ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 12, pp.43301-43306, December, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

FARMERS' RECORD MANAGEMENT SYSTEM AT THE MUNICIPAL AGRICULTURAL SERVICES, SALCEDO, EASTERN SAMAR

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ARTICLE INFO

Article History:
Received 03rd September, 2016
Received in revised form
17th October, 2016
Accepted 08th November, 2016
Published online 30th December, 2016

Key words:

Farmer's record management system,
Philippine Agricultural services,
E. Samar Agricultural services,
FARMS.

ABSTRACT

This study aimed to design, develop and test the Farmers' Record Management System at the Municipality of Salcedo, Eastern Samar. This was conducted to help the Municipality specifically the Office of the Municipal Agricultural Services (OMAS)to come up with a form of information management system that is query-specific and meets the demands of a user looking for information based on certain criteria. Effective collection, storage, management, processing and generating of pertinent information related to farmers, agriculture and livestock are all concerned of the OMAS. This study also envisions to assist that department provide necessary data to those queries in a timely manner through the implementation of a computerized information management system. Microsoft Visual Basic 6.0 was chosen as the programming language in designing and developing the system where the gathered data served as inputs to it.Acceptance tests were done in two stages - Benchmark and Pilot test in which this test is further divided into Alpha and Beta tests. For the Benchmark test, the researchers were the ones who evaluated the system and got a grand mean of 3.71 which was interpreted as Very Good. The second test was the Alpha test where all ICT faculty handling major subjects tested the system and got an overall grand mean of 4.31 which was interpreted as Excellent and the third test was the Beta test in which all OMAS personnel evaluated the system and got a grand mean of 4.42 and was interpreted as Excellent. All these tests were conducted through using the McCall's score card. This score card encompasses three criteria: Product Revision, Product Transition and Product Operation where each is divided into sub criteria. Product Revision covers Maintainability, Flexibility and Testability of the System, Product Transition includes Portability, Reusability and Interoperability, while Product Operation encompasses Correctness, Reliability, Efficiency, Integrity and Usability. Based on the results of the different tests, the researchers concluded that the developed system was functional since it can store, retrieve, process and generate reports needed by different agencies for policy formulation, decision-making and assistance generation.

Citation: Hershey R. Alburo, Gil G. Dialogo, Paul Anthony A. Torres and Renato A. Padullo, 2016. "Farmers' record management system at the municipal agricultural services, Salcedo, Eastern Samar", *International Journal of Current Research*, 8, (12), 43301-43306.

INTRODUCTION

One of the key benefits of computerization is the remarkable increase in office productivity. For a local government office that intends to deliver fast and effective frontline public service to its constituents, the availability of vital information relative to the functions of that specific office is of prime impetus for innovation on office procedures and workflow efficiency. The same impetus is of greater magnitude if the office in consideration belongs to the municipality ravaged by the onslaught of the recent super typhoon. It befalls upon the responsibilities of that municipality to provide prompt and expedient information to organizations that aim to assist the municipality recover from disaster.

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Thus, an innovation that facilitates the storage, retrieval and management of information would decisively empower that municipality to respond to the challenges and need towards more comprehensive information sharing with both government and non-government organizations both foreign and domestic. Salcedo is a fifth class municipality that lies on the Southern part of Eastern Samar. It is bounded on the north by the Matarinao Bay, Leyte Gulf and the municipality of Mercedes on the south, the Pacific Ocean on the east, and the municipality of Quinapondan on the west. Based on the Municipal Ecological Profile (2002), agriculture is the municipality's major economic activity and main source of livelihood and income. Coconut is the major commercial crop in terms of land area planted, followed by root crops and then bananas and other crops. There is only small livestock production. This study pushes the envelope forward and departs from the mere computerization of data. It is driven by

the need of the municipality to come up with a form of information management system that is query-specific and meets the demands of a user looking for information based on certain criteria. Since the start of the relief, recovery and rehabilitation efforts after ST Yolanda, the Office of the Municipal Agricultural Services (OMAS) has been receiving volume of queries on the information pertaining to farmers, agricultural crops and livestock. Most organizations that implement livelihood programs need baseline information prior to their implementation of agriculture-based livelihood programs. Data tracking and updating became a tedious task to the department. This project therefore envisions to assist that department provide necessary data to those queries in a timely manner through the implementation of a computerized information management system.

