

Online Plant Pests and Diseases Management and Information System with GIS and Android Platform for Department of Agriculture Region VIII and RCPC

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Abstract: - The purpose of this study was to speed the process of data commission to the RCPC. Which would easily monitor the pest and disease that affects the plants. So that monitoring the pest and disease that affects the plants and map out its existence will be natural and be taken. And also to avoid the migration of the pest from one place and to another. And to generate comprehensive reports for monitoring the pest and diseases. Many conclusions were drawn based on the result of the research and survey. Provincial Offices in Region VIII”, as an RCPC will be able to send reports whenever they are on the field at home or a vacation as long as the person can connect to a Wi-Fi or any internet provider. In this way, there will be no longer waiting for a day or a month to get their surveillance form to solve or to add a possible solution to the current diseases on the plants and to prevent the migration of pest and disease. The researcher recommends using an android tablet instead of mobile phones since the website is dealing with charts and graphs (massive data) that requires a bigger screen to see. Adding additional features like messaging and not just focuses on the crops but also focus on other plants.

Keywords: Pests, Diseases, Android, Mobile phones, Monitoring

I. INTRODUCTION

Our world has changed a great deal with the aid of information technology, a general term that describes any technology that helps to produce, store, communicate, and disseminate information. Tasks that were once done manually or by hand have now become computerized, and the job can be complete with the single click of a mouse. With the aid of IT, the researcher wanted to streamline our business processes and to get information in ‘real time’ that is up to the minute and up to date. Data is the backbone of every system, thus playing a vital role in society today.

According to the Provincial Agriculture Office in Leyte, there are nine types of pests and 800 types of diseases currently existing in this province. With this, the farmers alone cannot identify what types of pests and diseases affecting their plants and thus it needs the help of the Agricultural Technologist with the use of a stand-alone

computer to determine the types of pests and diseases existing in such particular farm.

Provincial Agriculture Offices in Region VIII covers the provinces namely, Biliran, Leyte, Southern Leyte, Samar, Northern Samar, and Eastern Samar. Biliran has 8 (eight) municipalities while Leyte has 40 (forty) districts including 3 (three) cities; Southern Leyte has 18 (eighteen) areas including 1 (one) city; Samar has 24 (twenty-four) municipalities and 2 (two) cities; Northern Samar has 25 (twenty-five) municipalities; Eastern Samar has 22 (twenty-two) towns and 1 (one) city. Each municipality has an Agricultural Technologist that was assigned to let the farmer’s fill-up the surveillance form. Then the Provincial Agriculturist will analyze the data.

The researcher decided to create a system that would help the Department of Agriculture in Region VIII to manage its transactions. The main goal is to create an Online Plants Pests and Diseases Management Information System with GIS for the Department of Agriculture: Provincial Offices in Region VIII. The current manual process in these Provincial Agriculture Offices delays the trending of the Plants Pests and Diseases that exists in every province because of the slow process of submitting the data to the Provincial Agriculturist and the RCPC.

The system will help the department to improve the monitoring of plant pests and diseases. Submission of comprehensive reports are secured and reliable, to have the data analysis in a short period and to have a fast generation of reports, visual representation of the data and thus enable to make solutions to the pests and diseases to be implemented quickly as possible.

The system will make it easier and thus more convenient for the users to be able to do their work on the go or in the field as it will provide the feature for users to be able to access and use the system through their Android device.

Conceptual Framework

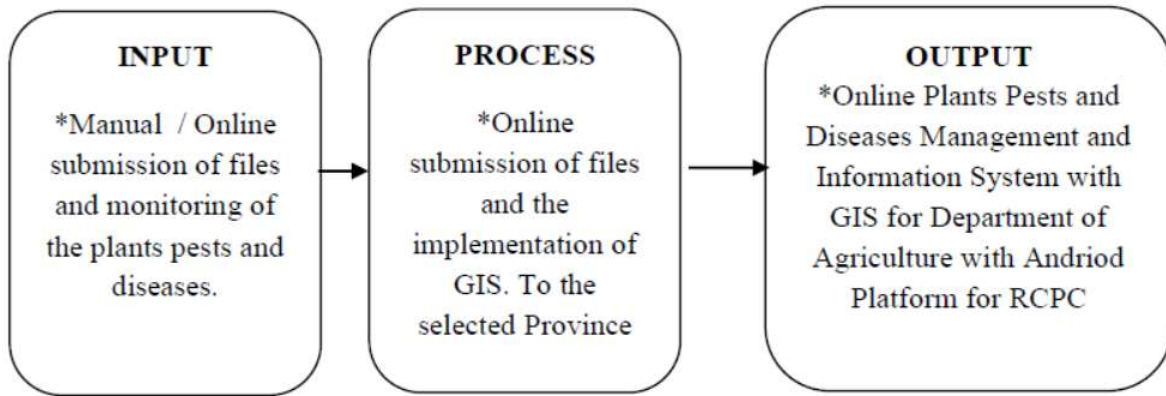


Figure 1: Input Process Output

The researcher used this kind of approach during the development of the system and the study to connect all the aspects of inquiries to solve the problem encountered by the recipient to identify what scheme to use to solve the problem.

II. METHODOLOGY

Research Design

The research design utilized in this study is both developmental and descriptive method. A fact-finding survey that provides adequate and accurate findings through a survey questionnaire to the respondents in the research locale. The information gathered will be analyzed and presented to draw up implications and inferences for the study.

Research Locale

The research locale of the study is the Department of Agriculture and the Regional Crop Production Corp (RCPC) in Palo, Leyte. Samples are selected purposively. With this, the elements included in the sample are chosen based on unique characteristics and smooth cooperation among the respondents, and the convenience of the researcher. The questionnaire is composed of the respondent's profile and questions about the problems encountered in the existing system.

