

THESIS PROPOSAL

I. THESIS PROFILE

(1) Thesis Title: OPTIMAL SITE SELECTION AND AUGMENTATION OF ADDITIONAL AGROMETEOROLOGICAL STATION USING GIS SUITABILITY ANALYSIS IN ORIENTAL MINDORO, PHILIPPINES
(2) Student/Sex: EVONIE C.V IVAS / F School: MINDORO STATE UNIVERSITY- Main Campus, Alcate, Victoria, Oriental Mindoro Address/Telephone/Fax/Email: evoniecivivas@gmail.com
(3) Cooperating Agency/ies: Mindoro State University-Main Campus (MinSU-Main Campus)
(4) Site/s of Implementation (Municipality / District / Province / Region) Base Station: Oriental Mindoro Other Implementation Site (s): _____
(5) Project Duration: February to June

II. PROJECT SUMMARY

(6) Rationale (Not to exceed one page) <p>The Philippines is an agricultural country with a land area of 30 million hectares (ha), with agricultural land accounting for 47 percent of the total. Prime agricultural lands in the Philippines are clustered around major metropolitan and high-population density regions. In general, the country's land resources are classified into forest lands and alienable and disposable areas. The climate of the Philippines is humid equatorial or tropical maritime. Its climates are affected by the intricate interactions of many different elements, including geology and topography, major air streams, ocean currents, linear systems like the intertropical convergence zone, and tropical cyclones. These are elements that have a major impact on the nation's agricultural growth.</p> <p>Since Philippine agriculture is dependent on climate and weather, the PAGASA is mandated to continuously render/contribute meteorological services supportive of the Philippine government's program thrusts toward food self-sufficiency and the attainment of progressive and sustained economic growth without jeopardizing environmental safety. It was acknowledged that weather stations, including agricultural weather stations, play a crucial role in the dissemination of accurate weather information and in reducing the impact of meteorological hazards, improving the capability of disaster prevention and mitigation through providing early warning on severe weather, such as typhoons, storms, rainstorms, lightning strikes, squall line winds, as well as line pollution flashover.</p> <p>Agrometeorological services are provided in the country not only at the farm operation level, but also at the strategic level, which includes both short- and long-term agricultural operations planning. The PAGASA administers a nationwide network of weather stations. The complete network of observation stations is made up of synoptic, agrometeorological, rainfall, climatological, upper-air, and radar stations spread over the country. The PAGASA runs roughly twenty agrometeorological stations in partnership with state colleges and universities, government research organizations, and commercial businesses to meet the demands of the agriculture sector. These functioning stations offer the meteorological and agrometeorological data needed to provide alerts, bulletins, warnings, and other weather and climate-related information.</p> <p>According to the World Meteorological Organization (WMO) 2010 Edition, agrometeorological stations should be located in farming regions performing with a specific purpose and be dense enough to function as a network station to have an accurate observations at a given time and a true representation of the existing agricultural areas, in which the appropriate distribution of agrometeorology stations can increase the effectiveness of the observations and provide accurate analysis results of the data.</p> <p>To assess the project's technical, economic, sociological, and environmental viability, the most suitable locations for agrometeorological stations are required. According to Gubler et al. (2017), one of the causes of errors in the collection of meteorological data is the incorrect location of weather stations. Geographic Information Systems (GIS) are a crucial decision-support tool that can operate and analyze a wide range of spatial data to find potential AWS sites.</p> <p>The Province of Oriental Mindoro is highly vulnerable to the impacts of climate change because it frequently experiences typhoons, flooding, and landslides. Since most communities in the province are Coastal,</p>

they are more likely to suffer negative effects from storm surges and tsunamis. Additionally, the northeastern half of the province's coastal regions and alluvial plains are thought to be particularly susceptible to flooding, liquefaction, and lateral spreading. However, the province is endowed with abundant and rich agricultural base, and also hailed as the "Food Basket of MIMAROPA" producing a wide array of high-value tropical fruits. The agriculture remains as the backbone of the province's economy (orminagri.com, 2021).

Since having an agrometeorological station in the province of Oriental Mindoro is necessary due to different circumstances to be addressed regarding climate towards agricultural crops, the proponent wanted to propose a study regarding site selection of agrometeorological station in Oriental Mindoro by stating possible locations through the use of Geographic Information System (GIS) technology to help in the future demands of agricultural production.

