DATABASE MANAGEMENT SYSTEM OF FARM MACHINERIES IN SALEKA IRRIGATORS ASSOCIATION INC KATIPUNAN, ALICIA, BOHOL

College of Technology and Allied Sciences
BOHOL ISLAND STATE UNIVERSITY
Zamora, Bilar, Bohol

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DATABASE MANAGEMENT SYSTEM OF FARM MACHINERIES IN SALEKA IRRIGATORS ASSOCIATION INC KATIPUNAN, ALICIA, BOHOL

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In Partial Fulfillment
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Bachelor of Science in Computer Science

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Jerick C. Angcod
Romel P. Malnegro
Lino Tuzon Jr.

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APPROVAL SHEET

This thesis entitled **"Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol"** prepared and submitted by *Jerick C. Angcod, Romel P. Malnegro, and Lino C. Tuzon Jr.* in partial fulfillment of the requirements for the degree Bachelor of Science in Computer Science has been examined and recommended for acceptance and approval for oral defense.

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ABSTRACT

The study aimed to develop a Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. in Katipunan, Alicia, Bohol. Currently, the association uses the manual method which leads to the problems such as booking, renting or reserving for farm machineries which written only in the calendar, logbook, or any piece of paper that leads to duplication of entry/information, overbook, misplace the schedule, or write down incorrect (or incomplete) information, time consuming, and difficult in the generation of reports. In addition, there scheduling and liquidation are messy. The information was gathered through; analyzing the process in acquiring amenities; identifying the problems of existing system; presenting a better economic performance of information and transaction management system; and measuring the level of acceptability of the user's perspective by the target users. The identified problems and issues lead the researchers to came up a solution which provide computerized Inventory and reservation management, Payment, Data management, Booking cancellation, Up to date and Secure list of records, Generate a cropping transaction report, monthly transaction report, and annual report, based on the defined problems and issues in documenting and managing records and farm machinery. Based on the identified needs, Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. is developed with the following modules: administration, inquiry process, availment process, recording process, scheduling process, inventory, payment process, and generation of report. The developed framework was put through its paces and evaluated for usability. The respondents gave an "Agree" rating based on the evaluation results, suggesting that they were pleased with the features such as ease of use, visual clarity, language, and its implementation in general. Thus, implementation of the Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. is highly recommended.

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THE PROBLEM AND ITS SCOPE

Rationale

Since the Internet's fast rise in recent years, an increasing number of daily jobs and operations are performed via computers and mobile devices (internetworldstats.com, 2015). One of these taskeds is making a reservation or booking for different services.

Many types of reservation or booking systems exist offered by various software developers and companies and there are endless situations where they are needed. There are booking systems for restaurants, hospitals, barber shops and schools examinations etc., booking systems are everywhere. Developing a good booking system that would work on every single situation, device, and business can be very complicated because every situation is somehow different (KUJANPÄÄ, 2015).

A reservation or booking management system is a computer application that allows you to digitize your reservation (RESMARK, 2020) and that can access and manage past, present and future reservation (RMS, 2021). The primary advantage of reservation management system is that, unlike a manual system you have to slave over to keep up to date, reservation management systems are designed specifically to manage reservations. In other words, it automates a lot of the things

you're doing by hand, things that are taking up your time, and that can really screw up your process if you make an error.

SALEKA IRRIGATOR ASSOCIATION INCORPORATED (SALEKA IA) is a known irrigation association located at Purok 2 Katipunan, Alicia, Bohol. It is an association that manage around 350 farmers who use their irrigation system in the area. This association is currently part of NIA or National Irrigation Association which organized an action plan for the benefit of the Bohol Integrated Irrigation System (BIIS). This plan was prepared for some significant reasons and this includes: improving, monitoring, and evaluating operations; equity and efficiency in water distribution; strengthen NIA-Irrigator's Association (IA)-local government unit coordination; rehabilitation and upgrading irrigation facilities; and enabling demonstration farms on water-saving technologies be established and providing a good services of farm machineries. Currently, Bohol Irrigation System 1 (BIS 1) in Pilar is the one who sustain water in SALEKA Inc. This dam was a reservoir type dam and commonly called in Pilar as Malinao Dam. This irrigation system was constructed with loans from the Japan Bank for International Cooperation. SALEKA IRRIGATOR ASSOCIATION not only manage all farmers who use their irrigation but they also offer Farm Machineries booking and reservation. Currently they have 2 tractors, 1 harvester, 1 Rice Reaper 1 Four-wheel Rice Planter, 4 kuliglig hand tractor, 2 Hand-tractor, 4 rice thresher and 1 rice plot bed dryer.

At present, the manual method of SALEKA IRRIGATOR ASSOCIATION used leads to the problems such as booking, renting or reserving for farm machineries which written only in the calendar, logbook, or any piece of paper that

leads to duplication of entry/information, overbook, misplace the schedule, or write down incorrect (or incomplete) information, time consuming, and difficult in the generation of reports. In addition, there scheduling and liquidation are messy.

With the identified problems encountered, the researchers aimed to develop a Database Management System of Farm Machineries in SALEKA Irrigator Association Inc. in Purok 2 Katipunan, Alicia, Bohol, a system that provide computerized Inventory and reservation management, Payment, Data management, Booking cancellation, Up to date and Secure list of records, Generate a cropping transaction report, monthly transaction report, and annual report.

Literature Background

According to Republic Act 7607 also known as the "Magna Carta of Small Farmers". The State shall recognize the right of small farmers and farmworkers, as well as cooperatives and independent farmers' organization, to participate in the planning, organization, management and implementation of agricultural projects especially through appropriate policies, research, technology and training, and adequate financial, production, marketing and other support services to enhance agricultural productivity. In addition, it shall provide incentives and reward system to small farmers so as to accelerate agricultural productivity and to promote sufficiency and full development of agricultural potentials. In Section 18, Availability of Farm Machinery and Equipment. The Department of Agriculture, through the barangay or municipal governments and farmers' organizations, shall support

activities to ensure the availability of farm machinery and equipment for the use of small farmers in both pre- and postharvest operations. For purposes of monitoring, all farm machinery and equipment must be registered with the municipal government. The Department shall devise a program to increase the total number of harvest in the area. Local agricultural officers shall, in coordination with farmers' organizations, devise schemes in the sharing, pooling, leasing or acquiring equipment or machinery needed by the farmers.

The researchers developed a Database Management System of Farm Machinery in SALEKA Irrigators Association. To meet an ideal farmers and machineries operation database information system, the system must control the storage, retrieval, deletion, security, and integrity of data within the database that is why a database management theory is highly needed to accomplish the goals. Hence, the following theories stated were used as a foundation in making this study.

Edgar F. Codd's Rule 7 for Relational Database Management System, which is the higher-level insert, to edit and delete rule. This rule explains that a system must support set-at-time insert, edit and delete operators. It means that data could be retrieved from multiple rows and or various tables. This rule states that insert, edit and delete operations should be supported for any retrievable set rather than just for a single row in a single table (Codd, 1985).

The next theory is the Normalization theory of Edgar F. Codd. It is the process of simplifying the design of a database so that it achieves the optimum structures. This gives the concept of standard forms to assist in achieving the

optimum structure. The normal forms are a linear progression of rules that was used to apply in the database, which each higher standard achieving a better, more efficient design. These normal forms are based on the relation rather than the table. Codd's term of the table is a relation. A relation is a simple type of table in which it has the following attribute, its attributes to describe one entity, and it has no duplicate rows; hence there is always a primary key, the rows and columns are in-ordered (Codd, 1985).

The next theory is the First Normal Form of Edgar F. Codd. It requires tables to be flat and have no repeating or potentially repeating fields or groups of fields. A flat table is one in which every record has the same number of fields. In addition, a single field cannot contain multiple data values. Repeating fields must be moved to a related table. The first normal form is the most important of the normalization steps.

The last theory is maintaining data integrity and accuracy when you add, modify, or delete table data. It's important that the additions and changes you make to the data don't conflict with the normalization rules that you used to create the database. One of the most vexing problems facing users of large RDBMS is "unclean data". Over time, data entry errors and stray records accumulate to the point.

The said theories helped serve as the basis for databasing in storing data and information of the farmers and farm machineries operation and transactions for fast retrieval of information and for editing, updating its records if necessary.

To provide accurate and dependable monitoring and recording system, these are numbers of related techniques that were used as references which was implemented in different organization and institutions. Among these that are significant in the study are the following:

1. "Scholarship Database Management System" in Institute of Business Administration, University of the Punjab, Lahore, Pakistan. This system provides a database that is normalized for adequate data storing. This system focuses on the management of data of scholars in their university, which is also the same as the developed system the Data Management System. The only difference is that this system manages the data of scholars of the University of the Punjab, Lahore, Pakistan (Dabeer, 2017).

2. An Inventory of Computerized Systems Used In Sydney Metropolitan General ICU's. This computerized equipment is defined as that which produced patient data. This covered all the monitoring systems and individual stand-alone computerize equipment externally attached to or inserted into the patient In fully computerized ICU's, the data readout is communicated electronically to the Clinical Information System (CIS), and paper charting is unnecessary. In partially computerized ICU's, the data readout is communicated electronically only to the Central Monitoring System (CMS) with paper charting being necessary. Computerized equipment did not include internet applications and/or information

derived from this source (O'Connel, 2008). This system is related to the present system because it has monitoring and charting. However, the developed system has scheduling features.

3. "Recording and Monitoring System of the Provincial Social Welfare and Development" covers the automatic recording and management of former rebel's information. Customers could expect ease and convenience in transaction processes, updated reports, and real rebel status and information. This system focuses on the monitoring former rebel's which is also the same as our developed system (Batilong, Lomod, Visto, 2018).

THE PROBLEM

Statement of the Problem

The study aimed to develop a database management system of farm machineries in SALEKA Irrigators Association Inc, Katipunan, Alicia, Bohol.

In order to attain the objective, the following questions must be answered.

1. What are the current processes involved in managing data in SALEKA Irrigators Association Inc. in Katipunan, Alicia, Bohol such as:

   1.1 Farmers information

   1.2 Machinery and operators' information,

   1.3 Scheduling and reservation, and

   1.4 Payment

   1.5 Transactions Reports

2. What are the needs and problems encountered in the SALEKA Irrigators Association?

3. What could be the possible solution for the problem encountered?

4. What is the level of the system acceptability as perceived by the target user?

Scope and Delimitation

This study was conducted at SALEKA Irrigators Association Inc. located at Katipunan, Alicia, Bohol. It focused on the computerization operation and management of machineries in Saleka IA in order to have a faster and efficient way of recording data and retrieval to improve the services of the present system

and to ensure that the system is user friendly to officers of the association and able

to manage all farmers that needs the farm machineries services within a short time

and to prevent an unauthorized person from accessing the data specifically, the

development of the system covered the following features:

1. **LAN.** It is important in implementing the Recording and Monitoring System. it shares a central database for the storage and retrieval of information between the Irrigators Development Officer and Secretary of the Saleka Irrigators Association.

2. **Data Management:** In the association all the machineries can generate income for the association that is why it is important to record all each machineries transaction in order to liquidate the said income correctly and transparently. This module provides recording activities in farm machineries such as dispatching schedule, availment and payment of the service acquired. This feature is also use to manage all the information of farmers and machineries.

3. **Reservation:** This module helps the association in providing a good service to the farmers it has the process on how to reserve and avail the services. The officers can also manage all the schedule of operations correctly and conveniently. The process for reservation includes the reservation of farm machinery and services. This has the particular date and scheduling process for the dispatchment of farm machinery and operators. This module

focuses in the process of reservation and availment of services in SALEKA Irrigators Association Inc.

4. **Payment:** This module is where the payment for the farm machinery and rendered services**.** The amount paid by the farmers shall be settle on the services rendered based on the approved terms, and upon payment (in full or partial). The acknowledgement receipt could serve as a proof that the payment was made.

5. **Inventory:** This feature helps the association to check all the farm machineries in SALEKA IA either it is functional, non-functional or under repair or under maintenance. In this feature the association can also update farm machineries and it is either vacant or in use.

6.   **Administration:** This function provides administrative tools for system maintenance and system configuration. A database system requires user log in privileges and security to avoid unauthorized person and avoid manipulation of data. This system is limited to access: it must depend on the user's accounts.

7. **Reporting:** Provides generates and printable reports of registered farmers, rendered services, return farm machineries, waiting list and other related reports such as income, transaction and cropping season with date range (e.g. daily, monthly and yearly).

This study is limited only to the operation and management of farm machineries in the SALEKA Irrigators Association Incorporated (SALEKA

IA) Katipunan, Alicia, Bohol. The users of the system are limited to the IDO, Secretary, and Farm Machinery In-Charge.

Significance of the Study

The study of the SALEKA Irrigators Association Katipunan, Alicia, Bohol aimed to develop to have a repository of all data related to the farm machineries information and reservation. To smoothen and make the office services faster, computerized information could help provide accurate and reliable access in providing a good service of farm machineries to the farmers.

Moreover, the study would benefit the following:

Irrigators Development Officer (IDO). The IDO is the one who oversees all the transaction in the office. The IDO could be benefited from the system by providing an easy and fast way of generating reports and all important documents as well as access all the processes of the system that made in the office.

President of SALEKA IA. The President is the one who approves the reports, trip ticket, reservation, daily report form, certification and management of the association. The President could be benefited from the system by providing an easy and fast way of generating reports and transmittal documents.

Secretary of SALEKA IA. The secretary is the one who responsible for accepting and managing reservations schedule and dispatching the farm machineries by using the develop system. The secretary is also the one who

collect and receive payments then issued receipt to the farmer who availed the service, and maintain full complete records of cash transactions. It could help them to deliver services faster in an organized, accurate and more convenient and reduce paperwork management of reservations schedule, dispatchment of farm machineries, which is time-consuming. An automated system promotes or eliminates errors and can easily access all the records in the database. The system could also benefit the secretary in terms of recording data of collections and received payments from the costumers to the system database.

Farm Machinery In-Charge. Is the person who is in-charge in all association farm machinery. This person also in-charge in the overall farm machinery operation, check/confirm the readiness of farm area subject for service, conduct daily inspection of the machine, report the status of the machine after every use to the Secretary, approve of trip ticket to release gasoline for operators and give the farm machinery keys. The Farm Machinery In-Charge could be benefited by the system in terms of inventorying the records of farm machinery, updating the current status of the farm machinery and create report such as list of functional, non-functional and under-repair farm machinery.

Farmers. Is the person who is availing the service of the association farm machinery. The farmer could be benefited in using the system by spending less time in processing transaction (availing reservation, payment and inquires in the office).

  Researchers. The study could improve the researcher's interpersonal relationship and help them become good communicators through interviews. It also enhances their reasoning, analytical abilities, and to widen their knowledge in programming and designing. Also, it served as a stepping stone in the application of such capability for their future job.

RESEARCH METHODOLOGY

Development Framework

Figure 1 shows the conceptual diagram of the study. It represents the model of the study that follows the principle of input-process-output. These inputs are coming from the user of the system. The process includes recording, data management, reservation, inventory, payments and administration. The output could provide decision support and reports from the administrator.
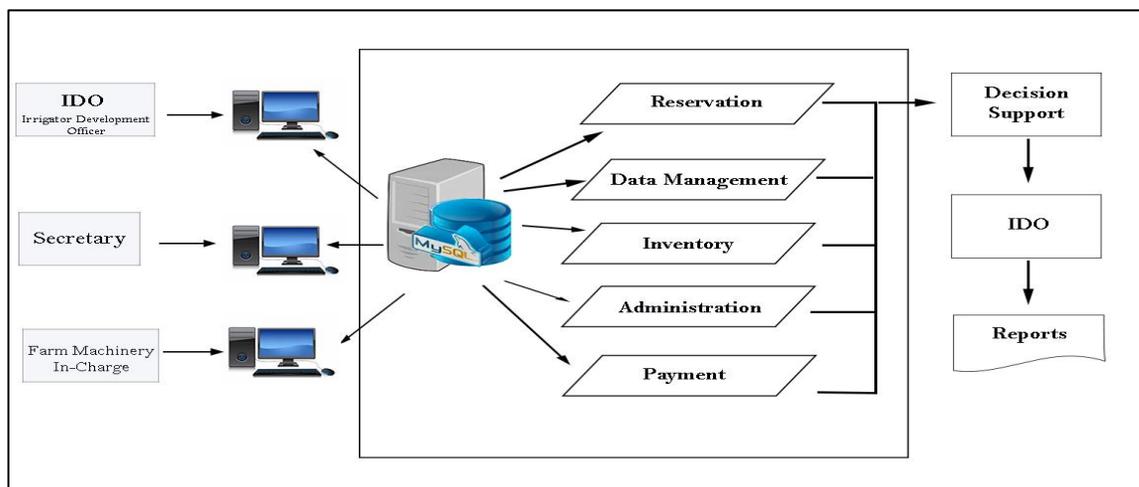
Figure 1. Conceptual Diagram of the Study

Block Diagram

Figure 2 shows the block diagram of the develop Database Management System of Farm Machineries in SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol. It shows the system's output, which demonstrates how the data is being processed to gain better result. It covers the specification of the basic functionality of the system that represents the work of the IDO, Secretary, Farm Machinery In-Charge. The other function of the system is generating reports that are sent periodically to the IDO.
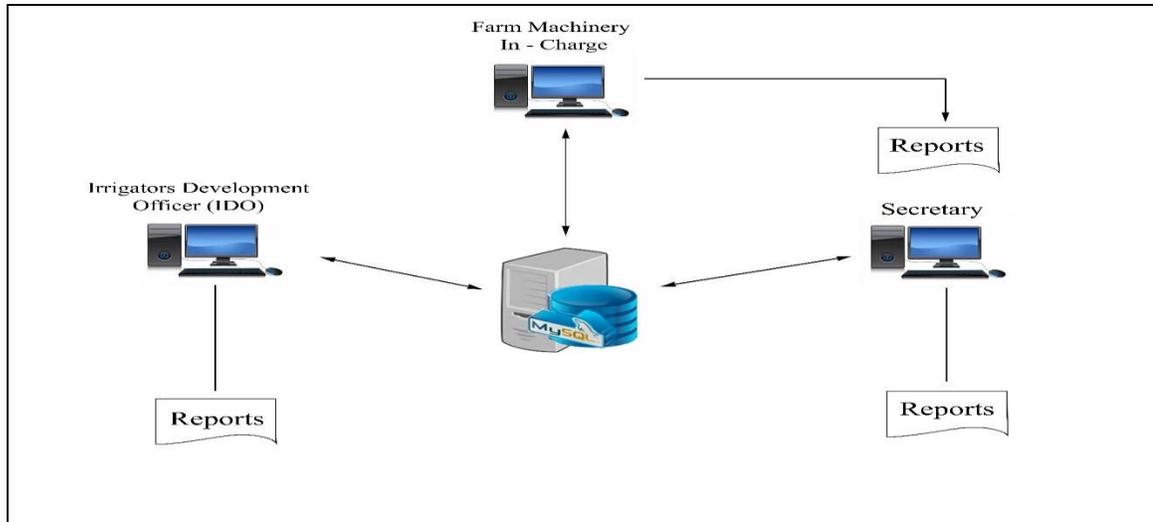
Figure 2. Block Diagram of the Study

Development Model and Approach

Rapid Application Development (RAD) is a development model that prioritizes rapid prototyping and quick feedback over long drawn out development and testing cycles. With rapid application development, researchers can make multiple iterations and updates to a software quickly without starting from the scratch each time. This helps ensure the final outcome is more quality-focused and is in alignment with the end-user's requirements. That is why this studyl used a Rapid Application Development (RAD) and it has four phases to be followed

Analysis and Design

Researchers, clients, and team members cooperate to identify the development's goals and aspirations, as well as current and potential problems that must be addressed during construction. The researchers are also looking for any existing system to be central point of the study, gathering data by askeding

questions of the study's respondents the office head, secretary, and staffs. To gather sufficient information for designing the system, document review and observation of procedures were done specifically in recording, monitoring and generation of reports.

