

Mangroves Profiling and Decision Support System in DENR (CENRO) Palo Leyte

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Abstract: - The study focused on presenting and manipulating mangroves data and support the decision making of the admin through the system entitled Mangroves Profiling and Decisions Support System. The study will shows patial or geographic data of Mangroves in Brgy. Burayan, Paraiso, and Kataisan San Jose, Tacloban City in terms of the status of mangrove trees and species composition of mangroves in different sites. The study used descriptive and developmental method research in this study. The research locale of the study is Brgy. Burayan, Paraiso, and Kataisan, San Jose, Tacloban City. DENR (CENRO) office of Palo Leyte serves as the beneficiary. The study showed the location of the different species and conditions of the mangroves in the barangay. It also provided information to the DENR the area of the barangays were mangroves are needed to be planted due to deforestation. The researcher concluded that the system is capable of using in a way that the system gives precise information to the admin and viewer. It is of significance for the admin to support the decision-making through the encoded data. Pertinent and concise information necessary is in the developed system. The system is appropriate for use because of its high security in keeping data for an extended period.

I. INTRODUCTION

Nowadays mangrove is very important especially to the humans and a variety of coastal organisms documented. Mangroves reviewed as supporting numerous ecosystem services including flood protection, nutrient and organic matter processing, sediment control, and fisheries.

Mangrove ecosystem is composed of plant communities found between the lowest and the highest tide level of the estuarine and riverine systems (Mastaller, 2007) as cited by Wah, Mojiol, and Saleh (2011). It is a significant habitat for sustaining biodiversity and provides direct and indirect benefits to human activities. Storm protection, shore stabilization, and control of soil erosion and flooding, nursery ground of aquatic life and carbon sinks are the primary environmental services offered by the mangrove trees.

Unfortunately, the mangroves were facing considerable degradation not only here in the Philippine's but also among tropical countries around the world. Deterioration and cleaning of mangrove forests occurred on the global scale due to urbanization, population growth, water diversion, aquaculture and fishpond construction (Heekendaet al., 2014). Deforestation also occurred due to harvested wood and non-timber products, impact of large-scale infrastructure development and as well as persistent small-harvesting of

communities to mangrove trees aggravated the devastation of mangroves ecosystem in many coastal communities (Valiela et. al, 2001; Walters, 2005; Alongi, 2007; Alongi& de Carvalho, 2008).

Similarly, the causes of mangrove destruction also happened in our country. The Philippines mangrove ecosystems have suffered from degradation since the late1920s because of its conversion to aquaculture ponds (Zamora, 1990; Primavera, 2000). Due to this conversion, 70 percent of the original mangrove forest were lost (Walters, 2000) and 50 percent of remaining mangrovesthreatened condition (Department of Environment and Natural Resources/United Nations Environment Program) DENR/UNEP, 1998). DENR (2001) reported that the most rapid decrease of mangrove covers in our country occurred during the 1960s and 1970s when national policies encouraged the expansion of aquaculture.

The Mangroves Profiling and Decision Support System are appropriate for theuse of DENR (CENRO) employees, who have access to profile information of mangrove's data for direct reports. The System is responsible for an effective and efficient approach for the admin. It will help them accomplish the task faster and also it eliminates the need for a large staff. It will provide a piece of profile-based information on mangroves.

Decision Support System is a specific class of computerized information system that supports business and organizational decision-making activities. Anadequately designed Decision Support System can identify and solve problems and make decisions. It is an information and planning system that provides the ability to interrogate computers, analyze information and predict the impact of decisions.

A framework of the study

Theoretical Framework

One of the theories applied to the survey is *Ecological Mangrove Model Theory* according to Robert R. Twilley, this theory anchors that the ecological model to simulate the trajectories of mangrove attributes according to different restoration criteria at geographically specific conditions and at decadal time scales".Therefore, this model can contribute to the design and implementation of restoration

projects, and also be used to verify critical mechanisms controlling ecosystem attributes during the recovery period. (Harris & Ulmann, 2010) Brought to the attention of geographers the sociologically based concentric-zonal hypothesis of city form and the economics-based wedge and sector theories of urban. The common element is the spatial dimension that is a dominant one. This theory helps the proponents realize that mangroves are essential to our environment in a way that this theory simulates a trajectory about mangroves. Concerning the study, it also gives a spatial dimension that offers the idea to formulate activities to improve the situation of mangroves.