Objectives of the Study

This study aims to design, develop and test Farmers' Record Management System at the Municipal Agricultural Services, Salcedo, Eastern Samar Specifically, it has the following objective:

- To develop a system that is flexible, portable, usable and efficient in the collection, storage, management, processing and generating farmers, agricultural crops and livestock.

Scope and Limitation of the Study

This study focused on designing, developing and testing the Farmers' Record Management System (FARMS) at the Municipality of Salcedo, Eastern Samar. This study was conducted at ESSU Salcedo Campus, S.Y. 2014 – 2015. The system was developed using MS Visual Basic 6.0 and was evaluated through acceptance testing. Following the protocol in the Software Engineering, the system had undergone three (3) tests – Benchmark, Alpha and Beta tests under Pilot testing. Respondents include the researches, all ICT faculty handling major subjects and all OMAS personnel. The score cards were retrieved from the respondents and were computed using average and weighted scoring system. The system was only capable of collecting, storing, browsing, processing and generating information pertaining to farmers, agricultural crops and livestock.

Conceptual Framework of the Study

Figure 1 shows the input-process-output flow of the system. Under the input is Farmers' Profile which consists of the Last Name, First Name, Middle Name, Appellation, Gender, Birthday, Cellphone No., Address, Non-Farm Annual Gross Income, Family Size, Family Type and Household Members; Farm Information includes Farm No., Size of the Farm**,** Tenure Type**,** Location**,** Commodities Planted**,** Product**,** Cropping Season**,** Yield**,** Marketing practices**,** Production expenses incurred**,** Labor Activities, Material and Agricultural Inputs**,** Fixed Cost**,** Miscellaneous Cost**,** Types of Crops**,** Average monthly income from crop production**,** Net Income and Profit**,** Related Trainings and Seminars**,** Support from NGO**,** Supply and Demand**,** including Problems Encountered. The process involves gathering data from the Office of the Municipal Agricultural Services which will be encoded and turn as fields or input to system development. Creating database, tables, forms and modules are under the design phase. Developing phase will be concerned on coding programs to make the whole system functional. Testing the system will be divided into two stages: the Benchmark test and the Pilot test which will be subdivided into Alpha and Beta tests. The output will be the computerized Farmers' Record Management System of Salcedo, Eastern Samar.

REVIEW OF RELATED LITERATURE AND STUDIES

Related Literature

A wide variety of technology adoption articles have been published in the agricultural economics journals. The main reason for so many articles is likely that there are many different technologies to study in many different segments of the farming industry. New technologies range from growth hormones, production hormones, reproductive hormones, genetically modified organisms, to technologies such as computer and internet technologies, and new software packages such as Global Information Systems software (GIS) (Grisham, 2007). Further, he stated that Computerized record keeping systems are mainly considered to be management-intensivetechnologies. The Farmers Record Management System (FARMIS) is a farm management and record-keeping web- based tool that is backed by a physical farm book. The benefits of being on FARMIS include access to market prices, market linkages, weather information, and advisory services and access to credit. The platform can be used by a farmer cooperative or association for robust profiling of the farmer to the system through a mobile application and taking records of the farmer to make a system. Farmers are then required to make a subscription payment of 20, 0000UGX through mobile money to enable them access the information and record keeping later enables farmers to access credit. Currently, there are over 10, 000 small holder farmers on the system. FIT began populating the platform in October 2013 (fin4ag, 2014).