Prototype Cycle

Through several prototype iterations, the developer fully worked out the user design. Clientele collaborates with the developer as well as present the system to the end users to ensure that the needs are met at every stage of the design process, including reviewing the system's usability and functionality to see if it follows the procedures, and suggesting additional add-ins and recommendations that were tweaked until the expectations and satisfaction were met.

Testing Phase

It follows extensive prototyping and cutting-edged design in the third stage. The beta system is presented to the office head and staff to ensure that everything is running smoothly and that the clientele's expectation and goals are met. For the system's usability, the developers provide guide questions.

Implementation Phase

The final stage is implementation, in which the completed program is launched. IDO and secretary are allowed to use the newly developed system. Data conversion, final tests, and user training were all done by the developers.
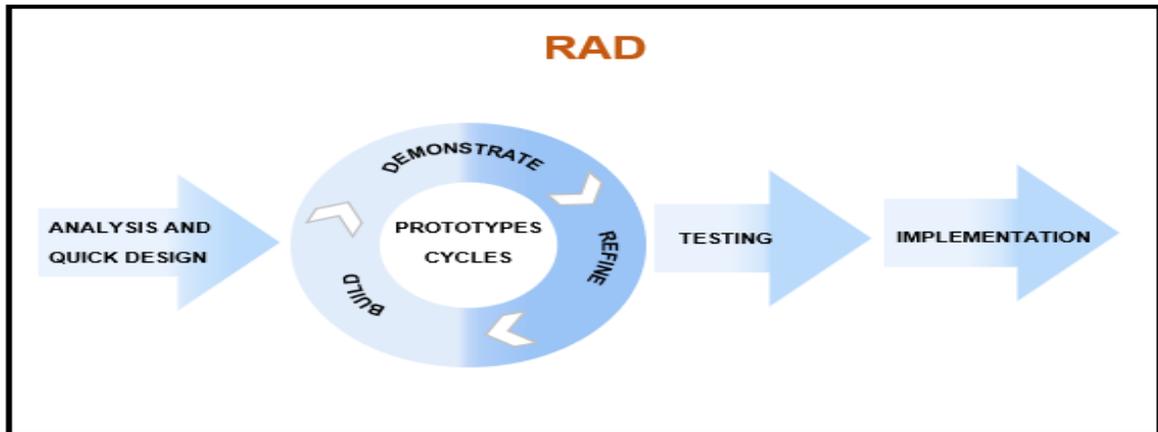
Figure 3. Rapid Application Development Model (RAD) Diagram

While the developer and clients continue to look for bugs and potential problems that need to be addressed right away, the finalization was completed.

The following were the tools used in the development and analysis phase of the Management System of Farm Machineries in SALEKA Irrigators Association Inc, Katipunan, Alicia, Bohol.

- **A Forge Framework** - an open-source Visual Basic framework designed for developers and researchers in the fields of Computer Vision and Artificial Intelligence - image processing, neural networks, genetic algorithms, fuzzy logic, machine learning, robotics, etc. It could be used as the artificial intelligence – image processing for the developed Database Management System of Farm Machineries of SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol.

- **Adobe Photoshop CS6 -** is a graphics editing program developed and published by Adobe Systems, a leading paint program from Adobe System. It is used for designing the interface of the developed system software. This

could be used by the researchers in designing and editing the desired theme in the develop system.

- **Guna Frameworks-** a tools that helps build awesome desktop application interfaces. It guarantees a great user experience in your apps and reduces development time. It provides an easy-to-use drag and drops functionality within your .NET development environment. This could be used as the framework for the user interface of the developed Database Management System of Farm Machineries of SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol.

- **Crystal Report -** used in the system to make, generate and view reports of requested information of the system.

- **Just Color Picker –** an interface tool for capturing the color of any pixels in any screen area and displaying its code in a variety of formats. This could be used for the color display of the Database Management System of Farm Machineries of SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol.

- **Microsoft Visual Studio 2012** - an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services, and mobile apps. This could be used in the developed Database Management System of Farm Machineries of SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol.

- **WAMPP Server -** a free and open-source cross-platform web server solution stack package, consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the PHP and Pearl

programming languages. It is used to create an application for saving and data basing in the developed system.

Environment and Participants

The study was conducted at the SALEKA Irrigators Association Inc Katipunan, Alicia, Bohol. The study's participants were the President is the one who oversees all the operation of the association and next is the Secretary is the one who responsible for accepting and managing reservations schedule and for dispatching the farm machineries. The secretary is also the one who can collect and receive payments, responsible for the insurance of trip ticket and daily report form and maintain full and complete records of cash transactions, update some details of farmers such as name, surname, contact number, address, and request other details to the IDO for permission. The Secretary is also the responsible for checking and balancing the financial record (receipt & vouchers), and checks financial transaction and generates reports from that financial record and audit it regularly. The last one is Farm Machinery In-Charge who is responsible in inventorying the farm machinery, updating the current status of the farm machinery and create report such as list of functional, non-functional and under-repair farm machinery. These participants were personally interviewed by the researchers to gather the exact data needed in the study. The researchers asked some questions using the interview guide questionnaire.

The Saleka Irrigators have 350 members that could benefit from their farm machinery and services. During the reservations process, the daily average of the reservations depends on the area of hectares owned by the farmers, the association can cover 8 hectares daily.

Data Collection

The researchers asked permission from the SALEKA Irrigator's Association Office Inc Katipunan, Alicia, Bohol to conduct the study through a letter request. Data was gathered through personal interviews using the interview guide question. The researchers asked some question to the IDO. Actual participation of SALEKA IA business process was observed to document the flow of the activity that is important to the study. Different documents and reports were reviewed to develop with the design for the required forms of the developed system including the possible input and output of data for the features to be added.

Table 1. Distribution of Respondents in the System Usability Assessment

Respondents	Frequency
Irrigators Development Officer	1
Secretary	1
Farm Machinery In-Charge	1
President of SALEKA	1
Operator	2
Farmer	2
Total	8

Table 2. Interpretation Guide of the System Usability

Weight	Range	Description	Interpretation
7	6.4 – 7.0	Strongly Agree	The respondents strongly believe and are confident that the system is very usable.
6	5.5 – 6.3	Agree	The respondents strongly believe and are confident that the system is very useful
5	4.6 – 5.4	Tend to Agree	The respondents tend to agree that the system is usable.
4	3.7 – 4.5	Neither Agree or Disagree	The respondents are neutral in trusting that the system is usable.
3	2.8 – 3.6	Tend to Agree	The respondents tend not to trust the system is usable.
2	1.9 – 2.7	Disagree	The respondents believe that the system is not usable
1	1.0 – 1.8	Strongly Disagree	The respondents strongly confident that the system is not usable.

Table 2 shows the interpretation of the results used for system usability. In the system usability, rating was done based on the System Usability Guidelines developed by MIT Information Services Technology. To determine the general acceptability of the system, the average weighted mean or the weighted mean score was computed to evaluate/assess the system acceptability level using the following formula:

$$WMS = \frac{1f1 + 2f2 + 3f3 + 4f4 + 5f5}{n}$$

Where:

WMS=Weighted Mean Score
f^1 = frequency of respondents given a rate of 1
f^2 = frequency of respondents given a rate of 2
f^3 = frequency of respondents given a rate of 3
f^4 = frequency of respondents given a rate of 4
f^5 = frequency of respondents given a rate of 5
n   = total number of respondents
1, 2…5 = constant (rating to the service provided)

The range of the interpretative guide for usability was computed by getting the interval value. The table above shows the interpretative guide that was used to describe the usability of the system.

OPERATIONAL DEFINITION OF TERMS

The following terms are the defined conceptually in the conduct of this study:

Database. It is used for storing, maintaining and accessing any sort of data. It collects information/data and that information's/data could be gathered in one place so that it can be observed, used and analyzed. Database can be thought of as an organized collection of information.

Department of Agriculture, Alicia. It one of the department of Municipality of Alicia which the one who audit the transmittal documents and reports submitted by the association that been approve by the IDO in every cropping season.

Farm Machineries. It refers to all machines and tools that are used in the production, harvesting, and care of farm products, and includes trailers that are

used to transport agricultural produce or agricultural production materials between a local place of storage or supply and the farm, agricultural tractors, threshing

Financial Records. Are documents that provide evidence of or summarize business transactions. A well-organized set of financial records is an essential part of an accounting department. ... At the most aggregated level, they include the income statement, balance sheet, and statement of cash flows.

Financial Reports. It is the process of documenting and communicating financial activities and performance over specific time periods, typically on a quarterly or yearly basis. Currently the association use financial reports to organize accounting data and report on current financial status.

FMSP. FMSP stands for Farm Machinery Service Provider is a facility that houses different kinds of rice farm machinery needed for on-farm operation such as land preparation, crop establishment, harvesting and threshing, and off-farm processing such as drying and milling of rice.

IA. IA stands for Irrigators Association is a non-secretariat, and non-profit organization of farmers-beneficiaries. The formation of an IA starts from identification and listing of individual farm lots and the potential beneficiaries who are later on grouped according to hydrologic boundaries and layout of the water distribution system.

NIA. NIA stands for National Irrigation Authority is a government-owned and controlled corporation primarily responsible for irrigation development and management.

Operator. Is the person who could use the association farm machinery and could be the one who could render service to the farmer. The operator is also the responsible for checking/confirming the readiness of the farm area subject for service, conduct thorough inspection of the machine before and after provision of farm machinery services, remit client's payment to the treasurer, secure the machine properly after use and surrender the keys to the office, report the status of the machine after every use to the Farm Machinery In-Charge, and act as a mechanic for immediate repair.

Receipt. Is a document that represents proof of a financial transaction. Receipts are issued in business-to-business dealings as well as stock market transactions. Receipts are also necessary for tax purposes as proof of certain expenses.

Transmittal Documents. It is a "packing slip" for a document or collection of documents that are transferred from one company to another. The transmittal might be just the front page in an extensive document. But more often it is a separate document file that contains details of the documents that are sent.

Trip Ticket. It is a small document use to exchange for fuel for the machinery.

Vouchers. It is a document used by a company's accounts payable department containing the supporting documents for an invoice. A voucher is essentially the backup documents for accounts payable, which are bills owed by companies to vendors and suppliers.

Chapter 2

PRESENTATION OF FINDINGS, ANALYSIS AND INTERPRETATION OF DATA

Existing Operation and Processes

The SALEKA Irrigator Association Incorporated is a known irrigation association in Alicia, Bohol which offer farm machinery services. The office SALEKA IA is composed of Irrigators Development Officer (IDO), Farmers, Operators, President of IA, Farm Machinery In-Charge, and Secretary. The IDO and Secretary are accountable for recording of reservations and monitoring the farmers' information, services offered, scheduling of farm machineries, payments and financial report inside the office. The office is still using the manual process of recording and tracking the information of a farmer or machineries, scheduling, and generating of reports. These are the following present process that takes place.

A. Inquiry Process

In inquiring about the services of the SALEKA IA Alicia, Bohol, the farmers could go to the secretary of the association for query regarding the services they would like to avail such as Reservation, Rent or Asked the current rate of Farm Machineries and certification of membership. At present, the office is using the manual method in recording farmers' records, information, schedule, reservation and rentals to be written in the calendar, logbook, or any piece of paper. The inquiry

could take place when farmers asked for a certain service to the SALEKA IA. If a farmer askeds what farm equipment is available, the secretary could check the farm machineries record book. The secretary creates a blank form to fill out and keep in the list the list of members record book if they choose to join in the association. And if a farmer requests a reservation, the secretary could asked what kind of machine he or she wishes to borrow or rent then the secretary check it in the reservation and farm machineries record book. Then the secretary releases a daily report form and receipt for the farmers to sign after services are delivered then if the operator askeds about the schedule for that day, what machines are scheduled, or reserved the secretary check the reservations book. The secretary could audit the cash in the payment drawer and release a report to the IDO (Irrigator's Development Officer) if he wants to know how much their revenue is.

B. **Availment of Services**

The SALEKA IA Alicia, Bohol could provide farm machinery services to farmers according to their category. Each category has its own appropriate benefits and specification. The farmers could asked for availment on a certain farm machinery to the secretary then the secretary could scan the Farm Machineries Record Book if that certain farm machinery is available. If it is available, the secretary could offer the available schedule then the farmer could decide when on that available schedule he/she could avail and after that transaction the secretary could write onto the reservation record book for record keeping. The standard services or category that the association offered are as follows:

A. For Land Preparation, it is all machineries that are going to be use in process of preparing the soil to provide a favorable soil environment for plant germination and growth. The functions of Land Preparation Machinery are effectively break and loosen soil clods for optimum root and plant growth, eliminate weeds for maximum soil nutrients uptake by plants, and well-levelled land for good irrigation and uniform maturity. This are the following machinery to be used in land preparation:

   a. **Four Wheel Tractors.** The service package of this machinery is P1, 000.00 per hour with operators and gasoline as inclusion.

   b. **Hand Tractor.** The service package of this machinery is P200.00 per day and the operators and gasoline could be provided by the farmer.

   c. **Floating Tiller.** The service package of this machinery is P250.00 per day and the operators and gasoline could be provided by the farmer.

B. For Plant Establishment, it is all machineries that are going to be use in the sequence of events that includes seeding, seed germination, seedling emergence and development to the stage where the seedling could be expected to grow to maturity. The functions of Plant Establishment Machinery are to eliminates the cost in seedling preparation and optimize seeds requirements per area, requires less seeds than the manual direct seeding method,

precise depth and placement of seeds for stability and vigor, and requires less labor compared to manual direct seeding method. This are the following machinery to be used in Plant Establishment:

a. **Rice Precision Seeder.** The service package of this machinery is P2, 500.00 per hectare with operators and gasoline as inclusion.

b. **Mechanical Rice Transplanter (Walk Behind).** The service package of this machinery is P2, 500.00 per hectare with operators and gasoline as inclusion.

C. For Harvesting, it is machinery that are going to be use in the process of collecting the mature rice crop from the field. The function of Harvesting Machinery are makes operation faster and efficient, has higher capacity than manual harvesting, requires less labour, and curbs postharvest losses. This is the machinery to be used in Harvesting:

a. **Rice Reaper.** The service package of this machinery is P1, 500.00 per hectare with operators and gasoline as inclusion.

D. For Threshing, it is all machinery that is going to be used in the removing of grains from the plant by rubbing action, impact and stripping. This are the following machinery to be used in Threshing:

a. **Rice Thresher (standard scale).** The service package of this machinery is by 7% of the total harvested rice sack of the farmer and the operators and gasoline could be provided by the farmer.

E. For Combine Harvesting, it is machinery that are also going to be used in the process of collecting the mature rice crop from the field. The function of Combine Harvesting are combine the crop cutting and threshing in one operation, and require minimum manpower and save on high labor cost. This is the machinery to be used in Combine Harvesting:

a. **Combine Harvester.** The service package of this machinery is by 7% of the total harvested rice sack of the farmer. The operators and gasoline are included in the package.

C. Registration Process

The famers could be given a blank data sheet serve as registration form to be filled out with their personal information. The filled-out application form could be stored in a member information folder. The farmer could also pay a membership fee to be collected by the secretary and the secretary could give the original receipt to the farmer. All data gathered could be manually written in the list of member record book for record-keeping and to be updated every year. The records also use to identify farmers that can enlist for any financial assistance coming from the government.

D. Payment of Rendered Services

The secretary could approach the operator for his assign schedule and could be given a daily report form together with the trip ticket and receipt. The

operator could render service to the farmers and after that the operator could hand the daily report form to be sign by the farmer as a sign that the service was rendered. The farmer could give the sign form together with the payment and hand it to the operator then the operator could give the original receipt to farmer. The operator could report to the secretary and hand over the daily report form, duplicate receipt and the cash payments. The secretary could put the daily report form to the rendered services folder and could also keep the receipt and money to be stored in the drawer.

E. Generation of Reports

At the end of the crop season, the association could be checked by the Irrigators Development Officer to know if the association and farm machineries are well managed by the president and staff. All hard copies received could be stored in the transmittal documents before submitting them to the IDO. The IDO could collect all forms of documents from the log book and all the financial report in the whole cropping season to know the total transactions and financial income of the association. The IDO could check and approve all the submitted documents and return it to the secretary, then the secretary could give the approve documents to the Department of Agriculture (DA) in Alicia, Bohol for auditing. The audited documents could return to the association for the record keeping.