A Geographic Information System (GIS) is a computer system that analyzes and displays information that is georeferenced. It makes use of data that is associated with a specific location. It captures, stores, verifies, and displays data about positions on the Earth's surface. GIS can display a wide range of data on a single map, including streets, buildings, and vegetation. This allows people to see, analyze, and comprehend patterns and relationships more easily. Open Source GIS software were chosen in this study. The main reason is the lack of software usage fees and it provides great opportunities for the users. An open source GIS is a great help to find suitable location for agrometeorological station in the province of Oriental Mindoro.

The Agrometeorological Station (Agro-Met) is a different type of station that makes use of the advanced remote data-acquisition unit (arQ). This station is made especially for farming. They have particular sensors and is equipped with multi-parameter weather sensors that can simultaneously measure the wind speed and direction, air temperature, air humidity, air pressure, rain amount, duration, and intensity, soil moisture and temperature, solar radiation, and sunshine duration. The station receives data from the sensor for transmission via SMS or satellite network. The device was developed to lessen agriculture's vulnerability to the effects of climate change and related natural disasters through timely and accurate data monitoring, particularly for farmers and communities.

7) Project Description (Not to exceed 15 pages)

OBJECTIVES (General and Specific)

Generally, this study aims to delineate a suitability map for optimal site selection and augmentation of the Agrometeorological Weather Station network using a Geographic Information System (GIS) suitability analysis in Oriental Mindoro, Philippines.

Specifically the study aimed to:

1. Develop GIS Mapping Framework for suitability analysis of Additional Agrometeorological Weather Station in Oriental Mindoro.
2. Determine the area of individual factors and generate thematic map which includes the following.
 - 2.1. Boundary of the Study Area
 - 2.2. Slope
 - 2.3. Agricultural Production Areas (LULC)
 - 2.4. Water Bodies and Coastlines
 - 2.5. Buffer zones for Road Accessibility
 - 2.6. Buffer zone for existing weather station
3. Determine the suitable locations in siting agrometeorological station networks in the province of Oriental Mindoro, Philippines
4. Generate Map for the Augmented Agrometeorological Station Network in Oriental Mindoro, Province

METHODOLOGY

As the Thesis/Research paper is approved, the proponent will gather data in terms of the site or geographical description of the area, will complete the data for the criteria with regards to the factors needed, and the process involved to farther elaborate the map that will be created.

The proponent will gather data from different agencies collecting the parameters needed to complete the data for creating a site map based on the selected areas that fits the criteria.

The GIS Framework that this research will follow is given below to further understand the flow of the study.