Related Studies

In the study "Status of Farm Data System and Farmer Decision Support in Sub-Sajara Africa" conducted by Minae, *et al*, stated that farm data are essential to sound decision making by farmers as well as to organizations that provide support facilities and advisory services to enhance agricultural production. The importance of farm data in appraising farm profitability and in support of sound investments has increased in the recent years with increasing agricultural commercialization. A synthesis of ten national review papers on the status of farm data systems in sub-Sahara Africa indicates that the importance of farm data has tended to be underrated in the past two decades of participatory development. A declining allocation of human and material resources from the public sector for farm data systems has culminated in low quantity and poor quality data, coupled with ineffective dissemination to the main users. Based on the findings, it is clear that under the current conditions, the public sectors' capacity to establish sustainable farm data system is a distant mirage for most countries. This is aggravated by the views in some quarters that trends and policy impacts at the farm are well known and thus significant investment in data collection are not warranted. Innovative farm data monitoring and information networking through farmer study groups, farmer association, participatory farm management and learning groups used by different member countries need to be assessed and if possible replicated and scaled up.

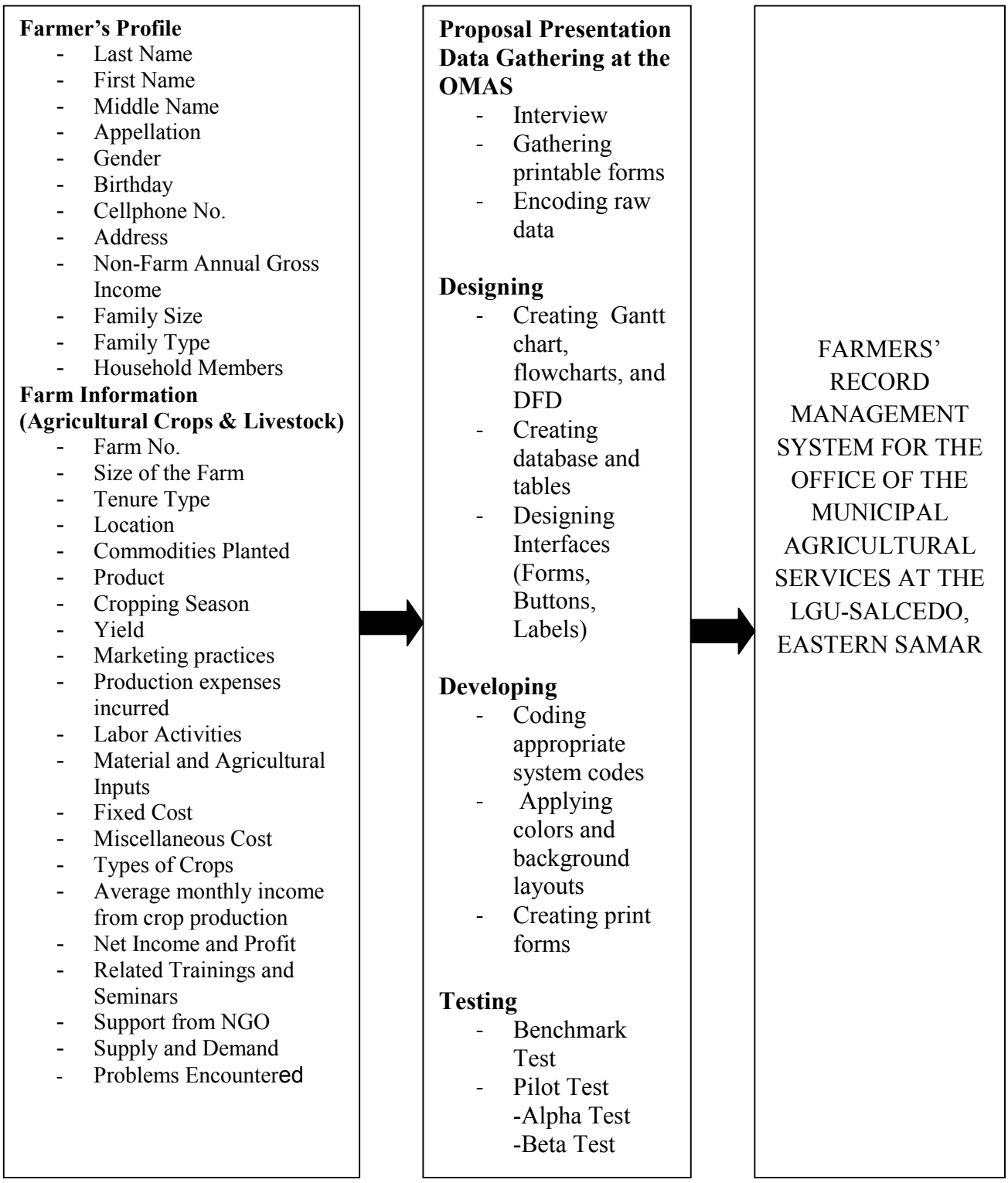

Figure 1. The Conceptual Paradigm showing the Input-Process-Output flow of the System

In a case study conducted by Doye (2003) titled Farmer's Use of Information System found out that Carl Frank, a sole farm proprietor in Western Minnesota, established good record-keeping practices when he bought a computer. The information system played an important supporting, but not central role in his decision to make the transition from farrow-to-finish to specialized finishing in the network arrangement. He learned about networking arrangements of this sort from magazine articles, university publications and discussions from other farmers. He then thought through how a network could be set up in his own situation and shared ideas with his brother and nephew.

As he moved toward that decision, he did some "back to envelope" budgeting with a spreadsheet, but this was mostly to confirm his perception that the arrangement would work. Carl is a manager who is willing who thrives on having access to information and who is willing to spend time maintaining the records that are the foundation of an effective information system. He is quick to adopt new applications and adept at using then to work more effectively. His commitment to extending his knowledge of sustainable agriculture to the broader community also may motivate his dedication to record keeping because those others will adopt more sustainable practices only if their feasibility is carefully documented.