Data Flow Diagram
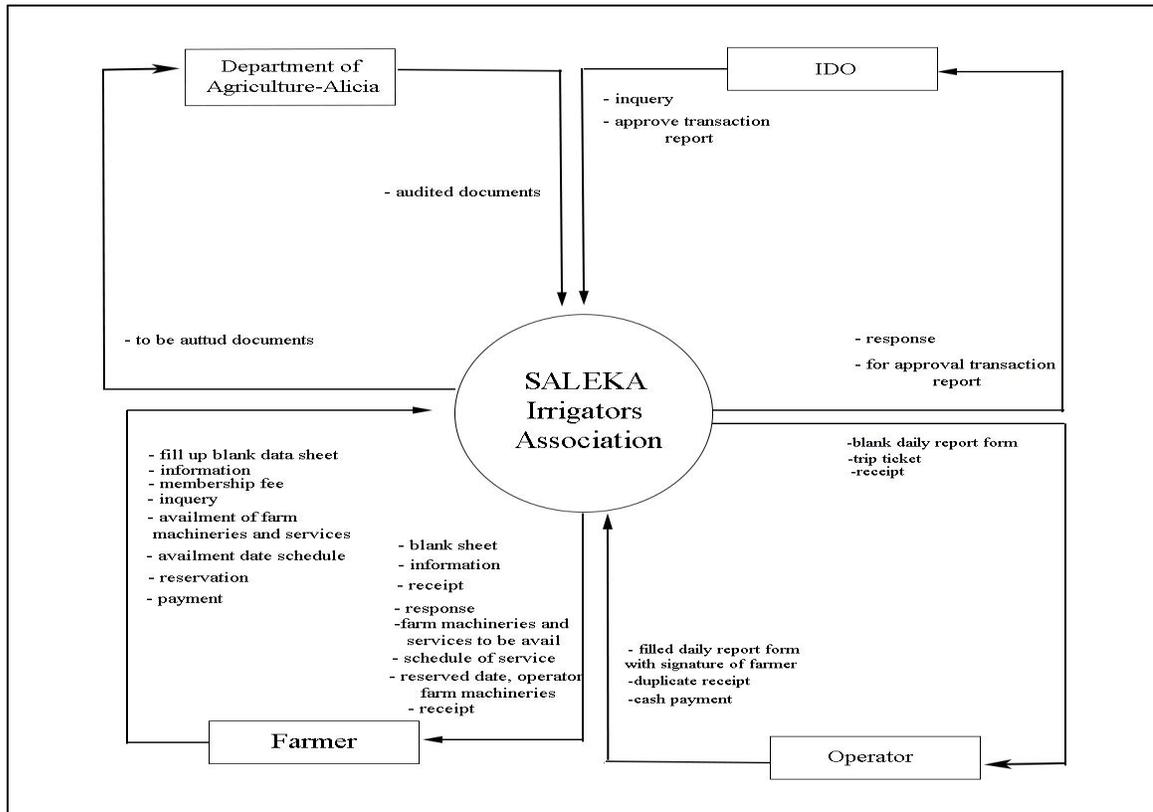
Figure 4. Context Diagram of the Present System

EVENT SPECIFICATIONS

Event List

1. Inquiry Process

2. Availment of Services

3. Registration Process

4. Payment of Rendered Service

5. Generation of Reports

Even List Diagrams
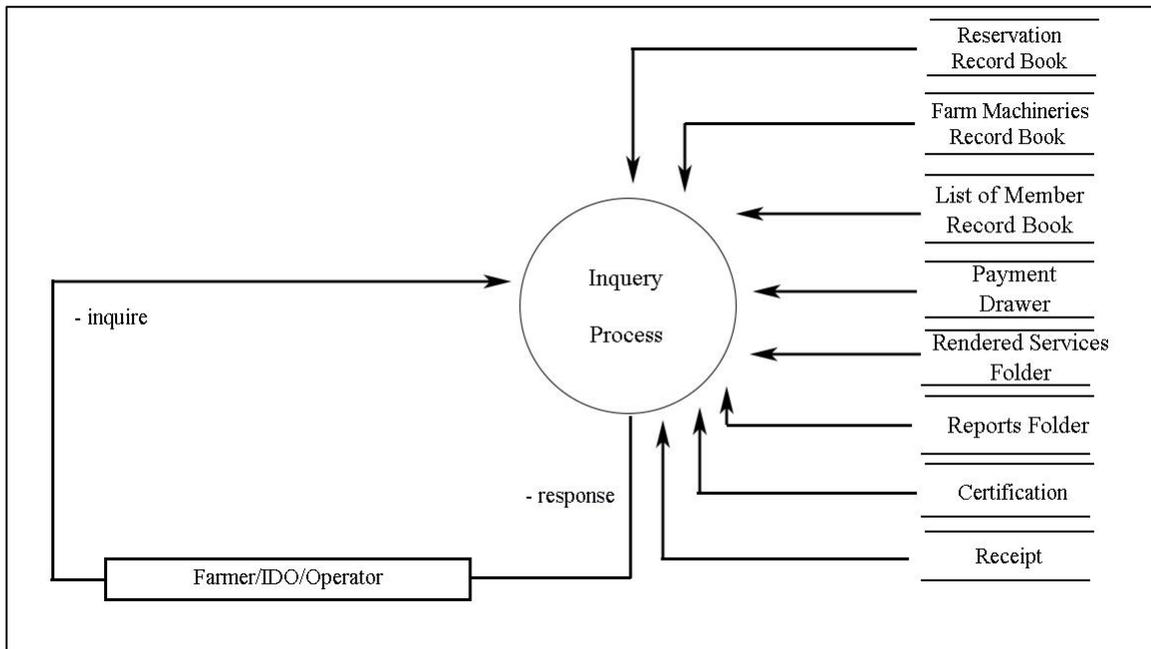
Figure 5. Inquiry Process (Event 1)
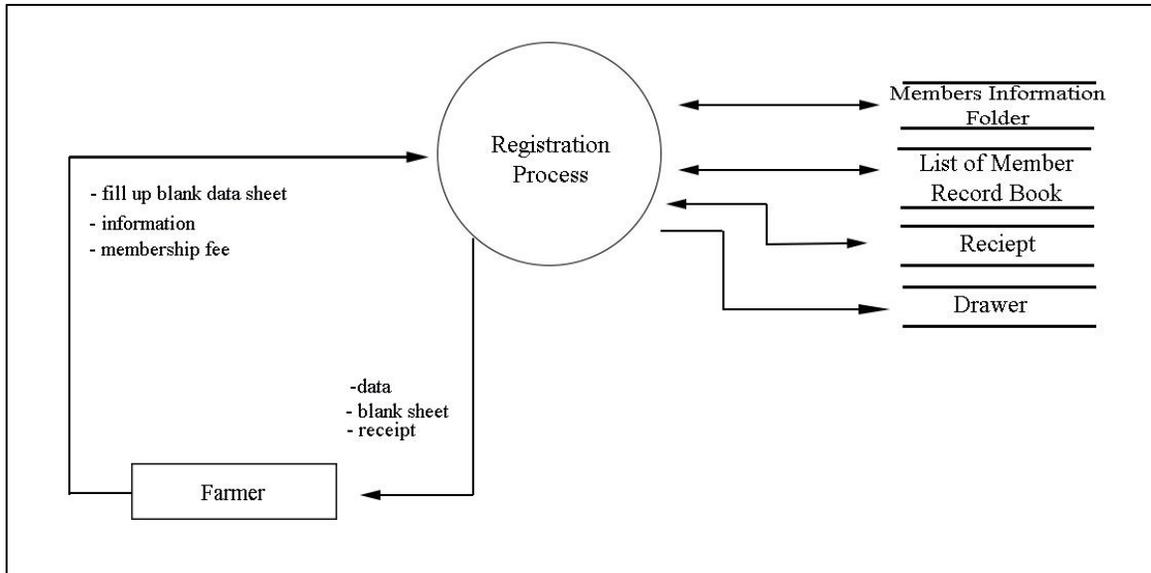
Figure 6. Registration Process (Event 2)
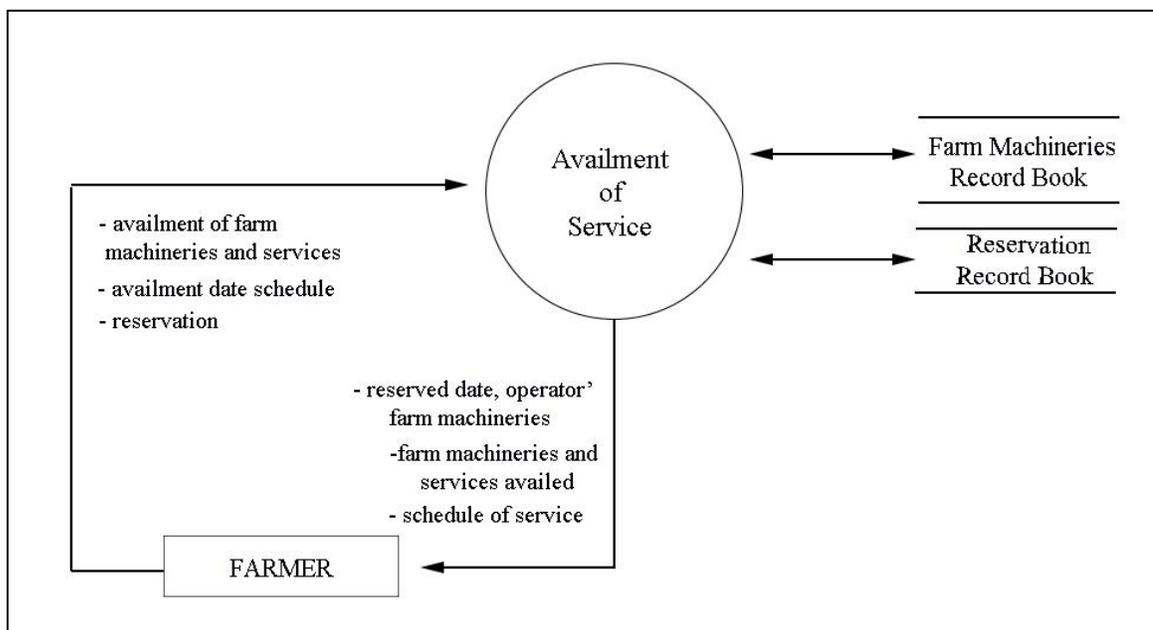
Figure 7. Availment of Services (Event 3)
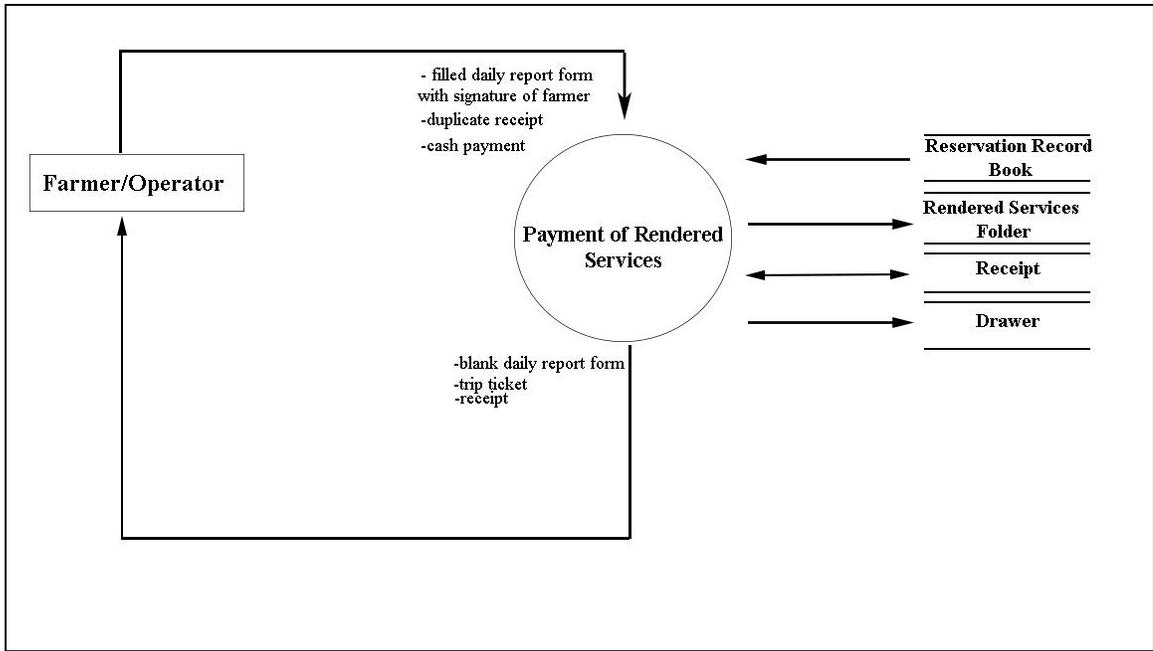
Figure 8. Payment of Rendered Services (Event 4)
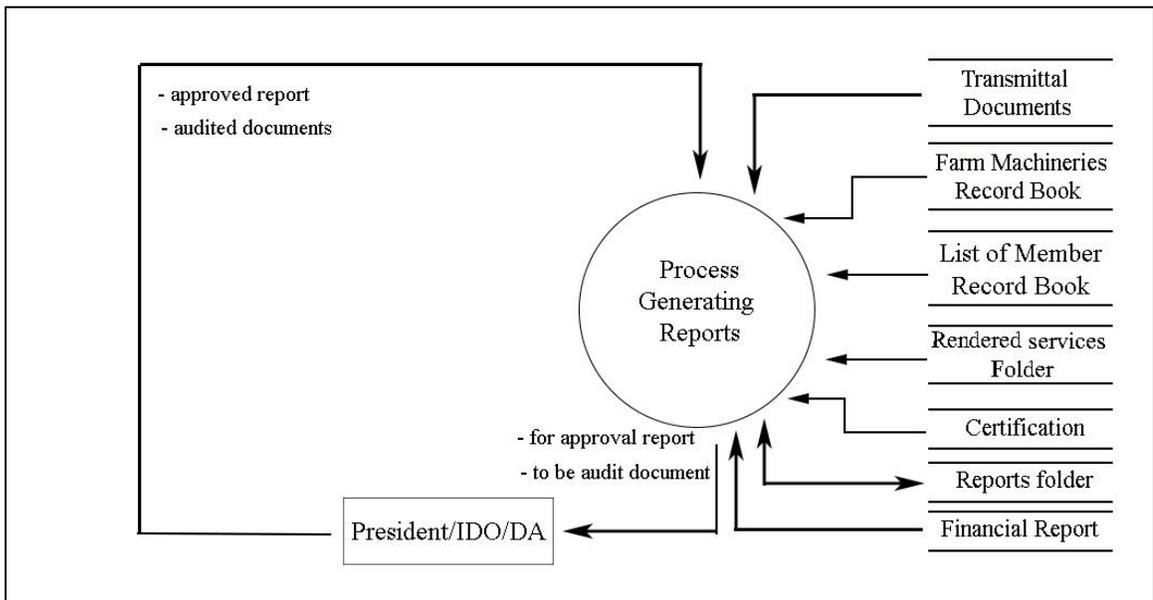
Figure 9. Generation of Reports (Event 5)
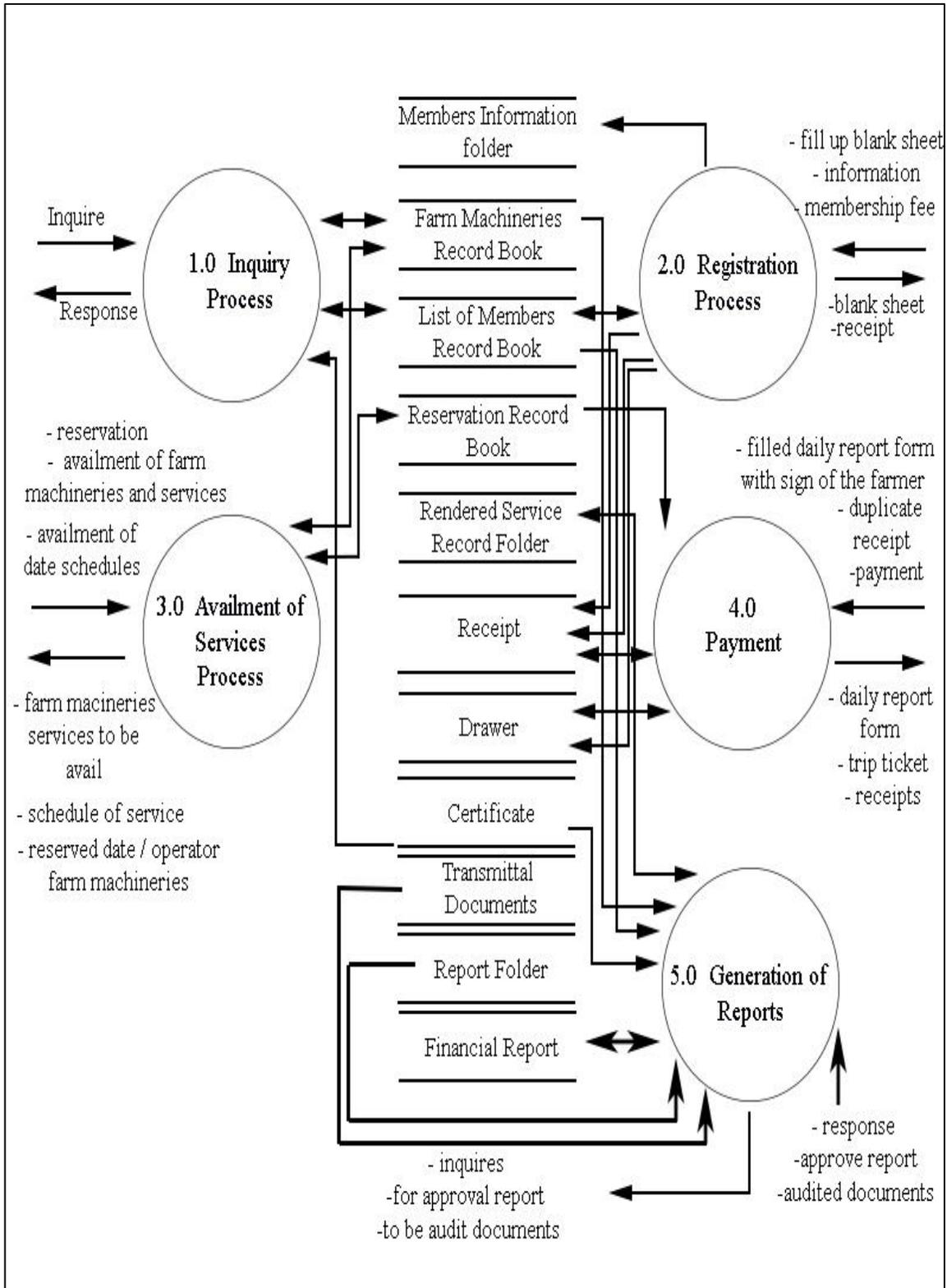
Figure 10. Top Level of the Present System

Needs of the Existing Operation

The following are the needs of the Management System of Farm Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol:

1. A secured system to prevent leaks of confidential information, as well as to avoid unauthorized person, because there is a chance that someone could get access to the system without authorization.

2. Computerized system to manage records, rents or reservation, and provides faster transactions and reduce processing time and confusion when retrieving farmers' records as well as to avoid confusion and make it easier to generate reports in a timely and efficient manner.

3. Improved and more importantly secured placement of files and records of farmers' information and farm machinery to avoid misplacement or unnecessary filing of papers for easy and fast retrieval. The needed reports of actual status of farmers' information and farm machinery should be generated timely.

