

FLOOD ASSESSMENT: A FLOOD MITIGATION AND PREPAREDNESS PLAN IN DON HONORIO VENTURA STATE UNIVERSITY, BACOLOR, CEA MAIN BUILDING AREA

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Abstract:

The purpose of this study, having a preparedness plan and mitigating the situation are the best ways to approach the problem. Flooding is a major problem in the Philippines, especially during the rainy season. Don Honorio Ventura State University, located in Barangay Cabambangan, Bacolor, Pampanga, is significantly impacted, particularly around its older buildings such as the CEA Building. Mitigation efforts can significantly reduce the risks and hazards associated with flooding, thereby enhancing the safety and well-being of everyone on campus. As a result, non-structural measures have been categorized as follows. (1) Floodplain/floodway mapping (2) Flood warnings (3) Flood Emergency plans (4) An evacuation and preparedness plan (5) Flood Level Indicator. Through data collection and observations, the study identified the flooding issue and developed potential mitigation strategies. These strategies include installing flood gauges around campus and creating a dedicated flood map for students and administrators. The researcher’s objective to have attainable and sustainable mitigations and plans have been fulfilled in accordance with the official data that the researchers obtained during the study. The researchers posit that these measures will not only enhance student awareness but also empower them to prepare for and mitigate potential risks and hazards associated with campus flooding.

Keywords — mitigation, non-structural, flooding

I. INTRODUCTION

The Philippines is known for its beautiful islands and the surrounding waters around it. It is also known for the weather it has. The Philippines is located in the west pacific area, and it is known for frequent typhoons. According to ADRC or Asian Disaster Reduction Center (2024) the Philippines is visited by an average of 20 typhoons every year, five of which are destructive, because of this, flooding is one of the prominent concerns during typhoons and tide seasons. Many people are affected by it due to the natural topography”. Rainfall varies also from southeast monsoons, especially in the summer months. The northeast monsoon and tropical cyclones are common in the

winter and in the Philippines, it is the rainy season. In the Philippines, due to its geographical characteristics, rain can be quite different from area to area. According to the news, Inquirer (2018), Pampanga is one of the provinces in the Philippines which has low elevation and, also stating “The lowest elevation, which is almost equal to mean sea level, extends widely at around the river mouth of Pampanga River basin,” because of this, Pampanga is known for its municipalities where flooding is common. These municipalities are the Sasmuan, Guagua, Bacolor, Macabebe, and other municipalities. According to the official website of DHVSU, the University was established on November 4, 1861, as Escuela de Artes y Oficios de Bacolor, a grammar school, by an Augustinian friar,

Fr. Juan P. Zita, aided by civic leader Don Felino Gil on land donated by the Suarez family. Many disasters passed through the years where the school was tested including the tragedy of the Pinatubo that erupted last June 15, 1991 according to Google. Because of the natural elevation of Bacolor, the school was buried in lahar. One of those buildings that are present at that time is the CEA main building. For the past few years, after the Lahar incident the school began to expand its premises and built new infrastructure. As time goes by, every rainy season and typhoons the building experiences different kinds of issues. One of those issues is the problem of flooding in the CEA main building area. The reports of flooding in the area are said to be consistent every year. The documentation of flooding was recorded by various students during their class time. Some of these reports said to be that the flood can be as deep as 3 to 4 inches. Not only it will expose the students to hazards but also staffs within the vicinity.

II. EFFECT OF FLOOD

Flooding is one of the most known problems when the rainy season starts, and sometimes, it also leads to many casualties, like when Typhoon Yolanda hit Tacloban. Many buildings were affected and many families lost their lives during the catastrophe, and during those types, one of the places they first go is public schools. According to the World Health Organization (2020), flooding contains many diseases that people may obtain, including vector-borne diseases like typhoid fever, malaria, cholera, yellow fever, and many other diseases. It is important to keep the students safe in times of disaster. Floods do not only apply to the Philippines but also too many other parts of the world. For example, in Bangladesh, research conducted by Sarfaz (2023) Floods, caused by the overflow of lakes, rivers, or oceans, severely impact various sectors, including education. This study examines how floods affected student enrollment, attendance, and performance in Tehsil Bhowana of District Chiniot. The flood led to issues such as disease outbreaks, poor government planning,

temporary relocations, food shortages, damaged school buildings, increased absenteeism and dropouts, an unhealthy environment, psychological stress, and temporary school closures. There are several ways in which floods might originate. According to Kurata (2023), floods are believed to be the most catastrophic climate-related disaster worldwide, in accordance with Yoshiki (insert year). The study's results, which can save lives in flood catastrophe circumstances, provide more knowledge on the factors impacting readiness for flood disasters. These elements have a very big impact on residents of flood-prone regions, as well as how prepared and mitigated people are for flood catastrophes. This study evaluated the perceived disaster prevention and mitigation in