Finally, Carl's cropping season narratives epitomize his approach to information management. They place carefully kept records into a narrative context, capturing observations he makes as a careful, involved observer in all his farming operation and making experiences more readily available for understanding new problems as they arise.

MATERIALS AND METHODS

Research Design

The research method that was used by the researchers in this study was the descriptive research design which include survey questionnaire to gather inputs from the personnel of OMAS and product development method which was used in designing, developing and testing the system.

Research Locale

The researchers conducted the survey at the Office of the Municipal Agricultural Services (OMAS), LGU Salcedo, Eastern Samar. The product development was conducted at the CICT Laboratory of this University.

Respondents of the Study: The respondents of the study in the survey method werethe personnelof OMAS in which they were given a set of carefully prepared and logically ordered questions. For the developmental method, the respondents included the all CICT faculty who are handling major subjects, the researchers themselves and the OMAS personnel who evaluated the system using score cards to qualitatively measure the system's performance.

Sampling Plan: The researchers used non-random sampling procedure in the selection of respondents in this study. This included four (4) researchers, all OMAS personnel and 12 CICT core faculty.

Data Gathering Procedure

A set of interview questions was given to the OMAS personnel that served as respondents of the study on the 1st week of April 2015. The data collected from the respondents was consolidated, analyzed and encoded as input and basis of product development that led to an efficient system. The system was rated using McCall's score card which is divided into three categories: product revision, product transition and product operation. Product revision measures maintainability, flexibility and testability; product transition determines portability, reusability and interoperability while product operation assesses correctness, reliability, efficiency and integrity of the system. The researchers get the weighted average for each criterion and constructed a table showing the average in the different tests. The researchers adopted the following statistical interpretation based on the same statistical representations used by Brigham (1901) from North-Eastern United State, one of the psychologists who worked in the Army Alpha and Beta:

Mean Score Range	Qualitative Description
4.2 - 5.0	Excellent
3.4 - 4.1	Very Good
2.6 - 3.3	Good
1.8 - 2.5	Fair
1.0 - 1.7	Poor

Data Analysis

The scores retrieved from the respondents of the study through the scorecards distributed were computed, tallied, analyzed and treated using appropriate statistical measures. Frequency counts, average mean and grand mean were computed from the scores obtained using MS Excel Application.