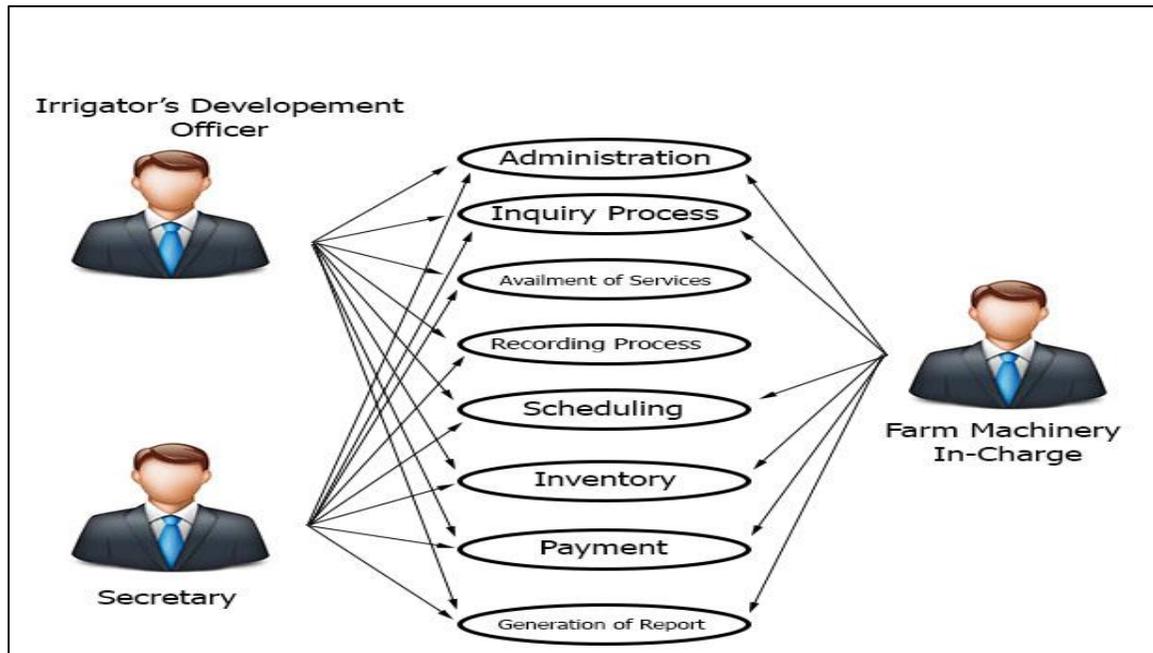4. Organize reservation for the use of farm machineries to avoid delay and confusion.

Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol

The researchers gathered all of the data and information about the current system and developed the Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol, a computerized system that processes farmers' transactions, reservation, rents, records them, and generates the required reports.

A. Administration

To ensure the security of all records and file in the SALEKA IA, log-in features could be created by administration. User must log-in first with the username and password. This process was made to prevent unauthorized user to access the system. If it cannot login, it shows invalid username and password.

B. Inquiry Process

In inquiring about the services of the SALEKA IA, the farmers could asked for the available farm machineries of their choice that could be referred at the farm machineries list. The farmers can also inquire membership and the current rate each of machineries. This process could less time consuming than the manual method.

C. Availment of Services

In availing the services of the SALEKA IA, the farmers must asked first the availability of a certain farm machinery and date that could be referred on the database. If it is available, they can vouch for reserving or renting on to that farm machinery that is why the secretary must properly record all important data to be stored into the database, including the details of their reservation.

D. Data Management

The secretary is responsible for inputting all the necessary information about the farmers, farm machineries, and operators in the system. All the information could store at the database. The administrator has complete access to the system and can handle all of the farmers' information, farm machineries, operators and other system transactions.

E. Scheduling

The secretary is responsible on the plotting of schedules, do the transaction and view list of reserve machineries and operators who are assigning on it. In every transaction that has been made, it must be stored in the database and in every reservation or rentals has its own unique transaction code that contains information of the farmers, farm machineries, operators and payments. This process is made to prevent delay, duplication of schedules, misplace of reservation or rental records and confusion.

F. Inventory

The Secretary/Farm Machinery In-Charge is responsible on checking the status and the number of the farm machineries. The Farm Machinery In-Charge is the one who manage the inventory count of farm machineries and its usability status that can be also viewed by the Secretary during the reservation or rentals process. This module can also generate list of farm machineries and available farm machineries.

G. Payment

During the payment process, the Secretary could first view the list of rendered services and return farm machineries to check their remark. Then the farmers could pay his/her dues if his/her remark is unsettled and this could be updated to settled if the payment process is done together with the official receipt. If the farmers cannot pay, he/she no longer can avail any service from the SALEKA IA unless he/she pays all her balance or dues. All the payment process could be recorded and saved to the database which can retrieve every time the farmers could asked for the current status for her/his bill.

H. Report Generation

The IDO and secretary can generate reports such as list of farmers, farm machineries, rendered services, return farm machineries, reservation, income

report, and transaction reports. The secretary is also responsible for submitting reports and documents to be checked and approved by IDO and audited by the Department of Agriculture Alicia per cropping. This also includes the generation of tabular reports.

Use Case Diagram

A use case represents a functionality of the system from the viewpoint of the user and describes the goals of their use. Each use case should provide some visible and valuable result to the actors or other stakeholders of the system. As shown in the diagram, the Irrigators Development Officer has full access to the system unlike the secretary where she cannot manage users but she can manage farmers, machineries and operators' information, view farmers, machineries and operators' information, and can generates reports while the Farm Machinery In-Charge can only access inventory, scheduling, inquiry process and generation of report.

Manangement System of Farm Machineries in Saleka Irrigators Association Inc. Katipunan, Alicia, Bohol

Figure 10. Use Case Diagram of Database Management System of Farm

Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol

Use Case Narrative

Use case narrative describing a use case that requires both frame context of the use case and represents the dialog between the user (actor or use case) and the use case. In every use case narrative, there are Pre-conditions, Process, and Post-conditions.

Table 1. Use Case 1 Login to the system as Administrator

Log-in-to the system	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	To access the system and access information
Primary Actors	Irrigators Development Officer (IDO)
Stakeholders	Irrigators Development Officer wants to view information of farmers, farm machineries, operators, and reports
Preconditions	None
Triggers	Irrigators Development Officer input username and password
Success Guarantee	The Irrigators Development Officer successfully log-in to the system
Scenarios:	1. The Irrigators Development Officer access to the system. 2. The log-in form could show. 3. The office head input username and password 4. The system check for the username and password if it matches the database record. 5. The system could go to main form

Table 2. Use Case 2 Login to the system as Secretary

Log-in-to the system	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	To access to the system, access information, managed booking and rentals, payments and reports
Primary Actors	Secretary

Stakeholders	Secretary wants to view information of farmers, farm machineries, operators booked and rented farm machineries , payments and reports
Preconditions	None
Triggers	The Secretary input username and password
Success Guarantee	The Secretary successfully log-in to the system
Scenarios:	1. The secretary access to the system. 2. The log-in form could show. 3. The secretary input username and password. 4. The system check for the username and password if it matches the database record. The system could go to main form.

Table 3. Use Case 3 Login to the system as Farm Machinery In-Charge

Log-in-to the system	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	To access to the system and inventory
Primary Actors	Farm Machinery In-Charge
Stakeholders	Farm Machinery In-Charge wants to view Inventory form
Preconditions	None
Triggers	The Farm Machinery In-Charge input username and password
Success Guarantee	The Farm Machinery In-Charge log-in to the system
Scenarios:	1. The Farm Machinery In-Charge access to the system.

| | 2. The log-in form could show.
3. The secretary input username and password.
4. The system check for the username and password if it matches the database record.
5. The system could go to main form. |

Table 4. Use Case 4 To Add Farmers, Farm Machinery, Operators and Add User

To add Farmers, Farm Machinery, Operators and User	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Primary Actors	Irrigators Development Officer and Secretary
Stakeholders	Irrigators Development Officer and Secretary who want to add new farmers, farm machineries and operators
Preconditions	None
Triggers	The Irrigators Development Officer and Secretary could receive a membership form from farmers that to be encoded in the system
Success Guarantee	Added the farmers successfully to database

	Adding new farm machinery and operator to the system
	Adding user to the system
Scenarios:	1. The farmers could provide his/her information. 2. The secretary could encoded it to the system and the membership form transmit it for approval.

Table 5. Use Case 5 Inquiry Process

Inquiry Process	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	Inquire of availability of farm machinery for booking and renting
Primary Actors	Farmers
Stakeholders	Farmers want to inquire about the availability of a certain farm machinery
Preconditions	None
Triggers	The Farmers want to inquire about the availability of farm machinery and its rate
Success Guarantee	Farmers successfully inquire about the farm machinery
Scenarios:	1. The farmer could asked the availment of farm machinery 2. The secretary could look onto the system about the availability of the farm machinery 3. The secretary could either booked or rent the farm machinery into the farmers' name 4. The transaction could be saved into database d

Table 6. Use Case 6 Payment Process

Payment Process	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	To accept payment and update the payment status of farmer, status of the farm machinery and operator
Primary Actors	Secretary
Stakeholders	Secretary who could accept and update the payment status of the farmer, status of the farm machinery and operator
Preconditions	None
Triggers	Secretary could receive a payment from farmers
Success Guarantee	Receive the payment and update the payment status of farmers, status of the farm machinery and operator
Scenarios:	1. The farmer could give her/his payment to the secretary 2. The secretary could receive the payment and update the payment status of the farmer, status of the farm machinery and operator

Table 7. Use Case 7 Inventory

Inventory	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal

Goal in Content	To check, update farm machinery information and status
Primary Actors	Secretary and Farm Machinery In-Charge
Stakeholders	Farm Machinery In-Charge who could check and either the Secretary or Farm Machinery In-Charge update the status of the farm machinery after used by the operator
Preconditions	None
Triggers	Farm Machinery In-Charge could check the farm machinery and its either the Secretary or Farm Machinery In-Charge update its information and status
Success Guarantee	The farm machinery was successfully check and update
Scenarios:	1. The operator could hand over the keys and farm machinery to the Farm Machinery In-Charge 2. The Farm Machinery In-Charge could check the farm machinery. 3. Either the Secretary or Farm Machinery In-Charge update the status or information of farm machinery.

Table 8. Use Case 8 Generation of Reports

Generation of Reports	
Scope	Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Alicia, Katipunan, Bohol
Level	User Goal
Goal in Content	To generate report of monthly, yearly, cropping season transaction

	To generate list of rented machinery, rendered service, return machinery, farmers and farm machinery To generate user log To generate Farmer Certification To generate total income of every farm machinery
	Irrigators Development Officer and Secretary
Stakeholders	Irrigators Development Officer, Secretary who want to generate reports of monthly, yearly, cropping season transaction, generate list of rented machinery, rendered service, return machinery, farmers and farm machinery, generate Farmer Certification and generate total income of every farm machinery
Preconditions	None
Triggers	The Irrigators Development Officer and Secretary display the monthly, yearly, cropping season transaction, list of rented machinery, rendered service, return machinery, farmers and farm machinery and total income of every farm machinery
Success Guarantee	Display the monthly, yearly, cropping season transaction, list of rented machinery, rendered service, return machinery, farmers and farm machinery and total income of every farm machinery
Scenarios:	The Irrigators Development Officer and Secretary generate report of monthly, yearly, cropping season transaction The Irrigators Development Officer and Secretary generate list of rented machinery, rendered service, return machinery, farmers and farm machinery The Irrigators Development Officer and Secretary generate user log The Irrigators Development Officer and Secretary generate Farmer Certification The Irrigators Development Officer and Secretary total income of every farm machinery

Database Design

Database design is the process of producing a data model of the database. This data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be to create a database.

System design is an aspect of system progress that serves as building for the system enhances the Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol, and the researchers aim a new system which would be used in the Office.

Class Diagram

A class diagram is an illustration of the relationships and source code dependencies among classes of the system, their relationships (including inheritance, aggregation and association), and the operations and attributes of the classes (Margaret, 2007)
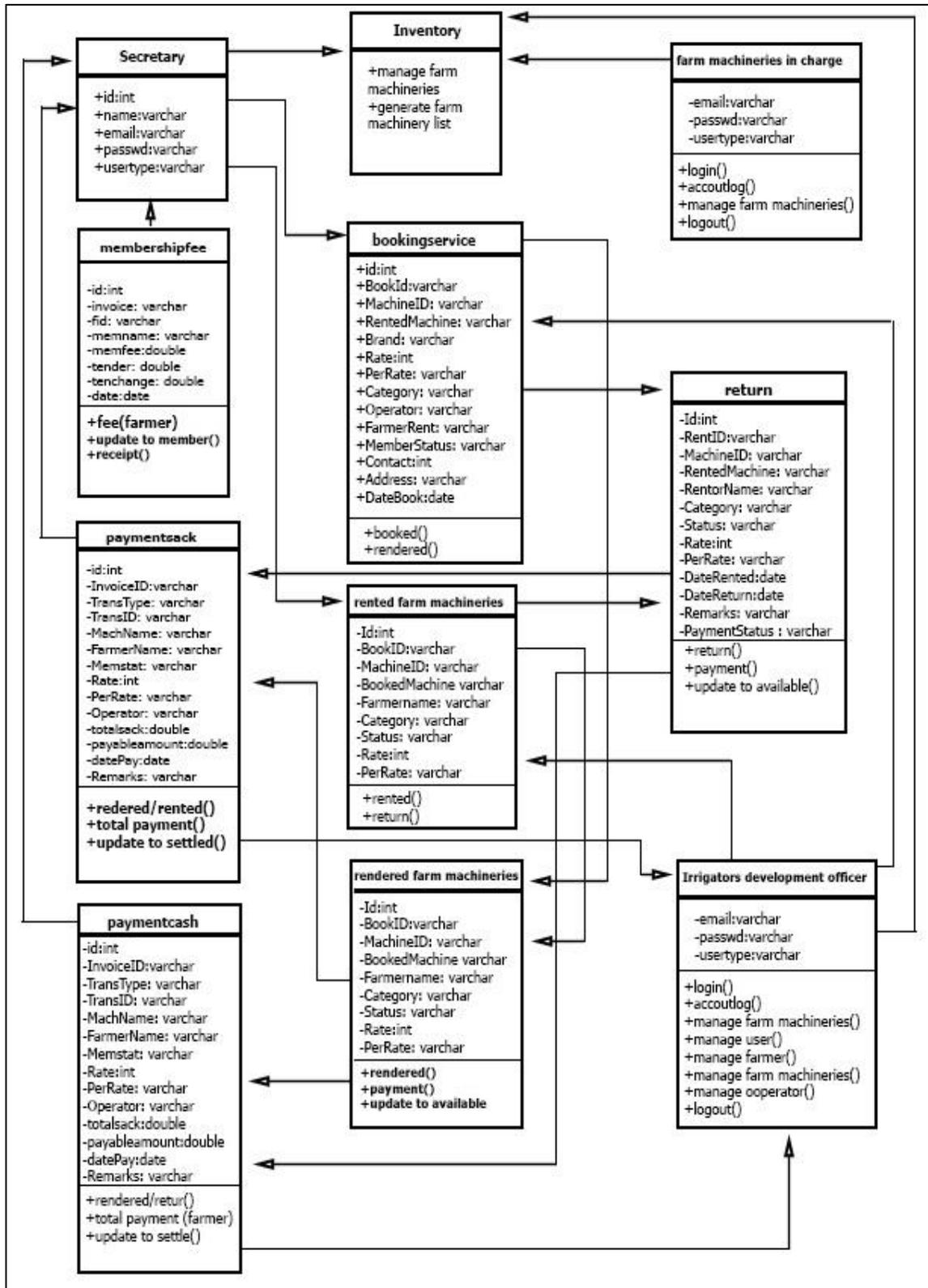
Figure 11. Class Diagram of the System

Database Structure

The following are the database tables used in storing the information that is inputted in the system together with a collection of operations that facilitate searching, sorting, recombination, and similar activities.

Table 1

Data Structure for the System Add User info.

Field No.	Field Name	Type	Width	Description
1	id	Int	11	Auto increment
2	name	varchar	40	user's name
3	email	varchar	20	user's email
4	passwd	varchar	8	user's password
5	usertype	varchar	15	user's type

Table 2

Data Structure of Account Log

Field No.	Field Name	Type	Width	Description
1	id	Int	15	Auto increment
2	User	varchar	15	username
3	Pass	varchar	15	password
4	Position	varchar	10	position
5	Date	varchar	10	date
6	Tin	varchar	11	time in
7	tout	varchar	11	time out

Table 3

Data Structure Booking Services

Field No.	Field Name	Type	Width	Description

1	id	Int	4	Auto increment
2	BookId	varchar	15	booking identification
3	MachineID	varchar	15	machine identification
4	RentedMachine	varchar	15	machine rented
5	Brand	varchar	15	machine brand
6	Rate	Int	10	machine rate
7	PerRate	varchar	10	rate per machine
8	Category	varchar	10	machine category
9	Operator	varchar	20	machine operator
10	FarmerRent	varchar	25	name of farmer
11	MemberStatus	varchar	10	member status
12	Contact	Int	12	farmer contact
13	Address	Varchar	30	farmer address
14	DateBook	Date		date

Table 4

Data Structure of Farmer Info

Field No.	Field Name	Type	Width	Description
1	id	Int	10	Auto increment
2	farmer_id	varchar	15	Farmer's identification
3	name	varchar	30	Farmer's name
4	gender	varchar	8	Farmer's gender
5	civil	varchar	8	Farmer's civil status
6	dob	date		Farmer's date of birth
7	age	int	3	Farmer's age
8	educ	varchar	15	Farmer educational attainment
9	spouse	varchar	30	Farmer's spouse
10	address	varchar	40	Farmer's address
11	cp	bigint	12	Farmer's cellphone number
12	area	varchar	12	Farmer's farm area
13	memstat	varchar	10	Farmer's member status
14	pic	blob		Farmer's image

Table 5

Data Structure of the Machine Info.