The methodological framework was systematic which followed phase-by-phase steps that the researchers did to ensure the cleanliness and accuracy of the study in every step conducted. It also served as a guide to the researchers in formulating and completing the study

III. RESULTS AND DISCUSSIONS

3.1 Introduction and List of Data Needed

Flooding is one of the natural problems that the Philippines encounters, especially during the rainy season. According to the data from PAGASA, in 2022, the Philippines experienced a mean annual rainfall of 2,966.5 mm that is wetter than the 1991–2020 base period by 0.6 mm, which ranks as the 7th wettest year since 1991. This results in flooding in different parts of the Philippines, including the place where Don Honorio Ventura State University is located. This study aimed to develop long-lasting mitigation strategies for the campus to improve flood preparedness and ensure the safety of students, staff, and professors during the rainy season.

3.2 Actual Gathering of Data and Sample

To ensure both applicability and attainability, the researchers obtained sample plans such as preparedness plans, flood maps, and flood gauges

that are already used in different parts of the country. The researchers ensured that the collected plans are used for references in formulating plans, mitigations, and flood gauges that are exclusive and can only be used and applied to a specific area, which is DHVSU.

3.2.1 Identification of Areas and Elevations

The researchers came up with the following preparedness signs and a plan that the administration may apply to the campus for better preparation in case of flooding. By the data given to the researchers by the authorities, the researchers identified the areas that needed to have mitigation and preparedness plans present. The following photos are the areas that needed to have indicators and plans for the purpose of informing not only the students but also the authorities for better action and plan before, during, and after the flood. The first station to be identified is the reference level from the road in front of the CEA main building (Station A). The researchers used the measured meter at 1.07 meters for reference elevation. The measured elevation is used as focal point of the areas that will be measured. Below are the photos that proved the researcher's actual elevation measurement.



Fig. 1. Actual Data Gathering

This study investigated potential approaches, modifications, and applications adaptable to specific context of the research topic, ensuring their realism and feasibility. The researchers came to the conclusion that the optimum course of action in this sort of problem and circumstance is to have non-structural mitigations with the aid of the relevant literature. To ensure reliability and attainability, the researchers conducted a literature-based approach with proven affectability with relation to the problem. The researchers procured an interview from one of the staff in the campus and the following mitigation techniques were suggested: Flood gauges, Preparedness plan, flood map and evacuation route in different area within the CEA premises for better information and awareness



Fig. 2. Sample Flood Map

3.3.2 Sample Preparedness Plan

To gather data on historical flooding events on campus, the researchers conducted interviews with key personnel who have firsthand experience with flooding. This included professors, custodial staff, and security guards, all of whom were present during flood events. The interviewees identified specific areas prone to deeper flooding. Notably, all participants indicated that the engineering complex, being one of the oldest parts of the campus, consistently experiences the most severe flooding. The flood data collected through interviews is presented and analysed through flood mapping in a

later section. In this part, the researchers listed down the mitigations and preparedness plans that are currently available and applicable to some areas in the Philippines. The objective of these steps is to have a basis and an inspiration for the plans that the researchers formulated. For validity and effectiveness, the following are being used in real-life situations.

III. CONCLUSIONS

The problem of flooding in the Philippines is one of the leading problems it experiences during the rainy season. Due to its topography, the Philippines experiences a rainy season for 5 months from June to November. Located in Barangay Cabambangan, Bacolor, Pampanga, Don Honorio Ventura State University, like many areas in the region, faces challenges with flooding. Due to the age of some of its buildings, the university experiences flood every rainy season especially in the CEA Building area since it is one of the oldest buildings to be built way back the Lahar.

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