One of the theories applied to the study is the *Geographical Theory* by Reginald G. (2013). This theory states the emergence of the geographical theory which was an imminent brand of the aspiration to arrange current geographic knowledge and to use that organized base to explore new areas of expertise. About the study, anchors that human members or machines perform fill-in utilizing information, innovation, and different assets to process items and administrations to interior alternately outer clients. Within the realm of geographical theory, two unique paths followed. One focused on 'form,' or the patterns or peculiar spatial configurations distributed in a well-defined area. (Amedeo and Golledge 2009).

Decision Theory determines the decisions given unknown variables and an uncertain decision environment framework. Decision theory brings together Psychology, Statistics, Philosophy, and Mathematics to analyze the decision-making process. Decision theory applied to a wide variety of areas such as game theory, auctions, evolution, and marketing. About this, the proposed study is to give decision support in terms of the data of the mangrove trees (Williams 2013). It helps the admin to formulate a decision for DENR in terms of mangrove's status and the species found in Burayan, Paraiso and Kataisan San Jose, Tacloban City. The proposed system generates reports to support the decision process of the DENR (CENRO) to have bases for the next project.

Conceptual Framework

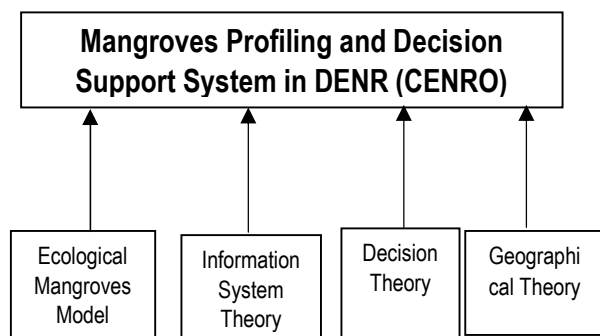


Figure 1.0 Schematic Diagram of the Mangroves Profiling and Decision Support System in DENR (CENRO) Palo, Leyte

Objectives of The Study

General Objectives

This study aims to create a system for Department of Environment and National Resources specifically in the City of National Resources Office (CENRO-Palo) that can help to make its decision support based on the data gathered about mangroves.

Specific Objectives

Specifically, the researchers aim to;

1. Existing spatial or geographic data of Mangroves in Brgy. Burayan, Paraiso and Kataisan San Jose, Tacloban City in terms of:

1.1 Status of Mangroves Trees.

1.2 Species composition of Mangroves in different sites.

2. Develop a decision support system for DENR in terms of:

2.1 The number of mangroves planted.

2.2 The species of Mangroves planted.

2.3 Specific area to be covered in re-planting mangroves as replacement of extinct species.

3. Delineate the mangrove forest in the locality from the upstream to downstream estuaries of the different barangays.

II. METHODOLOGY

Research Design

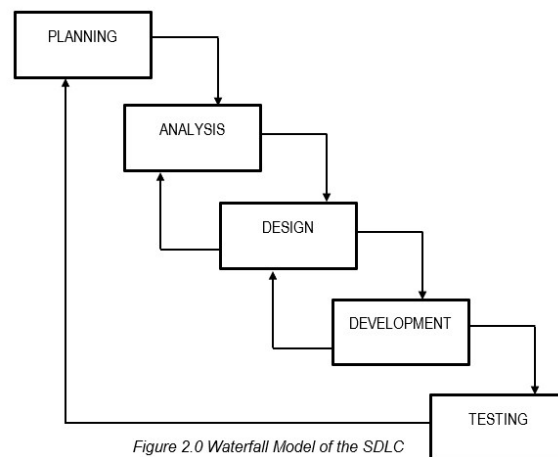


Figure 2.0 Waterfall Model of the SDLC

Figure 2.0 Waterfall Model of the SDLC

Planning:

The first phase is planning which consists of activities such as the confirmation of the project title for the system to be developed, identifying the background issues,

objective and the scope of the project. Confirm the project title which is summarizing the idea into a sentence for the system. The researcher created the project plan using the Gantt chart and Pert chart to meet the schedule.

Security Plan:

Having a security plan for the study is very important to avoid the manipulation of data. The security plan of this study is that the administrators provide the restriction between the users.

Test Plan:

The test plan is the testing interface which the researcher will run the system and see if it is working.