Field No.	Field Name	Type	Width	Description
1	id	int	10	Auto increment
2	machine id	varchar	15	Machine id
3	mname	varchar	20	Machne name
4	brand	varchar	20	Machine brand
5	rate	int	5	Machine rate
6	perrate	varchar	15	Machine per rate
7	dpurchase	date		Machine date of purchase
8	age	int	8	Machine age
9	status	varchar	15	Machine status
10	category	varchar	15	Machine category
11	lspan	int	10	Machine life span
12	power	varchar	20	Machine power
13	capacityr	varchar	20	Machine capacity
14	fuelcon	varchar	10	Machine fuel consume
15	cost	varchar	15	Machine cost
16	armain	int	20	Machine annual repair cost
17	pic	blob		

Table 6

Data Structure of Membership Fee

Field No.	Field Name	Type	Width	Description
1	id	Int	6	Auto increment
2	invoice	varchar	15	Invoice number
3	fid	varchar	15	Member's id
4	memname	varchar	20	Member's name
5	memfee	double	12,2	Membership fee
6	tender	double	12,2	Member's amount tender
7	tenchange	double		Member's amount change
8	date	date		date

Table 7

Data Structure of Operator Info

Field No.	Field Name	Type	Width	Description

1	tid	int	10	Auto increment
2	operator_id	varchar	15	Operator's identification
3	fname	varchar	20	Operator's fullname
4	address	varchar	30	Operator's address
5	contact	bigint	15	Operator's contact
6	statusphoto	varchar	15	Operator's status
7		blob		Operator's image

Table 8

Data Structure of Payment per Sack

Field No.	Field Name	Type	Width	Description
1	id	Int	10	Auto increment
2	InvoiceID	varchar	15	Invoice Identification
3	TransType	varchar	10	Transaction type
4	TransID	varchar	15	Transaction Identification
5	MachName	varchar	15	Machine name
6	FarmerName	varchar	20	Farmer's name
7	Memstat	varchar	10	Membership status
8	Rate	int	10	Machine Rate
9	PerRate	varchar	12	Machine per rate
10	Operator	varchar	20	Machine Operator
11	totalsack	double	10,2	Total of sack harvest
12	payableamount	double	12,2	Total of Payable sack
13	datePay	date		Date of pay
14	Remarks	varchar	10	remarks

Table 9

Data Structure of Rendered Services

Field No.	Field Name	Type	Width	Description
1	id	Int	11	Auto increment
2	BookID	Varchar	15	Book Idendification
3	MachineID	Varchar	20	Machine Identificaton
4	Farmername	Varchar	20	Booked Machine
5	Category	Varchar	30	Farmer's Name
6	BookedMachine	Varchar	15	Machine category
7	Status	Varchar	10	Machine status

8	Rate	Int	10	Machine rate
9	PerRate	Varchar	11	Machine per rate
10	DateBook	ar		Date of booking
11	DateRendered	Date		Date of rendered machine
12	Remarks	Date	15	Remarks
13	PaymentStatus	Varchar ar varchar ar	10	Status of Payment

Table 10

Data Structure of Rented Machine

Field No.	Field Name	Type	Width	Description
1	Id	Int		Auto increment
2	RentId	varchar	4	Rent Identification number
3	MachineID	varchar	15	Machine Identification Number
4	RentedMachine	varchar	15	Rented Machine
5	Brand	varchar	15	Machine Brand
6	Rate	int	15	Machine Rate
7	PerRate	varchar	10	Machine per rate
8	Category	varchar	10	Machine Category
9	FarmerRent	varchar	10	Farmer Name
10	MemberStatus	varchar	25	Membership status
11	Contact	int	10	Farmers contact
12	Address	varchar	12	Farmers address
13	DateRented	date	30	Date of Machine rent
14	DateReturn	date		Date of Machine return

Table 11

Data Structure of Reservation

Field No.	Field Name	Type	Width	Description
1	id	Int	10	Auto increment
2	reserve_no	Varchar	15	Reservation number
3	cname	Varchar	30	Farmers name
4	mtype	Varchar	10	Machine type
5	date	Int		Date of reservation

6	ccontact	Bigint	15	Contact information
7	address	Varchar	50	Farm address
8	machine	Varchar	15	Name of machine
9	rate	Int	5	Machine rate
10	perrate	Varchar	15	Machine per rate
11	operator	varchar	30	Machine operator

Table 12

Data Structure of Return Machine

Field No.	Field Name	Type	Width	Description
1	Id	Int	10	Auto increment
2	RentID	Varchar	15	Rent identification number
3	MachineID	Varchar	15	Machine Identification number
4	RentedMachine	Varchar	20	Rented Machine
5	RentorName	Varchar	20	Farmers name
6	Category	Varchar	15	Machine category
7	Status	Varchar	15	Machine status
8	Rate	Int	10	Machine rate
9	PerRate	Varchar	15	Machine per rate
10	DateRented	Date		Date of rented
11	DateReturn	Date		Date of return
12	Remarks	Varchar	10	Remarks
13	PaymentStatus	varchar	10	Machine payment status

Program Hierarchy

A program hierarchy is an organizational structure in which items is ranked according to levels of importance. Each module is represented by a box, which contains the modules. The system comprises of nine buttons representing main modules that hold the activity that the system is capable of. Submenus is also presented in each menu provided (Wigmore, I., 2012).
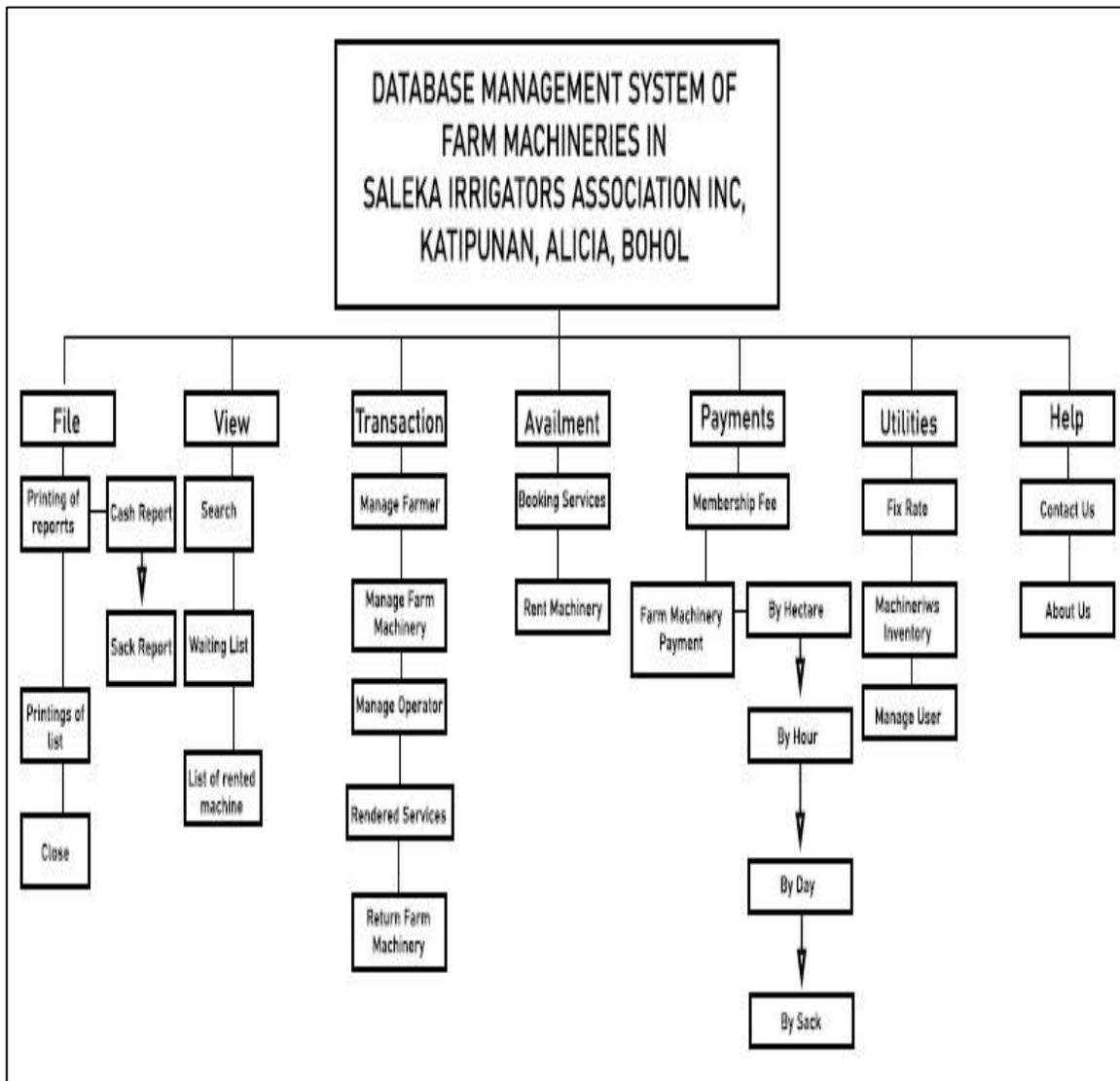
Figure 12. Top Level Program Hierarchy

Functional Requirements

The functional requirement was formulation using the prototype in eliciting capture requirement through contrast communication with the Irrigators Development Officer, Secretary, Farm Machinery In-Charge and Farmers. The functions mentioned are based on the existing standard need of the Saleka

Irrigator's Association with the approval and coordination from the respondents as follows:

Administration

FREQ 1: Access to the system must be password protected.

FREQ 2: All the data and information should be in a secure environment, limiting access to authorize only.

FREQ 3: The system could record all the login time and logout time of the SALEKA Irrigators Association Inc.

Inquiry Process

FREQ 4: The system should allow to search a certain farm machinery to check its availability.

FREQ 5: The system should allow to check the availability of operator.

FREQ 6: The system should allow to check the requirements for membership.

FREQ 7: The system should allow to search a certain farm machinery to check its rate.

Availment Process

FREQ 8: The system should display the status of farm machinery it is either available, not available and under-maintenance.

FREQ 9: The system should allow farmers to avail self-service rental or service package if the farm machinery is available.

FREQ 10: The system should allow the secretary to manage all the farmers' information using the submitted membership form for record keeping.

FREQ 11: The system should be able to verify the eligibilities of the farmers according to their membership status for the discounts and financial aid coming from the government.

Recording Process

FREQ 12: The system should allow the Irrigators Development Officer and Secretary to manage farmers, farm machineries, and operators' information.

FREQ 13: The system should allow the Irrigators Development Officer and Secretary to search for farmers, farm machineries, and operators' information.

FREQ 14: The system should allow the Irrigators Development Officer and Secretary to record the incoming rentals and booking of service in any farm machinery

FREQ 15: The system should allow the Irrigators Development Officer and Secretary to record the returned farm machinery.

FREQ 16: The system should allow the Irrigators Development Officer and Secretary to record payment transaction of farmers.

FREQ 17: The system should allow the Irrigators Development Officer and Secretary to view and search the available, rented and booked, returned and payed rented and booked farm machinery.

FREQ 18: The system should allow the Irrigators Development Officer, Secretary and Farm Machinery In-Charge to record their log-in log.

FREQ 19: The system should allow the Irrigators Development Officer and Secretary to view all log-in log.

FREQ 20: The system should allow the Secretary to view all the transaction.

Generate Report Process

FREQ 21: The system should provide the reports of monthly, yearly, cropping season transaction.

FREQ 22: The system should provide the reports of total income of every farm machinery.

FREQ 23: The system should provide the list of rented machinery, rendered service; return machinery, farmers and farm machinery.

FREQ 24: The system should provide Farmer Certification for farmers

Administrator Authority

FREQ 25: The system should allow the Irrigators Development Officer to change the system setting.

FREQ 26: The system should allow the Irrigators Development Officer to change the password and username of Secretary and Farm Machinery In-Charge

FREQ 27: The system should allow the Secretary and Farm Machinery In-Charge to request to Irrigators Development Officer to update their password and username.

FREQ 28: The information from the database can be exported.

Non-Functional Requirements

A non-functional requirement shows the operation of a system, rather than functional requirements that define specific behavior of functions. The following are the non-functional requirements of the system:

NFQ 1. The system should be easy to use. It should be user-friendly and manageable with naïve users.

NFQ 2. The system should operate on available technology provided by the office.

NFQ 3. The system should be free from errors.

NFQ 4. The system should with the hardware requirements.

Test Cases

A test case is a set of conditions or variables under which a tester could determine whether an application of a software system is working correctly or not. This is a detailed procedure that fully tests a feature. And also, a set of input variables, execution pre-condition, results, and execution, developed for the particular objectives or test conditions.

These are test case scenarios conducted during the acceptance testing. The test cases plan is to let the users use the system and follow the instruction in each test case in order to be considered successful. This test case is somewhat like guidelines on how to use the system.

The following are the details of each test case:

Test Case 1:

Module: Login Form

Instruction:

1. On login form enter the password and username

2. Enter counter number. Then click the "Login" button.

Expected Results:

1. The loading screen could show before main form.

Test Case 2:

Module: Adding Farmers

Instruction:

1. On the main form click "Transactions" tab

2. Click "Manage Farmer"

3. Fill up all the textbox of the information of Farmers

4. For the picture click "F3" on keyboard open the camera

5. Click "OK"

6. Click "Capture"

7. Then click "Save"

Expected Result:

1. Farmers Successfully Saved

2. Display List of Farmers

Test Case 3:

Module: Adding Farm Machinery

Instruction:

1. On the main form click "Transactions" tab

2. Click "Farm Machinery"

3. Fill up all the textbox of the information of Farm Machinery

4. For the picture click "Import"

5. Select picture

6. Click "Open"

7. Then click "Save"

Expected Result:

1. Farm Machinery Successfully Saved

2. Display List of Farm Machinery

Test Case 4:

Module: Adding Operator

Instruction:

1. On the main form click "Transactions" tab

2. Click "Manage Operator"

3. Fill up all the textbox of the information of Operator

4. For the picture click "F3" on keyboard open the camera

5. Click "OK"

6. Click "Capture"

7. Then click "Save"

Expected Result:

1. Operator Successfully Saved

2. Display List of Operator

Test Case 5:

Module: Booking Farm Machinery Service

Instruction:

1. On the main form click "Availment" tab.

2. Click "Booking Service".

3. Click "Find" button to search farm machinery they want to avail

4. Select Farm Machinery

5. To select operator click "Find" button near the operator textbox to view operator list

6. Select Operator.

7. For the farmer info click "Find" button to search the farmer who currently availing

8. Select Farmer

9. Click "Save" button

10. Then click "OK"

Expected Results:

1. Transaction Successfully Saved

2. Display on Booked Farm Machinery tab

Test Case 6:

Module: Rent Farm Machinery

Instruction:

1. On the main form click "Availment" tab.

2. Click "Rent Machinery".

3. Click "Find" button to search farm machinery they want to avail

4. Select Farm Machinery

5. For the farmer info click "Find" button to search the farmer who currently availing

6. Select Farmer

7. Click "Save" button

8. Then click "OK"

Expected Results:

1. Transaction Successfully Saved

2. Display on Rented Farm Machinery tab

Test Case 7:

Module: Rendered Services

Instruction:

1. On the main form click "Transactions" tab.

2. Click "Rendered Services".

3. On the "Unrendered Service Booking" tab select transaction that is already rendered in the datagridview

4. Click "Render" button

5. Then Click "OK"

Expected Results:

1. Selected transaction could be deleted on the list and could be moved onto the List of Rendered Services

2. Unrendered remarks could be updated into rendered onto the database

3. Can be apply for payment

Test Case 8:

Module: Returned Machinery

Instruction:

1. On the main form click "Transactions" tab.

2. Click "Returned Machinery".

3. On the "Unreturn Farm Machinery" tab select farm machinery that is already return in the datagridview

4. Click "Return" button

5. Then Click "OK".

Expected Results:

1. Selected transaction could be deleted on the list and could be moved onto the List of Returned Farm Machinery

2. Unreturn remarks could be updated into return onto the database

3. Can be apply for payment

Test Case 9:

Module: By Sack Payment Method

Instruction:

1. On the main form click "Payments" tab.

2. Click "Farm Machinery Payment" tab

3. Click "By Sack"

4. Click "Find" button to search transaction

5. On the "Search Form" select the type it is either "Rented Machine or Booked Service" on the "Combo Box"

6. On the datagridview select the transaction by tracing its "Transaction ID"

7. Click "OK"

8. Type the Total Sack Harvest on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Then click "OK"

Expected Results:

1. Payment successfully process and save

2. "Unsettled" payment status could updated to "Settled"

3. Display on the payment list

Test Case 10:

Module: By Hour Payment Method

Instruction:

1. On the main form click "Payments" tab.

2. Click "Farm Machinery Payment" tab

3. Click "By Hour"

4. Click "Find" button to search transaction

5. On the "Search Form" select the type it is either "Rented Machine or Booked Service" on the "Combo Box"

6. On the datagridview select the transaction by tracing its "Transaction ID"

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Then click "OK"

Expected Results:

1. Payment successfully process and save

2. "Unsettled" payment status could updated to "Settled"

3. Display on the payment list

Test Case 11:

Module: By Hectare Payment Method

Instruction:

1. On the main form click "Payments" tab.

2. Click "Farm Machinery Payment" tab

3. Click "By Hectare"

4. Click "Find" button to search transaction

5. On the "Search Form" select the type it is either "Rented Machine or Booked Service" on the "Combo Box"

6. On the datagridview select the transaction by tracing its "Transaction ID"

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Then click "OK"

Expected Results:

1. Payment successfully process and save

2. "Unsettled" payment status could updated to "Settled"

3. Display on the payment list

Test Case 12:

Module: By Day Payment Method

Instruction:

1. On the main form click "Payments" tab.

2. Click "Farm Machinery Payment" tab

3. Click "By Day"

4. Click "Find" button to search transaction

5. On the "Search Form" select the type it is either "Rented Machine or Booked Service" on the "Combo Box"

6. On the datagridview select the transaction by tracing its "Transaction ID"

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Then click "OK"

Expected Results:

1. Payment successfully process and save

2. "Unsettled" payment status could updated to "Settled"

3. Display on the payment list

Test Case 13:

Module: Membership Fee

Instruction:

1. On the main form click "Payments" tab

2. Click "Membership fee"

3. On the Membership Fee form click the "Search" link

4. Find the name of the farmers who currently availing the membership on the datagridview

5. Double click the selected farmer

6. Back in the Membership Fee form type onto the form the membership fee and amount tender

7. Click "Enter" onto the keyboard

8. Click "Save" button

9. Then Click "OK"

Expected Results:

1. Payment successfully process and save

2. "Non-Member" membership status could updated to "Member"

3. Display on the payment list

Test Case 14:

Module: Farm Machinery Fix Rate

Instruction:

1. On main form click "Utilities" tab

2. Click the "Fix Rate" tab

3. Select "Farm Machineries"

4. On the Farm Machinery Fix Rate form select from the "Combo Box" the   Farm Machinery you want to change the rate

5. Type the new rate to the Text Box

6. Click "Change Rate"

7. Click "OK"

Expected Results:

1. New fix rate could be saved

2. Update fix rate onto the farm machinery database

Test Case 15:

Module: Membership Fee Fix Rate

Instruction:

1. On main form click "Utilities" tab

2. Click the "Fix Rate" tab

3. Select "Membership Fee"

4. On the Membership Fee Fix Rate type the new rate to the Text Box

5. Click "Change Rate"

6. Click "OK"

Expected Results:

1. New fix rate could be saved

2. Update fix rate onto the farm machinery database

Test Case 16:

Module: Camera

Instruction:

1. On the main form click "Camera"

2. Click "Capture"

3. Click "Save"

Expected Results:

1. Open a camera.

2. Capture image

3. Save the capture image to add form.

Test Case 17:

Module: Add User

Instruction:

1. On the main form click "Manage User" tab

2. Fill the information required on the text box

3. Choose user type onto the combo box

4. Click "Register" button

5. Click "OK"

Expected Results:

1. User Successfully added

2. Display the list of users

Test Case 18:

Module: Update User

Instruction:

1. On the main form click "Manage User" tab

2. Change/Update the information on the text box

3. Click "Register" button

4. Click "OK"

Expected Results:

1. Successfully updated information.

Test Case 19:

Module: Update Farmer

Instruction:

1. On the main form click "Transactions" tab

2. Click "Manage Farmer"

3. Select farmer onto the datagridview who want to update their information

4. Change the information on the form

5. Click "Update" button

6. Then click "OK"

Expected Results:

1. Successfully updated information.

Test Case 20:

Module: Update Farm Machinery

Instruction:

1. On the main form click "Transactions" tab

2. Click "Farm Machinery"

3. Select farm machinery onto the datagridview that you want to update their information

4. Change the information on the form

5. Click "Update" button

6. Then click "OK"

Expected Results:

1. Successfully updated information.

Test Case 21:

Module: Update Operator

Instruction:

1. On the main form click "Transactions" tab

2. Click "Manage Operator"

3. Select operator onto the datagridview who want to update their

   information

4. Change the information on the form

5. Click "Update" button

6. Then click "OK"

Expected Results:

1. Successfully updated information.

Test Case 22:

Module: Delete User

Instruction:

1. On the main form click "Manage User" tab

2. Select user onto the datagridview who you want to delete

3. Right click onto the mouse or touchpad

4. Select "Delete"

5. Click "Yes"

Expected Results:

1. Successfully delete user.

Test Case 23:

Module: Delete Farmer

Instruction:

1. On the main form click "Transactions" tab

2. Click "Manage Farmer"

3. Select farmer onto the datagridview who you want to delete

4. Right click onto the mouse or touchpad

5. Select "Delete"

6. Click "Yes"

Expected Results:

1. Successfully delete farmer.

Test Case 24:

Module: Delete Farm Machinery

Instruction:

1. On the main form click "Transactions" tab

2. Click "Farm Machinery"

3. Select farm machinery onto the datagridview who you want to delete

4. Right click onto the mouse or touchpad

5. Select "Delete"

      6. Click "Yes"

Expected Results:

      1. Successfully delete farm machinery.

Test Case 25:

Module: Delete Operator

Instruction:

      1. On the main form click "Transactions" tab

      2. Click "Manage Operator"

      3. Select operator onto the datagridview who you want to delete

      4. Right click onto the mouse or touchpad

      5. Select "Delete"

      6. Click "Yes"

Expected Results:

      1. Successfully delete operator.

Test Case 26:

Module: Printing of Reports

Instruction:

      1. Click the "File" tab on the Main form

      2. Select the "Printing of Report"

      3. Select either "Sack Report" or "Cash Report" tab

      4. Select "Daily" from combo box

5. Select "Monthly" combo box

6. Select "By Cropping Season" combo box

7. Select "Yearly" combo box

8. Choose date "From" datetimepicker

9. Choose date "To" datetimepicker

10. Click "Load" button to display the date on dategridview

11. Click "Print Logs" to view print lay-out

12. Then click "Print"

Expected Results:

1. Generate a transaction report from day to day.

2. Generate a transaction report by the month.

3. Generate a transaction report by cropping season.

4. Generate a transaction report by yearly in graphical report.

Test Case 27:

Module: Printing of List

Instruction:

1. Click the "File" tab on the Main form

2. Select the "Printing of List"

3. Select "Farmer List" from radio button

4. Select "Membership Payment Collection" from radio button

5. Select "List of Farm Machinery" from radio button

6. Select "List of Rendered Services" from radio button

7.Select "List of Return Farm Machinery" from radio button

8.Select "Waiting List" from radio button

9.Then click "Print"

Expected Results:

1.Generate and print Farmer List.