Research Procedures

The researcher considered conducting an interview inquiring about the current system and what are the processes the Department of Agriculture commits to fulfill their duties under the current policy and then a survey – self-styled questionnaire, would be conducted with sample respondents purposefully taken from the research locale.

Research using the internet allowed the researcher to identify the cause and effect of the processes and the problems and solution for this study. The researcher also considers published materials which can be downloaded from the internet like e-books as the source of information, especially for creating thesis manuscript, software, and hardware development tools.

Research Instruments

The researcher used self – structured survey questionnaire and an interview for collecting data in this research. The researcher used the questionnaire to gather data on the respondent's opinions and judgment towards their existing system as well as on the proposed method. The proponents also conducted unstructured interviews with the respondents for clarification, verification, and further information for the study.

Research Respondent

The respondents of this study are the Agricultural Technologist and Provincial Agriculturist. Opinions of the respondents are essential for the completion of this study. In this study, the proponents chose a small population since the proponents only want to determine the respondents' reaction toward their existing system and to the proposed method. The proponents used a sample of 20 respondents since the type of sampling used is purposive. Purposive sampling is a type of non – probability sampling in which the researcher chooses the example based on who would be appropriate for the study.

Statistical Treatment of Data

The researcher used the percentage and frequency of distribution in computing the data gathered.

Scores in the Distribution

$$\text{Percentage (\%)} = \frac{\text{Number of Respondents}}{\text{Total Number of Respondents}} \times 100$$

III. RESULTS AND DISCUSSIONS

Table 1. Responses in terms of Effectivity and Reliability of the system.

Preferences	Frequency (Number of Respondents)	Total Number of Respondents	Percentage
No	9	9	45
Yes	11	11	55
Total	20	20	100

Table 1 shows that 55% of the respondents agreed that the current system is effective and reliable, while 45% said that the system is not that reliable and competent.

Table 2. Time taken before the Provincial Agriculturist can take action under the current system.

Choices	Frequency (Number of Respondents)	Percentage (%)
Day	0	0
Week	1	5
Month	19	95
Total	20	100%

Table 2 shows the experience of the respondents in terms of the speed to respond to a farmer's request. A clear majority shows that it takes about a month for the request to finish. This response confirmed the information gathered from the interview with the Provincial Agriculturist.

Table 3. Responses on the improvement of the system.

Preferences	Frequency (Number of Respondents)	Total Number of Respondents	Percentage (%)
Yes	17	17	85
No	3	3	15
Total		20	100

In table 3, 85% of the respondents, a clear majority of the respondent's opinion that the current system needs to be improved while only 15% were satisfied with the functionality of the system.

Table 4. Response on the immediate usage of the system

Preferences	Frequency (Number of Respondents)	Total Number of Respondents	Percentage (%)
Yes	18	18	90
No	2	2	10
Total		20	

Ninety percent of the respondents in table 4 are in favor of implementing the usage of the system, while only 10 percent of the respondents disagree.

Table 5. Suggested Additional Features for the System

Choices	Frequency (Number of Respondents)	Percentage (%)
Stable Server (Web Hosting Site)	19	95
Android Application	14	70
Good and Simple User Interface	16	80
Other: Fast Internet Connection	3	15

This table shows the respondents recommendations for additional features of the system. 95% of the respondents want a Stable server (Web Hosting site); this feature of the system will provide stability and reliability as the system and its database will be online so no matter what circumstances happen to the offices of the Department of Agriculture, the system won't be affected.

Eighty percent of the respondents want an excellent and straightforward user interface and be able to get on with their activities instead of spending time studying how to use the system. Seventy percent of the respondents want an android application so that they can access and use the system in the field if needed instead of requiring a PC or Laptop. And 15 percent of the respondents answered with faster internet as an addition to the speed of the system.

IV. SUMMARY OF FINDINGS

This study aims to develop a website/system that will allow users such as the RCPC (Regional Crop Protection Corp) will be able to quickly receive full comprehensive reports from all the Provincial Agriculturists of Region VIII instead of the current one month or even longer waiting a period of the current system. And thus be able to accurately know what diseases are affecting a particular province or municipality and react quickly instead of whereby the time the RCPC or Provincial Agriculturist acts to help the farmer, the disease or pest has already damaged the farm and moved on to a new farm.

The system will make it easier and thus more convenient for the users to be able to do their work on the go or in the field as it allows the usersto access and use the system through Android app using Android device.

With the results of the interviews and survey questionnaires, it is clear that the target users perceived the advantages of the "Online Plants Pests and Diseases Management and Information System with GIS for the Department of Agriculture Region VIII: Provincial Offices in Region VIII" as 80% find the system providing convenience, saving time, providing reliability and security and the DAR VIII office want it implemented as soon as possible.

V. CONCLUSION

The researcher concluded that the "Online Plant Pests and Diseases Management and Information System with GIS and Android Platform for Department of Agriculture Region VIII and RCPC", as an RCPC will be able to send reports whenever they are on the field at home or a vacation as long as the person can connect to a Wi-Fi or any internet provider. In this way, there will be no longer waiting for a day or a month to get their surveillance form to solve or to add a possible solution to the current diseases on the plants and to prevent the migration of pest and disease.

VI. RECOMMENDATION

The researcher provided the following recommendations based on the findings and conclusions made:

1. Develop the additional features not just focuses on the crops but also focuses on the other plants.
2. The researcher recommends using an android tablet instead of mobile phones since the site (website) is dealing with charts and graphs (massive data) that requires a bigger screen to see.
3. Add more additional features like messaging system and other stuff.

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