose buliding
- Evacuation center

The figure represent the evacuation place that the community goes when the storm is strong and the flood is in high alert. Many respondents answered the Multi-Purpose Building and Evacuation Center and some respond about the Macendoia UMC.

CONCLUSION

The Municipality is known for its alluvial plains and floodplain along the Pampanga-Angat river system and was located in the 'catch-basin' of the Pampanga watershed. This low elevation of the Municipality's land area was prone to make most of the flooding (Mines and Geosciences Bureau (MGB-Region 3), November 2012). The Pampanga River and Angat River contribute to the flooding, then if the Candaba Swamp also rise in water level, the flood will also begin to increase. On the same way, flood water coming from upper portion river and creeks downs to this low lying areas so that the water accumulate and theres no way to go out. Dike entraps the flood that had gathered within it. Dams contribute to flooding by giving more water to Pampanga river and become swollen and then the water will go to the community. Heavy rainfall is also a factor why Meysulao are easily flooded.

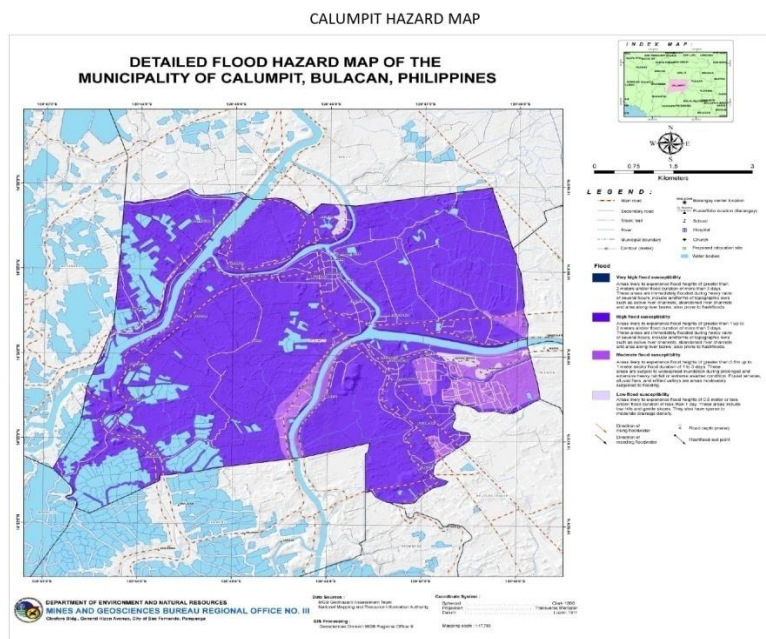
For the new data, its still the same from the old data gathered, with 6 respondents. The main reason of flooding in their area are by the heavy rainfall and also they said that even without rainfall, they experienced flooding. The flood stays for 2 weeks up to 1 month because their place is the low lying area. This result shows that the barangay Meysulao was prone of flooding since the past years because of low elevation of the area, and other aspects including climate/ weather. Respondents who answered were all affected by the rising of water from the Pampanga river basin. The municipality of Calumpit already has its own government official in their Barangay works out for the Typhoon and Flooding in their community. The respondents have different respond into the matter like raising the road, Nothing, Reliefs, Look out for the water in the River and construction of riprap but according to the respondents it is still not enough to solve the problem on the flooding of the community. Other reasons we got are the high tide, and the accumulation of water in Pampanga River Control System. There are also environmental factor, they said that the trees which may help them are slowly disappearing and construction of different infrastructures such as roads and buildings that leads to their area into easily flooded.

RECOMMENDATION

Here are the recommendations that could prevent more flooding in the area;

- To further the investigation concerning the contribution of the loss of trees in the area to the floodings in the barangay
- Plant more trees strategically like planting around the river
- Dredging the river to remove sediments so it will increase the capacity to carry water

- Improving drainage to easily flow storm water runoff
- Waste management in the community. Improper disposal could block the drainage system and will lead to flooding
- Flood contingency planning for local communities using flood simulation, flood risk management, and response strategies
- Order to carry out the risk identification processes, training of flood simulation and risk assessment should be provided for managers and engineers in flood risk management



APPENDIX B

Flood Pictures year of 2011

Figure 9



Figure 10



Figure 11



Figure 12



Figure 13

Figure 14



BRGY MEYSULA SUBMERGED CAUSED BY TYPHOON FALCON ON JUNE 25, 2011

(From MDRRMC-CALUMPIT)

APPENDIX C

Figure 15



Figure 17



Figure 16



Figure 18



Figure 19



Figure 20



Photos from Facebook by Carmina Gabriel Lubao & Spencer Serafin; November 14, 2020

Barangay Meysulao in Calumpit, Bulacan experiencing 1-6 feet of flood in November 14, 2020 as per PDRMO

APPENDIX D

Figure 21



Figure 22



Figure 23

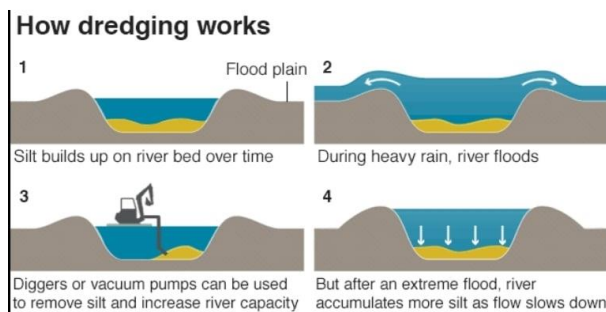


Figure 24

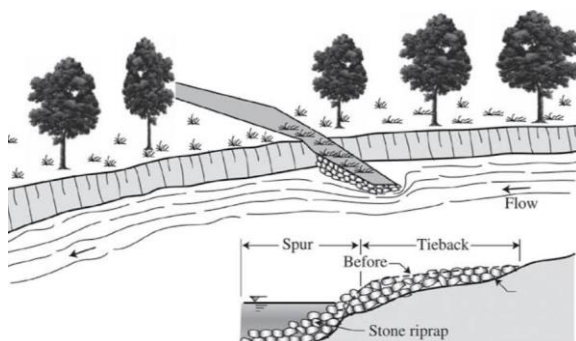


Figure 25

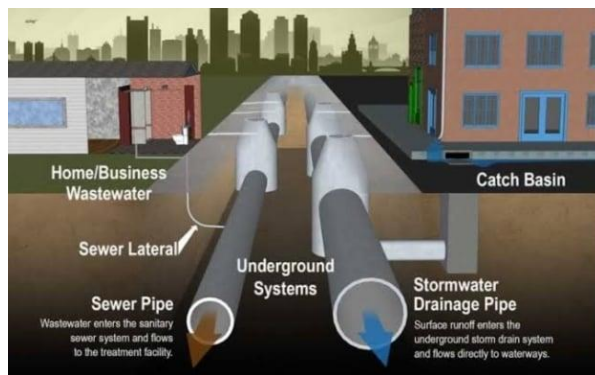


Figure 26



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