2.Generate and print Membership Payment Collection.

3.Generate and print List of Farm Machinery.

4.Generate and print List of Rendered Services.

5.Generate and print List of Return Farm Machinery

6.Generate and print Waiting List

Technical Requirements

The proper selections of hardware and software components, as well as identification of people involved in the operation and network, are identified. This is necessary for proper usage so that the system could be used to its fullest capacity.

Hardware components refer to the physical parts of the computer. This includes the motherboard, processor, random access memory, and hard disk. However, there were only three (3) components which basically facilitate the processing of data. These components are the Microprocessor, Hard Disk Drive (HDD) and the Random-Access Memory (RAM). Thus, components were just specified in the presentation.

Software is the general name given to all programs, documentation, manuals, and routines necessary to make the computer usable. It is a set of machine-readable instructions. The software produces an output that can be understood by human.

Peopleware refers to those who operate the system. The person-in-charge in the operating system is the Irrigators Development Office, Secretary and Farm Machinery In-Charge of SALEKA Irrigators Association Inc. who is responsible managing the system, and must be computer literate and have a piece of knowledge about the system.

Minimum Hardware Specification

Minimum Specification refers to the stipulation of a hardware device that can still meet the minimum system requirements. This covers the minimum hardware specification needed by the software to function properly as intended and expected. These were based on what is available in the market and what most computer package system offers.

Component	Specification
Microprocessor	Celeron, 1.10 Ghz
Hard Disk Drive	500 Gigabytes
Random Access Memory	4 Gigabytes, DDR3

Minimum Software Specification

The Database Management System of Farm Machineries in SALEKA Irrigators Association Inc. Katipunan, Alicia, Bohol requires different software to function and operate properly. This software was enumerated with its corresponding specifications. The specifications as provided were based on the specifications of the computer units utilized during the development of the system.

Components	Specification
Windows Operating System	Windows 8, 8.1, 10
Bunifu Framework	Bunifu Version 1.5.3.0
Guna UI Framework	Guna UI Version 1.9.0.1
Wamp Server	Version 3.2.3
Mysql	Version 55.7.31

Business Intelligence

In the existing theories, business intelligence means the ability of an organization to collect, maintain and organize knowledge. It aims to support better business techniques and decision-making with solutions that take business

intelligence (BI) to a whole new level and getting the right information. The system integrated business intelligence specifically in the query and reporting component.

The developed system is capable of analyzing data like farmers information, machineries and operators information, scheduling and reservation and payment and generating statistical reports thru tabular reports. Automated representation of information allows real time data representation. These generated tabular reports maybe used by the Irrigators Development Officer and Secretary of SALEKA Irrigators Association Inc. as basis for monitoring of accomplishment of transaction and the status of the farm machinery and operators.

Reports under business intelligence are namely: Graphical Reports of In-Sack Yearly Income, Graphical Reports of In-Cash Yearly Income, Daily Transaction Reports, Monthly Transaction Reports, and By Cropping Season Transaction Reports.

Preview 1 shows the Account Log Report

Preview 1 Account Log Report

Preview 2 shows the Graphical Farm Machineries Yearly Cash Income Report
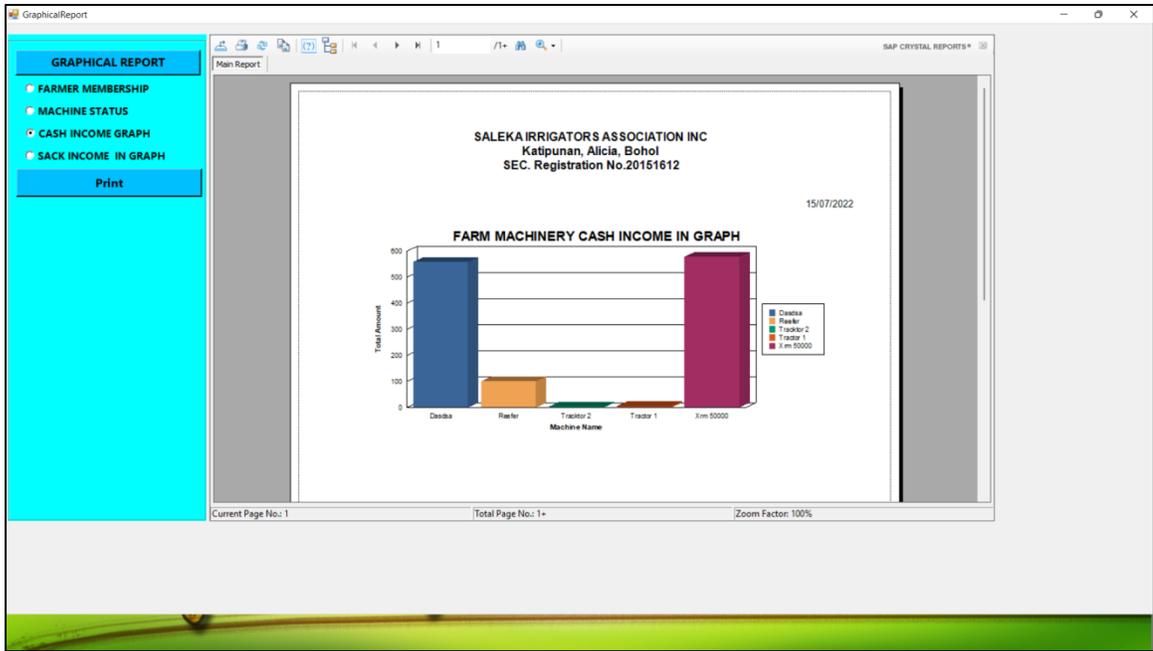
Preview 2 The Graphical Farm Machineries Yearly Cash Income Report

Preview 3 shows the Graphical Farm Machineries Yearly Sack Income Report
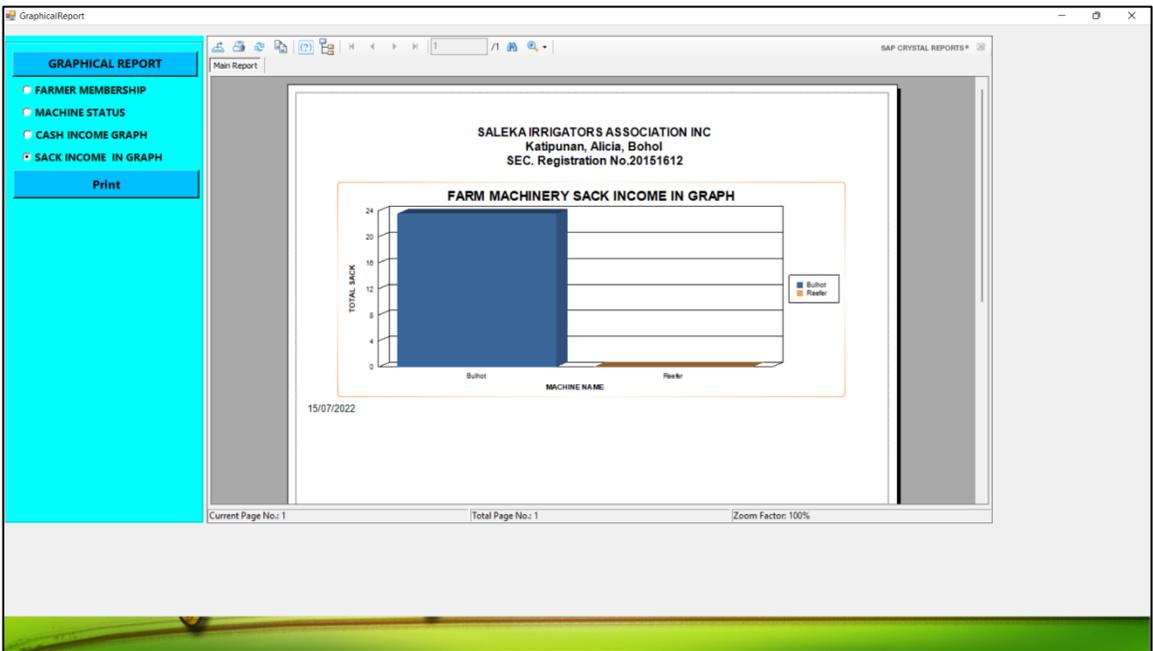
Preview 3 The Graphical Farm Machineries Yearly Sack Income Report

Preview 4 shows the Graphical Farmers Membership Status Report
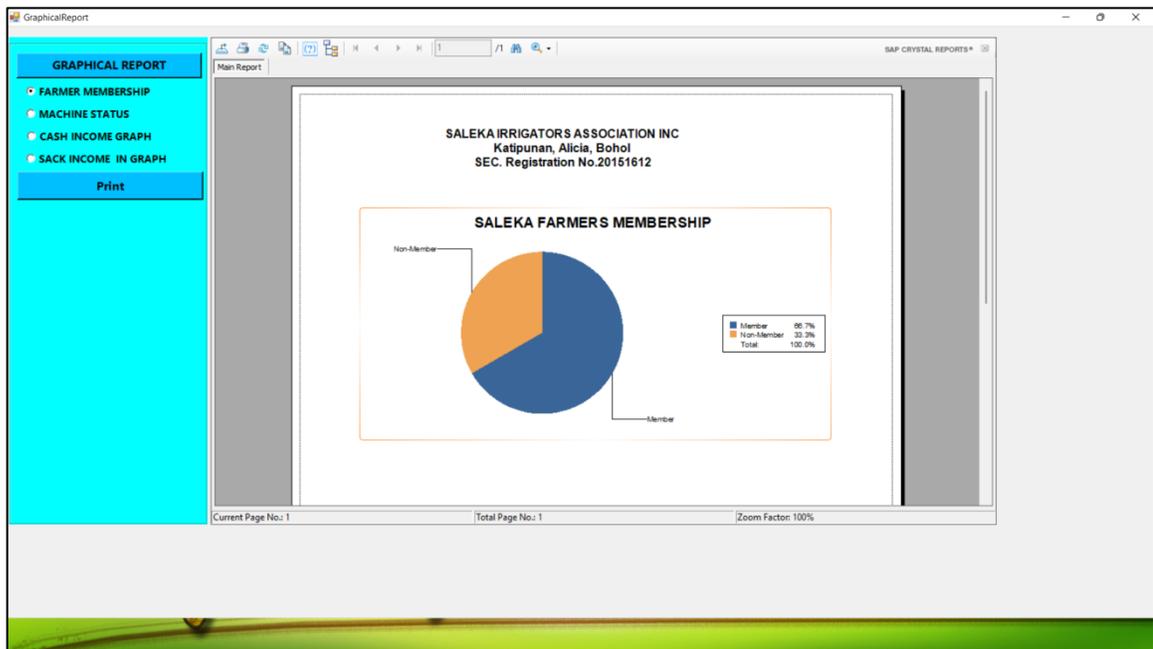
Preview 4 The Graphical Farmers Membership Status Report

Preview 5 shows the Graphical Farm Machineries Status Report
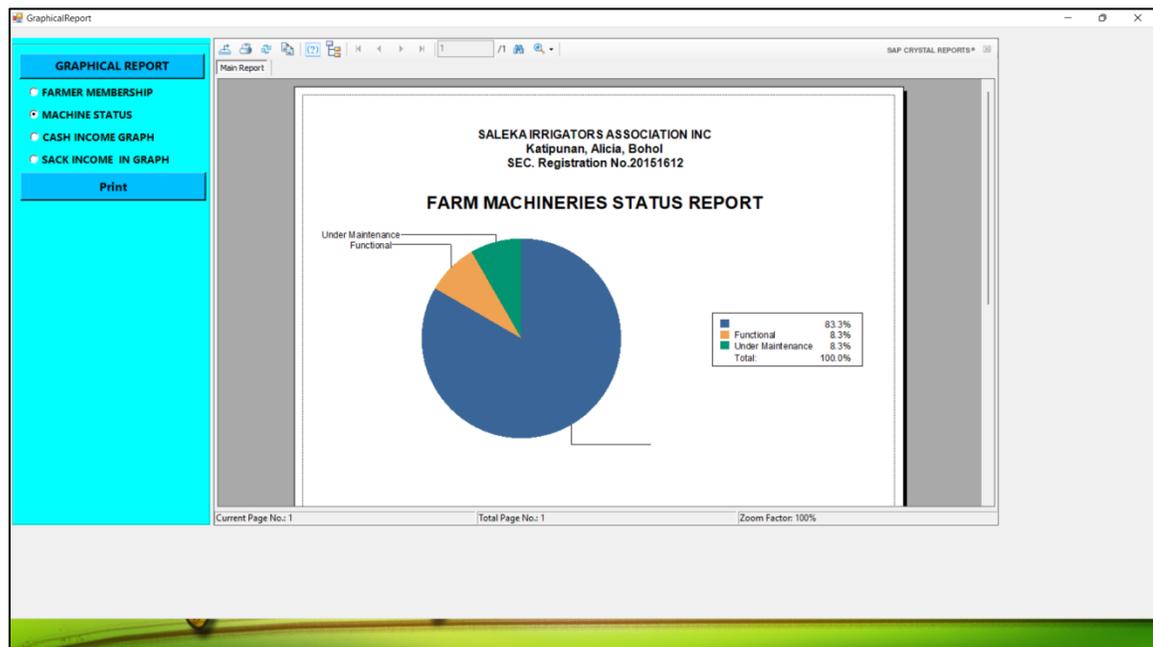
Preview 5 The Graphical Farm Machineries Status Report

Preview 6 shows the Graphical Yearly Cash Income Report
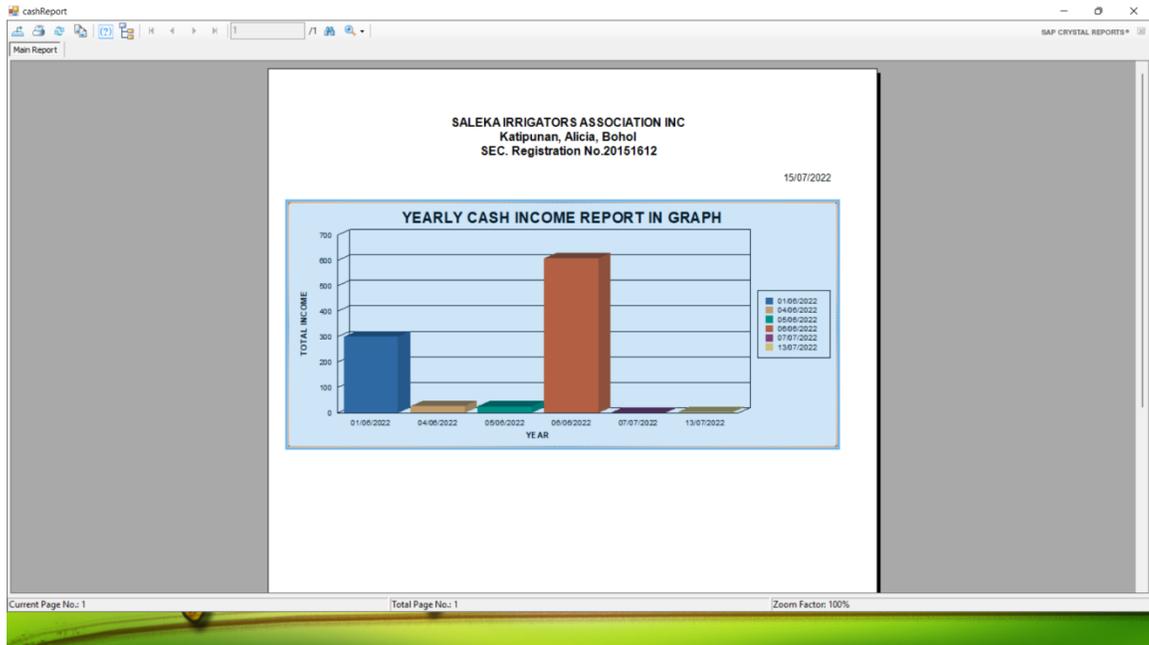
Preview 6 The Graphical Yearly Cash Income Report