Maintenance Plan:

In the maintenance plan, the researchers make sure that every change of code in the view will not affect the system in logic.

Analysis

The second phase is the analysis. In this phase, we gathered the data by asking the information related to our study and analyze the shapefiles given by our end user during the time we conducted our data.

Design

In the design stage, the researcher transformed a detailed requirement into a complete system design document focused on how to deliver the required functionality. We use a GPS device, Basecamp, Trackmaker and some diagrams like Context Diagram, Dataflow Diagram, and System Flowchart to be able to identify the flow of the system.

Developing

In the development phase, the proponents used different software to come up with the output that the system needed. They used Notepad++, HTML 5, CSS, and PHP for the programming language to develop the prototype and XAMPP for the database to store the data.

Testing

In this phase, the output of the study is being tested running the program to know if there is a problem. Also, to know if there is something to change or to edit on the system if it is not working and go back to the first phase to see where the problem is. Testing is essential, for us to know if the functionality of the system is useful.

III. RESULTS AND DISCUSSIONS

The findings from the DENR (CENRO) survey are presented in the first section, followed by the conclusions of the focus group discussions as well as a discussion of the study results.

1. The researchers aim to present spatial data of Mangroves in Brgy. Burayan, Paraiso and Kataisan San Jose, Tacloban City in

terms of Status of Mangroves Trees in Burayan, Paraiso and Kataisan San Jose, Tacloban City and the Species composition of Mangroves in different sites.



Figure 9.0 Reports

Data will display and will access on the home page. The home page shows a summary of the data that is in the system. The administrator will have access to all the data uploaded and inputted to maintain the restriction of the system

2. To develop a decision support system for DENR in terms of the number of mangroves to be planted and the species of Mangroves to be planted.

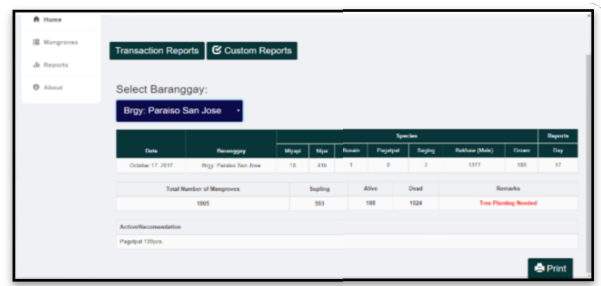


Figure 10.0 Custom Reports

For the admin or the forester to decide, the system will give the remarks on what to do if the specific barangay will have the smallest number of mangroves species present in each location.

3. Delineate the mangrove forest in the locality from the upstream to downstream estuaries of the different barangays.

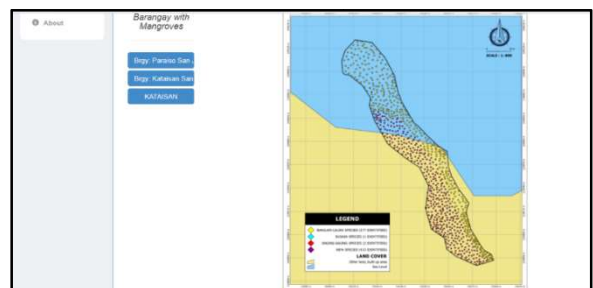


Figure 11.0 About

The system displays the map of each barangay for the users to notice the location that it has the specific mangroves data present in that barangay.

Table 4.0 Survey Findings

Questions:	5%	4%	3%	2%	1%
1. Displaying the Homepage.	2	0	0	0	0
2. View Mangroves data.	2	0	0	0	0
3. Manipulate Mangroves data.	2	0	0	0	0
4. Display and print monthly report.	2	0	0	0	0
5. Displays and prints reports in each Barangays.	2	0	0	0	0
6. Adds Mangroves data.	2	0	0	0	0
7. Gives precise decision support to the admin for the project that is going to be proposed.	1	1	0	0	0
8. The system gives precise information to the admin and viewers.	0	2	0	0	0
9. Helps support the decision of the admin and viewers through the use of data that the system gives.	0	2	0	0	0
10. Can access the internet easily.	2	0	0	0	0
11. The system loads faster.	2	0	0	0	0
12. The image and text are readable.	2	0	0	0	0
13. The data of the system is secure.	2	0	0	0	0
14. The system has concise information.	1	1	0	0	0
Total:	95%				

Charts

The admin gives 100% in terms of functionality of the system, 95% for the forester. The admin is more satisfied than the forester about the performance/functions of the system.