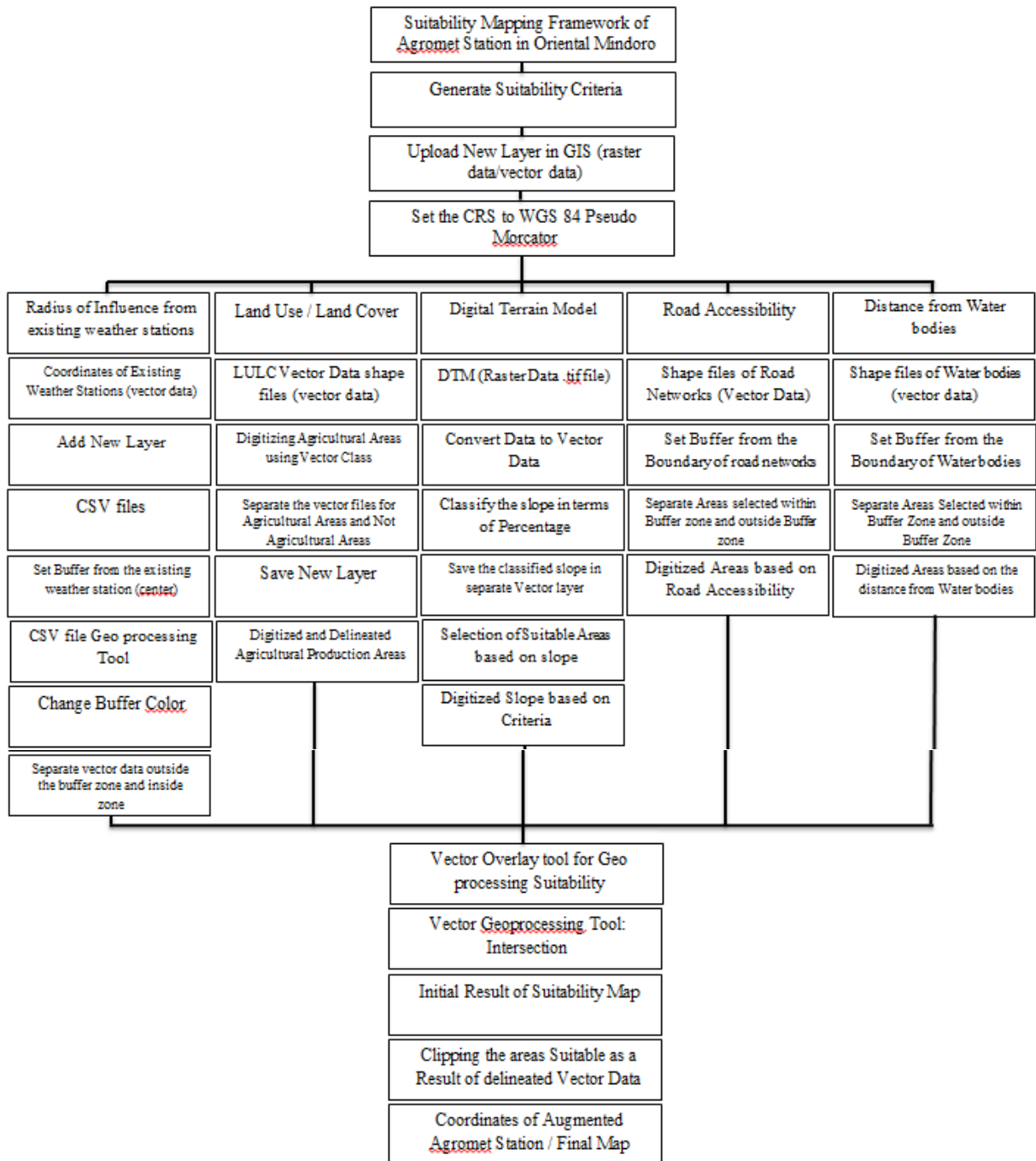


Figure 1. GIS Framework

EXPECTED OUTPUTS

Publication:

The thesis targets to finish by the use of the data that will be gathered and published at least 1 research output for future references.

Product:

This paper aims to develop a reliable map of an additional agro-met station in Oriental Mindoro using GIS and suitability mapping with regards to the data will be gathered from different agencies and LGUs in the province.

Policy

This study may be a possible basis and future references for installing an Agro-Met station in the province, especially when it comes in Agricultural sector.

EXPECTED OUTCOMES

The study of having an Agro-Met station will be the first of its kind in the province of Oriental Mindoro which will strengthen real-time monitoring system and will provide accurate data with regards to agricultural crops and land and support the function of weather station in the said province. It is targeted to analyze and provide reliable map of planning to where Agro-Met should be installed and where it is suitable and not based on the criteria and parameters provided and data gathered.

PERCEIVED IMPACT


Social Impact

Since Oriental Mindoro is rich in agricultural crops, and agriculture is the major source of living in the province, it is important to efficiently manage the agricultural production to ensure food security and sustainability in agriculture sector. Weather station including Agrometeorological station plays a crucial role in the dissemination of accurate weather information and in reducing the impact of meteorological hazards, improving the capability of disaster prevention and mitigation through providing early warning on severe weather. However, this study could be used by the Department of Agriculture to support agricultural sector to have relevant information regarding installation of agrometeorological station or other weather station networks around the province. Farmers can also use this study as a guide for having appropriate location of agro-met station in small or big farms for crop and animal production, and researchers for the future references and revisions in the expansion of the study.

Economic Impact

Through the strengthening of weather monitoring system, giving accurate and reliable data for the improvement of weather related problems with regards to agriculture supporting Agricultural sectors and farmers, economic losses will be minimized.

Prepared by:


EVONNIE C. VIVAS
(ABE Student)
MinSU-Main Campus

Noted:


ENGR. CHRISTIAN B. HERNANDEZ
Thesis Adviser
MinSU-Main Campus