Preview 7 shows the Yearly Sack Income Report
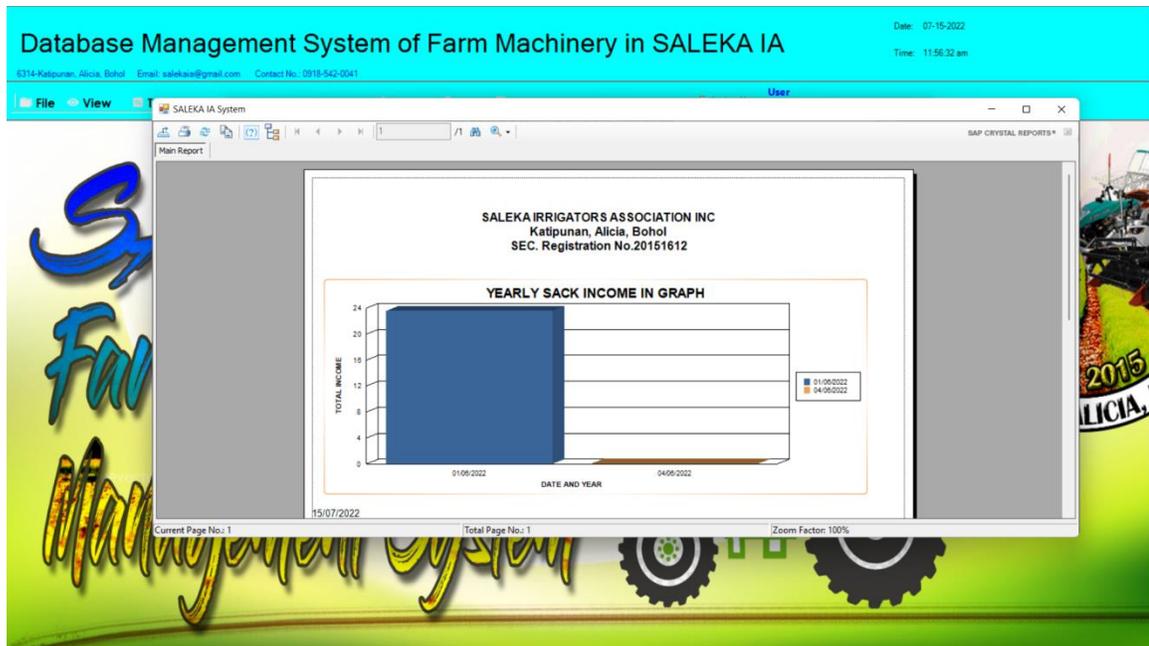
Preview 7 The Graphical Yearly Sack Income Report

Preview 8   shows the List of Farmer
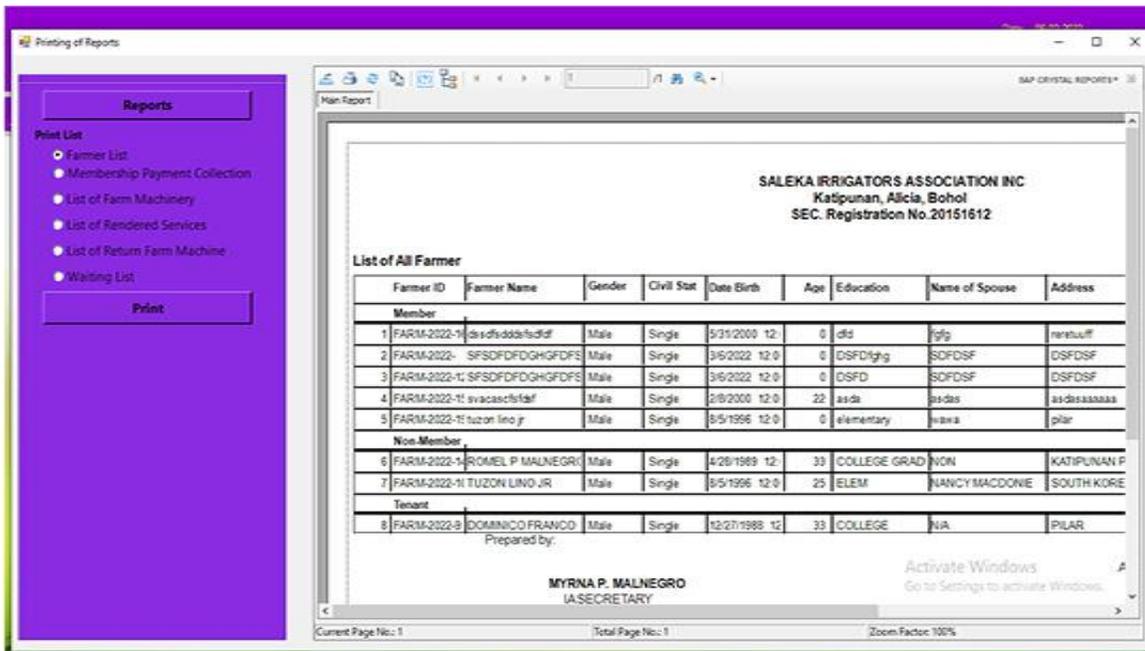
Preview 8. The List of Farmer

Preview 9 shows the List of Farm Machinery
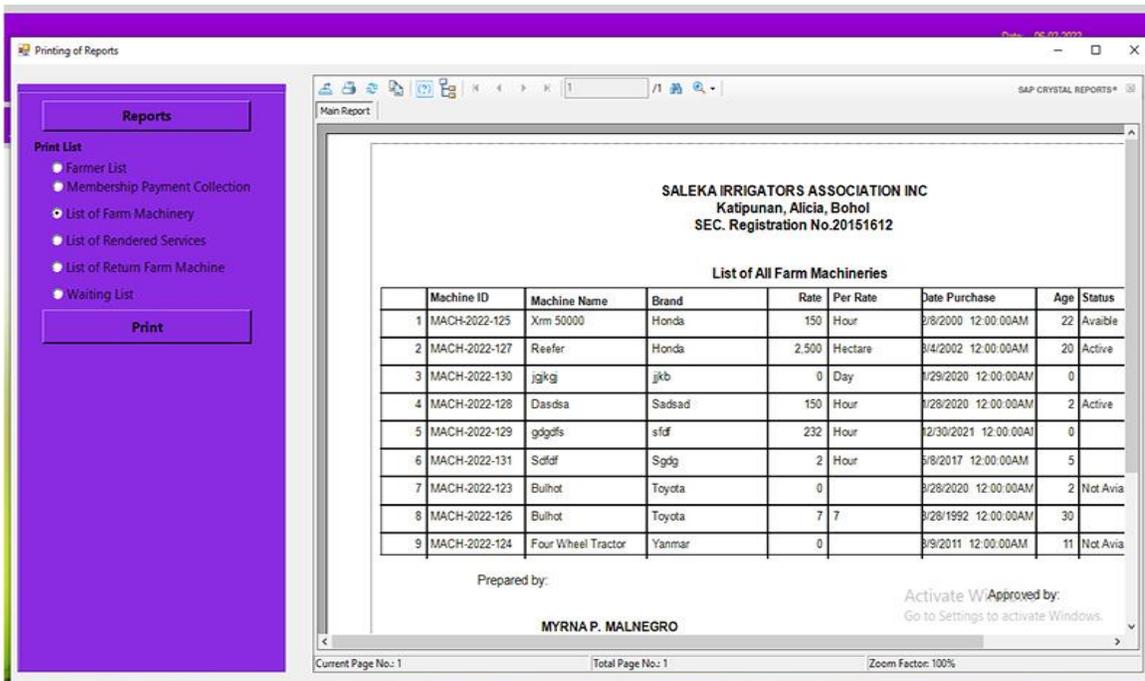
Preview 9. The List of Farm Machinery

Preview 10 shows the List of Rendered Services

Preview 10. The List of Rendered Services

Preview 11 shows the List of Return Farm Machineries

Preview 11. The List of Return Farm Machineries

Preview 12 shows the Membership Payment Collection

Preview 12. The Membership Payment Collection

Preview 13 shows the Farm Machinery Cash Income Report

Preview 13. Farm Machinery Cash Income Report

Preview 14 shows the Farm Machinery Sack Income Report

Preview 14. Farm Machinery Sack Income Report

Screen Layout

The Screen layout describes the design of graphical user interfaces. It includes a wide variety of applications where screens or displays can be used as part of human-machine interaction and should be distinguished from the functions of a graphical user interface" (ryte.com, 2020). Screen Layout is one of the many attributes of the system's user-friendliness. It should be designed in such a way to navigate the system quickly, easily, and it should provide clear recognition of the tasked of the users need to perform.

Preview 15 shows the Sign Up Form

Preview 15. Sign Up Form

Preview 16 shows the log-in display form for the user

Preview 16. User Log-in Form

Preview 17 shows the Main Form of the System

Preview 17. Main Form

Preview 18 shows the Farmers Information/Adding Farmers Form

Preview 18. Farmers Information/Adding Farmers Form

Preview 19 shows the Farm Machinery Information/Adding Farm Machinery

Form

Preview 19. Farm Machinery Information/Adding Farm Machinery Form

Preview 20 shows the Operators Information/Adding Operator Form

Preview 20. Operators Information/Adding Operator Form

Preview 21 shows the Farm Machinery Booking Details Tab

Preview 21. Farm Machinery Booking Details Tab

Preview 22 shows Farm Machinery Booking Booked Farm Machinery Tab
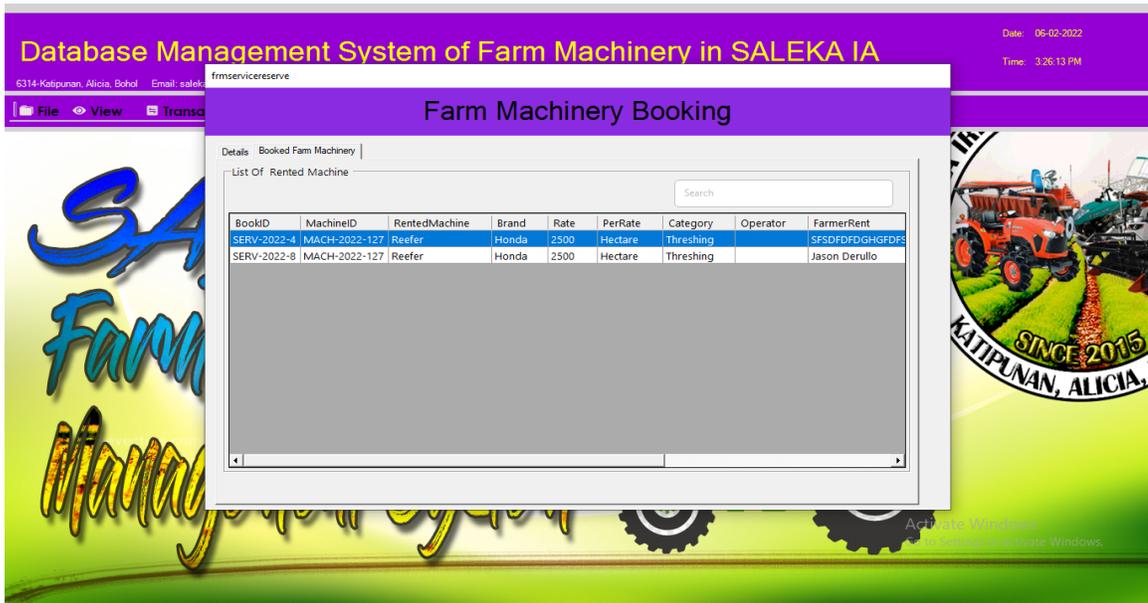
Preview 22. Farm Machinery Booking Booked Farm Machinery Tab

Preview 23 shows the Rent Farm Machinery Details Tab

Preview 23. Rent Farm Machinery Details Tab

Preview 24 shows the Farm Machinery Booking Rented Farm Machinery Tab

Preview 24. Farm Machinery Booking Rented Farm Machinery Tab.

Preview 25 shows the Return Farm Machinery Unreturned Farm Machinery Tab

Preview 25. Return Farm Machinery Unreturned Farm Machinery Tab

Preview 26 shows the Return Farm Machinery Returned Farm Machinery Tab
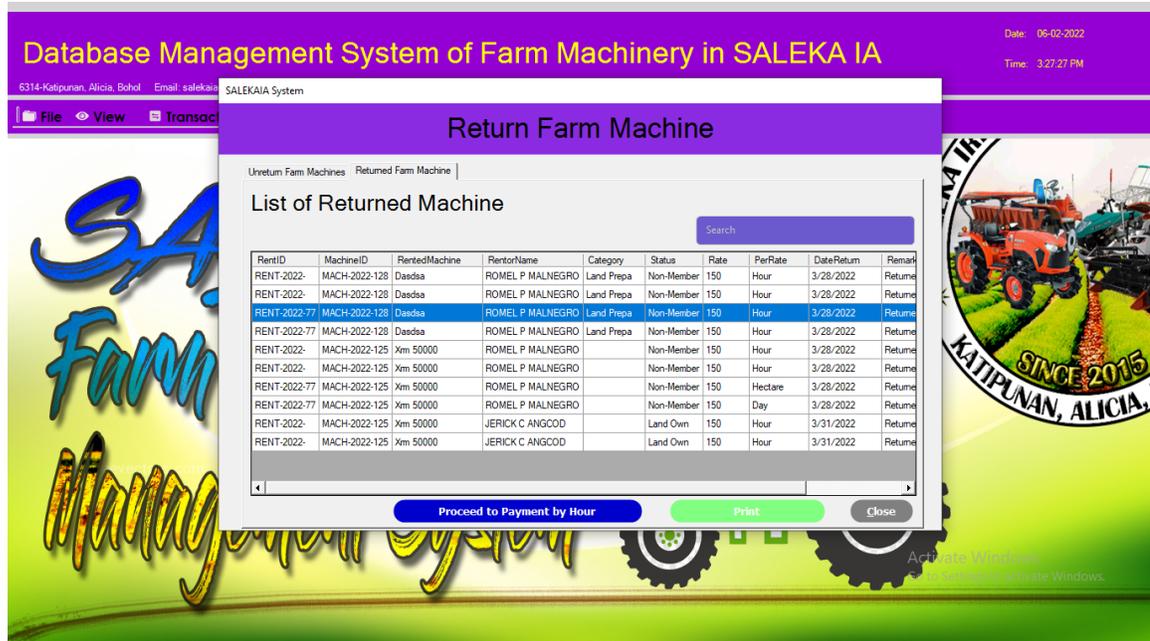
Preview 26. Return Farm Machinery Returned Farm Machinery Tab

Preview 27 shows the Rendered Services Unrendered Services Tab
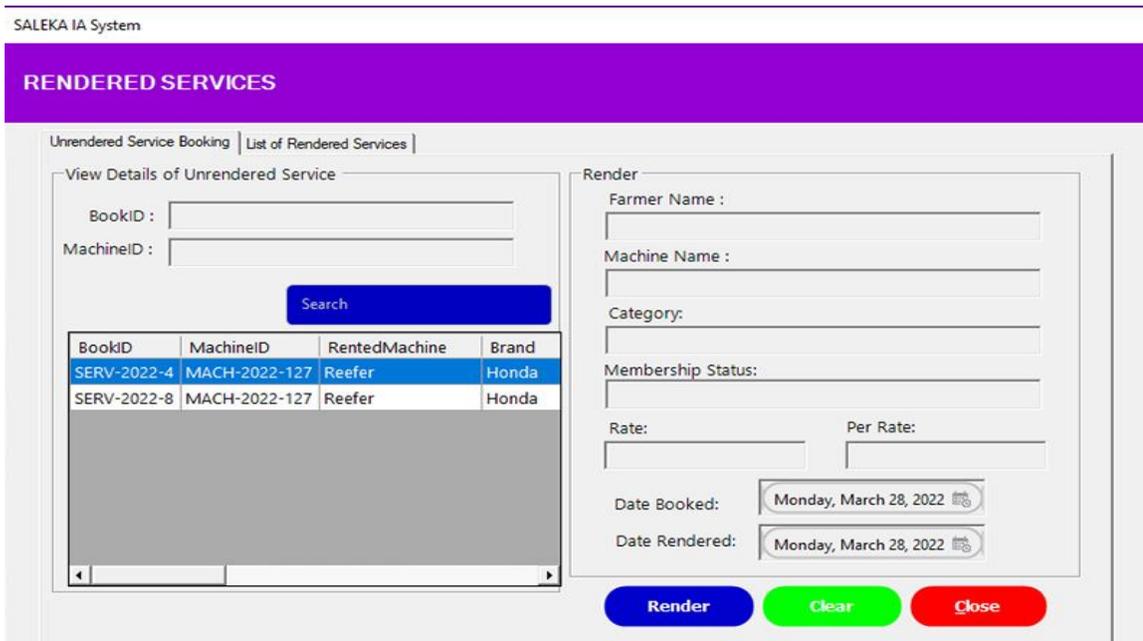
Preview 27. Rendered Services Unrendered Services Tab

Preview 28 shows the Rendered Services List of Rendered Services Tab
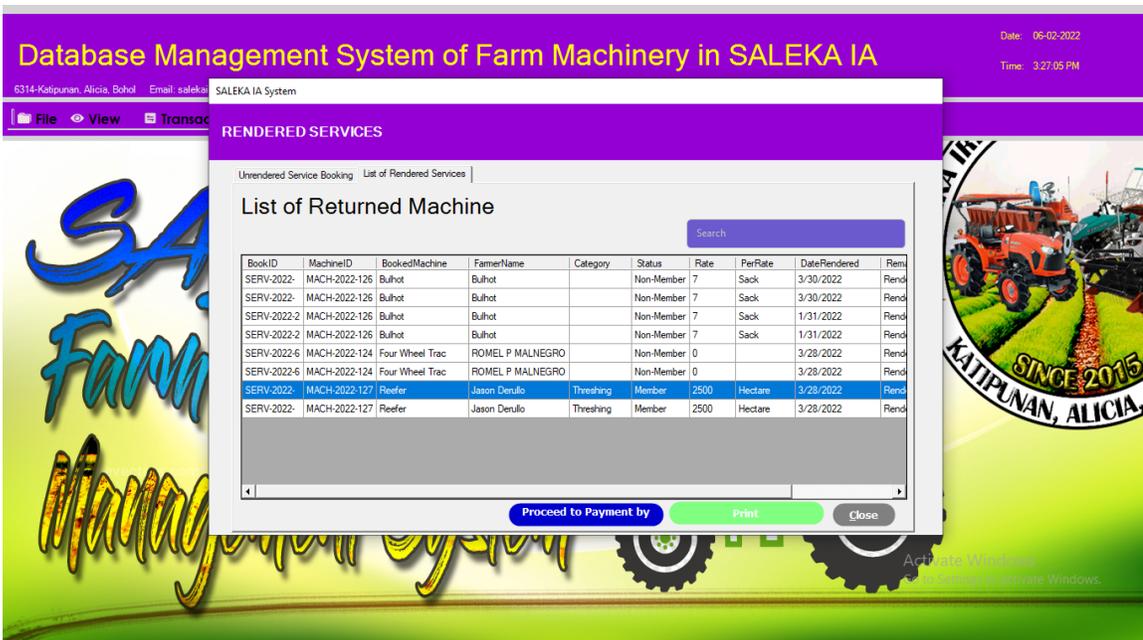
Preview 28. Rendered Services List of Rendered Services Tab