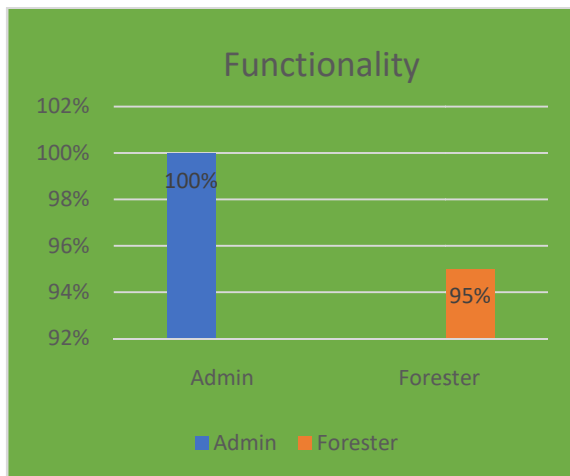


Figure 12.0 System Functionality

In terms of usability, the admin and the forester give 100% because they said that it gave more help to them especially in storing data and having decision support

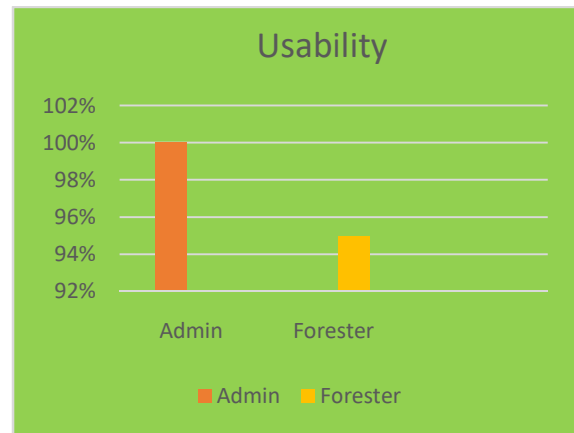


Figure 13.0 System Usability

The admin and forester are very satisfied in a way that the proposed system is fully functional in terms of portability.

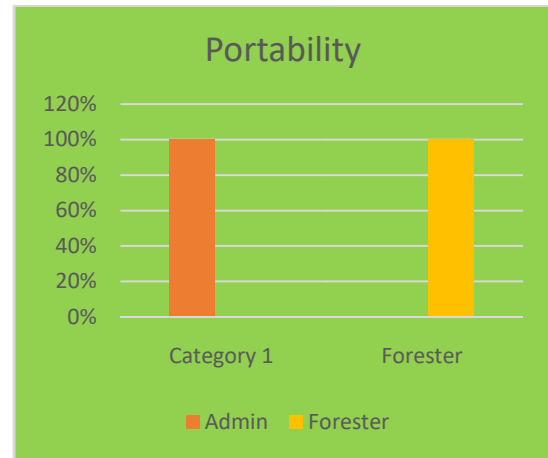


Figure 14.0 System Portability

The admin and Forester both agreed that the system is fully functional or 100% working while in giving concise information, they gave a different answer.

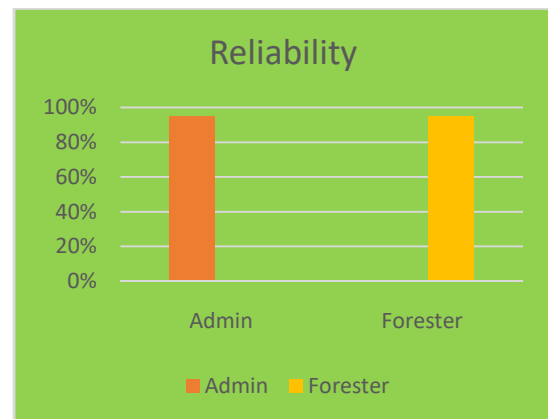


Figure 15.0 System Reliability

IV. CONCLUSION

The researcher concluded that the system is capable of using in a way that the system gives precise information to the admin and viewer. It also helps to support the decision-making of the admin through the data entered in the order. This system is more advantageous than the current system which is the manual system. It can manipulate mangroves data with less hassle. The system allows viewing and updating of data by the viewers and by the admin of each barangay through the internet. Pertinent and concise information necessary is in the developed system. The system is appropriate for use because of its high security in keeping data for an extended period.

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