PROCEDURE

Designing the System

Designing of the system was made through the data gathered from the OMAS department on the month of May 2015. The data gathered served as the basis of creating flowcharts, constructing database, making the interfaces, menus and submenus. Data flow diagrams and entity-relationship diagrams were also made during this stage. These diagrams guided them through the development stage.

Developing the System

The development of the system commenced on the month of July 2015 and was finished on the month of September 2015. The researchers followed the appended flowcharts they created so they would know how the system operates. The system was created using MS Visual Basic 6.0 in which this programming language was capable in creating menus, submenus needed for the system to be able to collect, store, browse, process and generate reports regarding farmers, agricultural crops and livestock. Microsoft Access 2003 was used as the backend of the system.

Testing the System

After the system development, testing the system took place for further evaluation and assessment of the developed system. Testing the system was done in three stages. The first test was the Benchmark test wherein the researchers were the ones who evaluated the system and was done on the 1st week of October 2015, the second phase is the Pilot test which was further divided into two tests – Alpha and Beta Tests. For the Alpha test, all faculty of the College of ICT who are handling major subjects evaluated the developed system on the 2nd week of October 2015 and for the Beta test, all library personnel rated the system on the 3rd week of October 2015. They have used McCall's score card to measure product operation (maintainability, flexibility, testability), product revision (portability, reusability, interoperability), and product operation (correctness, reliability, efficiency, integrity).

RESULTS AND DISCUSSION

Results in Designing and Developing the Website

To facilitate system design, the researchers gathered data from the respondents of the study through interview guided with survey questionnaire. After retrieving the survey questionnaire from the respondents, the data were then analyzed carefully and designing the system followed on the month of May 2015. The researchers came up with the overall design of the system. System flowchart, entity relationship diagram and data flow diagram were made in this process. FARMS was created using Microsoft Visual Basic 6.0 on the starting on the month of July

2015 until September 2015. The developing phase took place first by creating objects such as forms, modules, labels, textboxes, frames and other visual basic objects. The appropriate color combination for the background, font name and font sizes were also considered during this phase in order to have a user-friendly and a realistic graphical user interface.

Results in Testing the Website

The system had undergone different stages of acceptance testing. This helped the researchers in determining errors and lapses in the system. The first test was the Benchmark test, followed by the Pilot Test which includes the Alpha and Beta Tests. Thesetests were conducted on the month of October 2015. The system was evaluated using McCall's Quality Model.

Benchmark Test on the Quality Attributes of the Farmers' Record Management System as perceived by the Researchers

Benchmark Test Summary

Table 1 presents the summary result of product revision, product transition, and product operation quality attribute during the benchmark test of the library system. The researchers rated the system using the following criteria: "Product Revision" obtained a mean value of 3.67 and was interpreted as Very Good; "Product Transition" the system obtained a mean value of 3.67and was interpreted as Very Good; "Product Operation" obtained a mean value of 3.80 and was interpreted as Very Good. The grand mean obtained of the product transition quality attribute of the system was 3.71and was interpreted as Very Good. Based on this result, the system still needs improvements and revision.

Table 1. The Summary of Overall Quality Attributes of the System as Perceived by the Researchers during the Benchmark Test

Criteria	Weighted Mean	Interpretation
Product Revision	3.67	Very Good
Product Transition	3.67	Very Good
Product Operation	3.80	Very Good
Grand Mean	3.71	Very Good

Alpha Test on the Quality Attributes of the Farmers' Record Management System as perceived by all CICT Faculty Handling Major Subjects

Alpha Test Summary

Table 2 presents the summary result of product revision, product transition, and product operation quality attribute during the Alpha Test of the library system. The researchers rated the system using the following criteria: "Product Revision" obtained a mean value of 4.29 and was interpreted as Excellent; "Product Transition" the system obtained a mean value of 4.28and was interpreted as Excellent; "Product Operation" obtained a mean value of 4.35and was interpreted as Excellent. The grand mean obtained of the product transition quality attribute of the system was 4.31and was interpreted as Excellent. On the academe level, this result shows that the system can easily be upscaled to newer versions, can run on Windows OS and can operate efficiently based on user queries.

Table 2. The Summary of Overall Quality Attributes of the System as Perceived by College of ICT Faculty during the Alpha Test.

Criteria	Weighted Mean	Interpretation
Product Revision	4.29	Excellent
Product Transition	4.28	Excellent
Product Operation	4.35	Excellent
Grand Mean	4.31	Excellent

Beta Test on the Quality Attributes of the of the Farmers' Record Management System as Perceived by the OMAS Personnel

Beta Test Summary

Table 3 presents the summary results for the beta test of the library system. The researchers rated the system using the following criteria: "Product Revision" obtained a mean value of 4.17 and was interpreted as Very Good; "Product Transition" the system obtained a mean value of 4.58and was interpreted as Excellent; "Product Operation" obtained a mean value of 4.50 and was interpreted as Excellent. The grand mean obtained of the product transition quality attribute of the system was 4.42and was interpreted as Excellent. This result shows that the OMAS personnel perceived it as functional and is ready to be implemented.

Table 3. The Summary of Overall Quality Attributes of the System as Perceived by the OMAS Personnel of the Municipality of Salcedo, E. Samar

Criteria	Weighted Mean	Interpretation
Product Revision	4.17	Very Good
Product Transition	4.58	Excellent
Product Operation	4.50	Excellent
Grand Mean	4.42	Excellent

Summary

This study aimed to design, develop and test a computerized Farmer' record Management System at the Office of the Municipal Agricultural Services, LGU Salcedo, Eastern Samar. This study was conducted to develop a system that is flexible, portable, usable and efficient in the collection, storage, management, processing and generating farmers, agricultural crops and livestock. Different processes were undertaken to achieve the objectives of the study. First was designing the system, which took place upon conceptualization of the data gathered from the respondents of the study who were the OMAS personnel of this university with the use of survey questionnaire. The data served as the basis upon designing the flow of the system which was represented by the system flowcharts. After designing the system, the development of the system followed. Microsoft Visual Basic 6.0 was chosen as the programming language utilized in this study. Creating interfaces and other features were undertaken during this phase. Coding the program followed shortly to ensure the system's functionality. Testing the system was done in two stages - Benchmark and Pilot Tests. Pilot test was divided into 2 stages – Alpha and Beta tests. For the first test, the researchers were the ones who evaluated the system, for the Alpha test, all ICT faculty handling major subjects tested the system and for the Beta test, all OMAS personnel evaluated the system. All these tests were conducted through using the McCall's score card. The overall grand mean for the Benchmark test was 3.71 which was interpreted as Very Good

which also shows that the system still needs improvements and revision. Further, the Alpha test got an overall grand mean of 4.31 which was interpreted as Excellent and which attest that on the academe level, this result proved that the system can easily be upscaled to newer versions, can run on Windows OS and can operate efficiently based on user queries. Lastly, the Beta test got agrand mean of 4.42 which was interpreted as Excellentand the OMAS personnel perceived it as functional and ready to be implemented.

Conclusions

After a series of system modifications, the following conclusions were made:

- The researchers designed and developed a functional computerized Farmers' Record Management System for the Office of the Municipal Agricultural Services at the LGU Salcedo, E. Samar.
- The researchers evaluated the developed system based on the scorecard taken from McCall's Quality Model which has three criteria: Product Revision, Product Transition and Product Operation.
- The developed system is flexible, portable, usable and efficient in the collection, storage, management, processing and generating farmers, agricultural crops and livestock that will serve as baseline information for policy-formulation, decision-making and assistance-generation.

Recommendations

In the light of the findings and conclusions drawn, the following recommendations weremade:

- The developed Farmers' Record Management System should be deployed at the Office of the Municipal Agricultural Services at the LGU Salcedo, E. Samar since it passes the level of acceptability.
- Should there be an upscaling of the system, the municipality should coordinate with the ESSU Campus.
- The developed system will be used as one of the inputs in the industrial policy plan of Salcedo, E. Samar

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