Preview 29 shows the Membership Payment Process Form

Preview 29. Membership Payment Process Form

Preview 30 shows the Farm Machinery Payment Per Day

Preview 30. Farm Machinery Payment Per Day

Preview 31 shows the Farm Machinery Payment Per Hectare

Preview 31. Farm Machinery Payment Per Hectare

Preview 32 shows Farm Machinery Payment Per Hours

Preview 32. Farm Machinery Payment Per Hours

Preview 33 shows the Farm Machinery Payment Per Sack

Preview 33. Farm Machinery Payment Per Sack

Preview 34 shows the Inventory Form

Preview 34. Inventory Form

Preview 35 shows the Search Form Farmer Type

Preview 35. Search Form Farmer Type

Preview 36 shows the Search Form Farm Machinery Type

Preview 36. Search Form Farm Machinery Type

Preview 37 shows the Search Form Operator Type
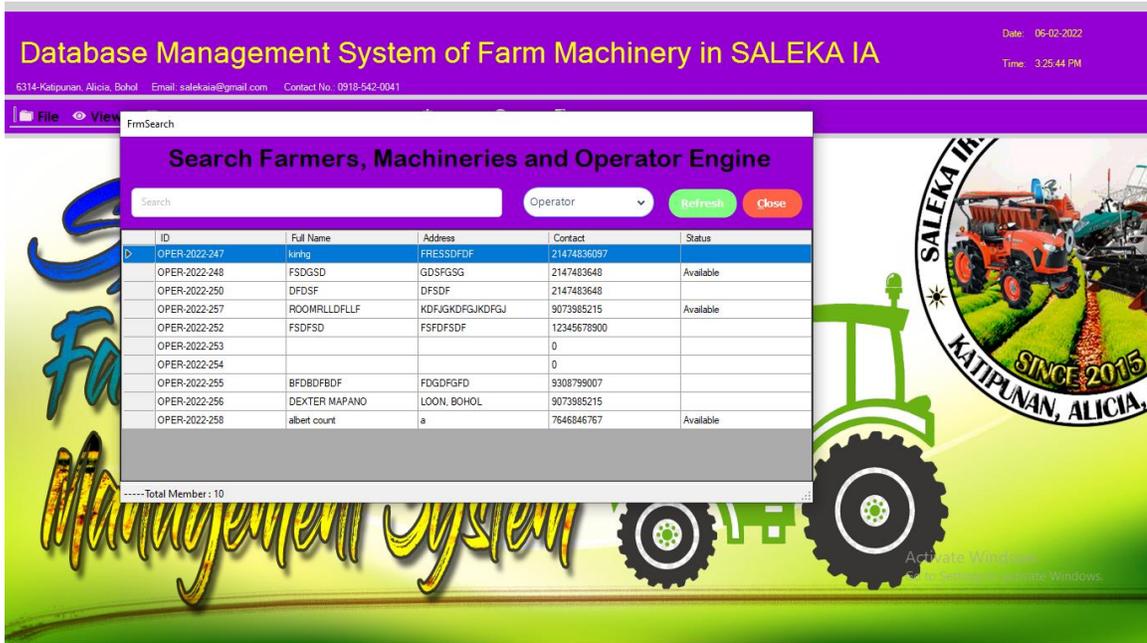
Preview 37 Search Form Operator Type

Preview 38 shows the Find Transaction for Per Day
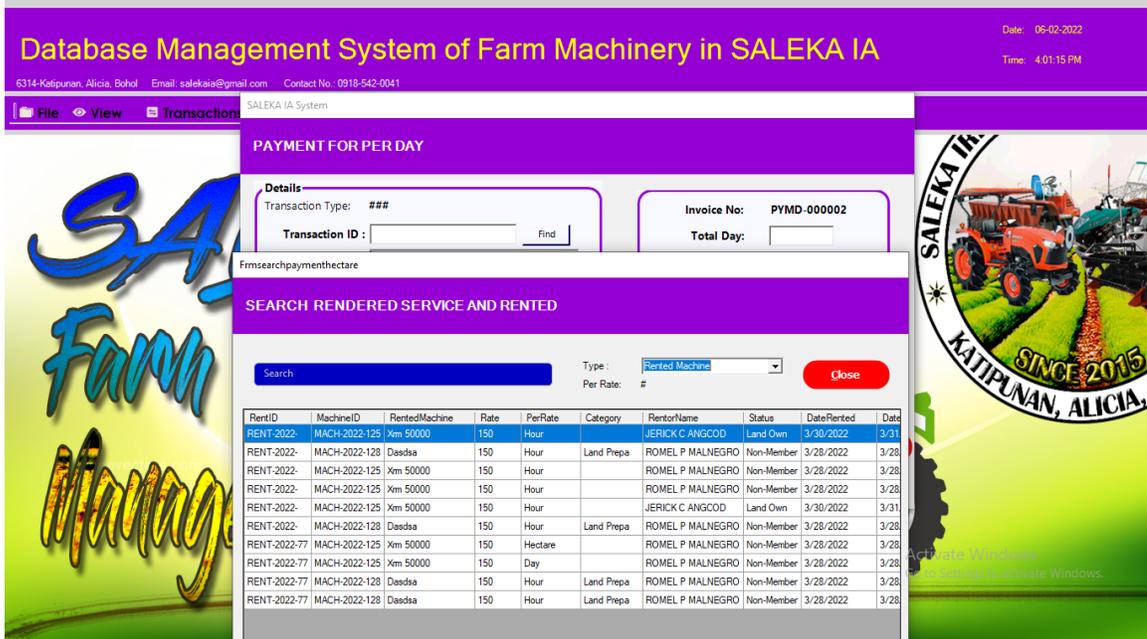
Preview 38. Find Transaction for Per Day

Preview 39 shows the Find Transaction for Per Hectare

Preview 39. Find Transaction for Per Hectare

Preview 40 shows the Find Transaction for Per Hours

Preview 40. Find Transaction for Per Hours

Preview 41 shows the Find Transaction for Per Sack

Preview 41. Find Transaction for Per Sack

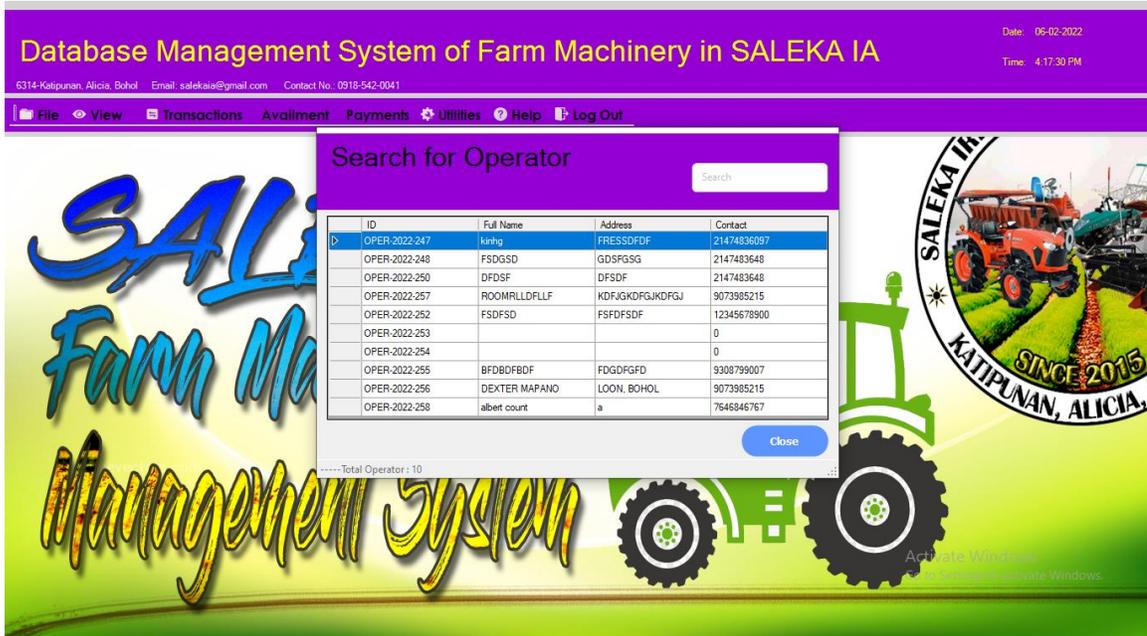Preview 42 shows the Find Farmer

Preview 42. Find Farmer

Preview 43 shows the Find Farm Machinery
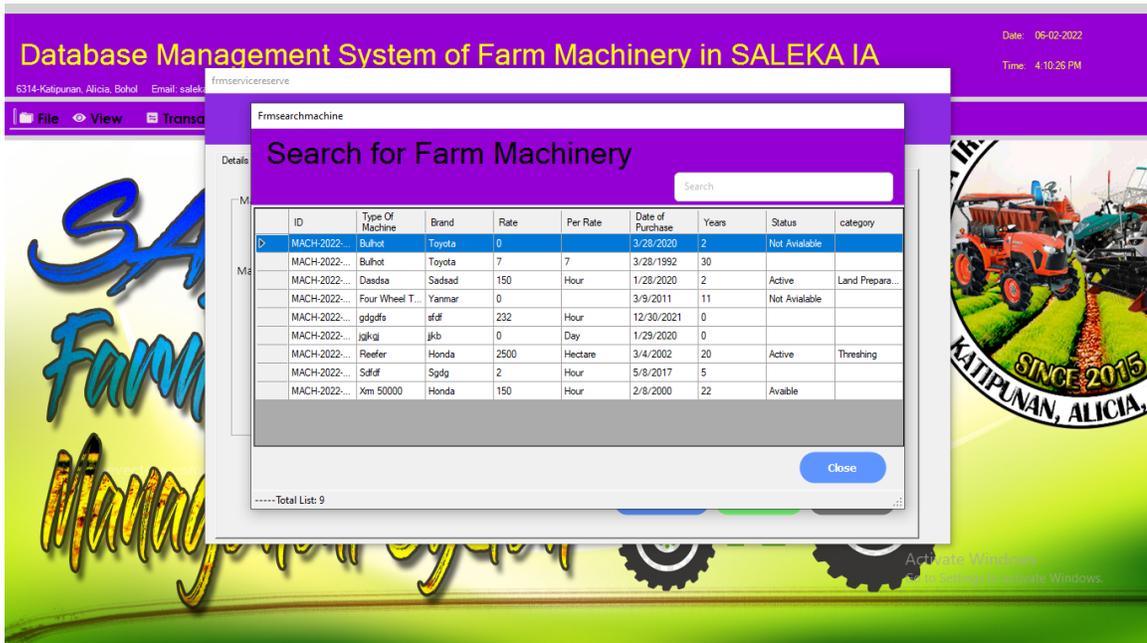
Preview 43 Find Farm Machinery

Preview 44 shows the Find Operator

Preview 44. Find Operator

Preview 45 shows the List of Rented Farm Machinery

Preview 45. List of Rented Farm Machinery

Preview 46 shows the List of Waiting Farmers

Preview 46. List of Waiting Farmers

Preview 47 shows the Account Log

Preview 47. Account Log

Preview 48 shows the Income Reports

Preview 48. Income Reports

Preview 49 shows the Account Log Report

Preview 49. Account Log Report

Preview 50 shows the Graphical Farm Machineries Yearly Cash Income Report

Preview 50 The Graphical Farm Machineries Yearly Cash Income Report

Preview 51 shows the Graphical Farm Machineries Yearly Sack Income Report
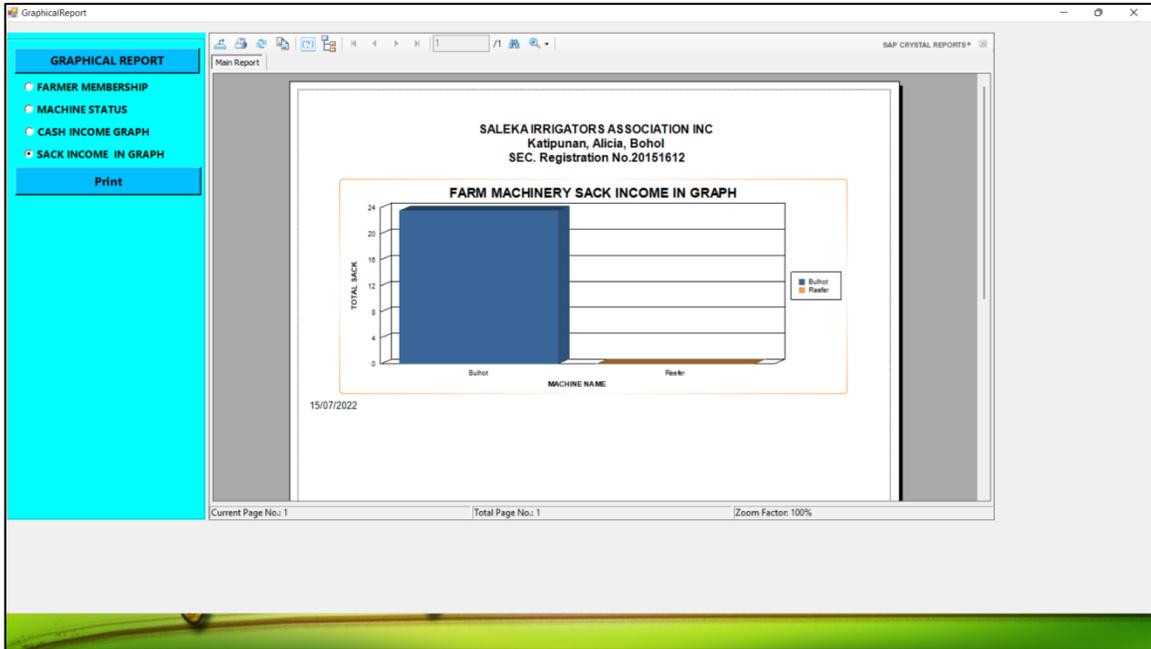
Preview 51 The Graphical Farm Machineries Yearly Sack Income Report

Preview 52 shows the Graphical Farmers Membership Status Report
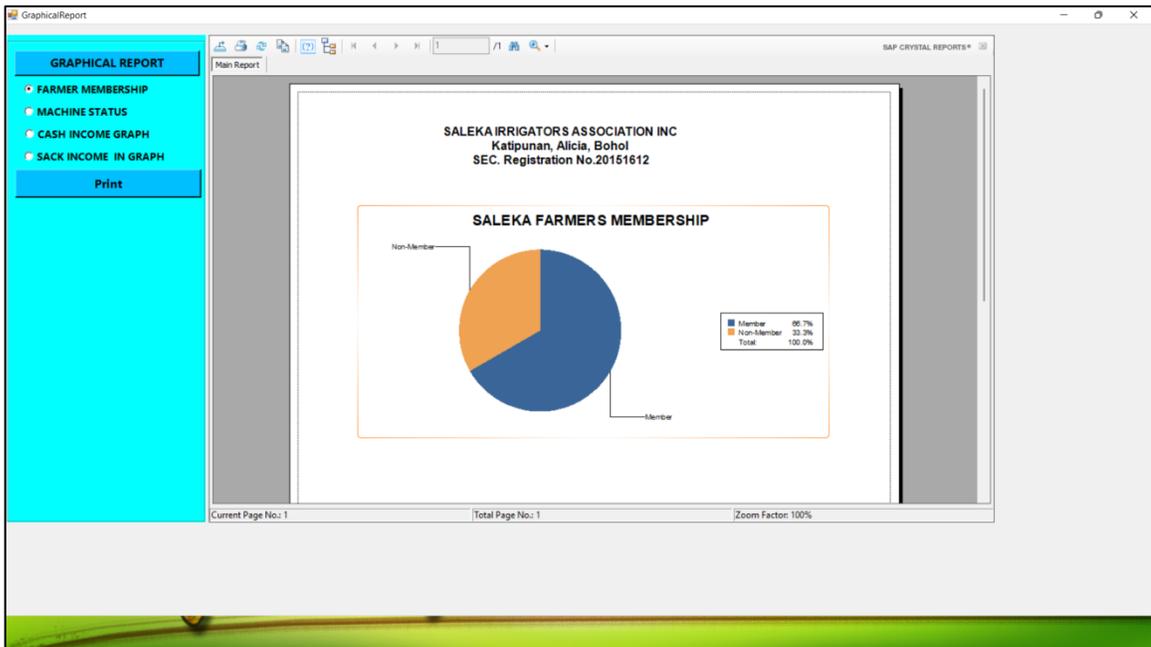
Preview 52 The Graphical Farmers Membership Status Report

Preview 53 shows the Graphical Farm Machineries Status Report
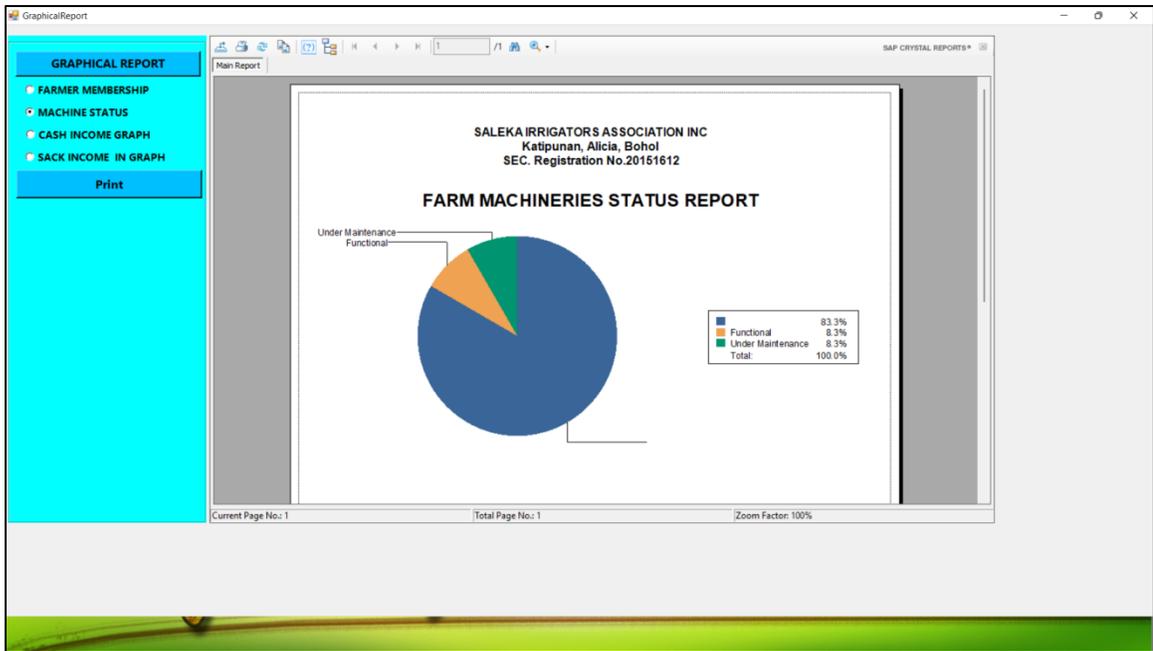
Preview 53 The Graphical Farm Machineries Status Report

Preview 54 shows the Graphical Yearly Cash Income Report
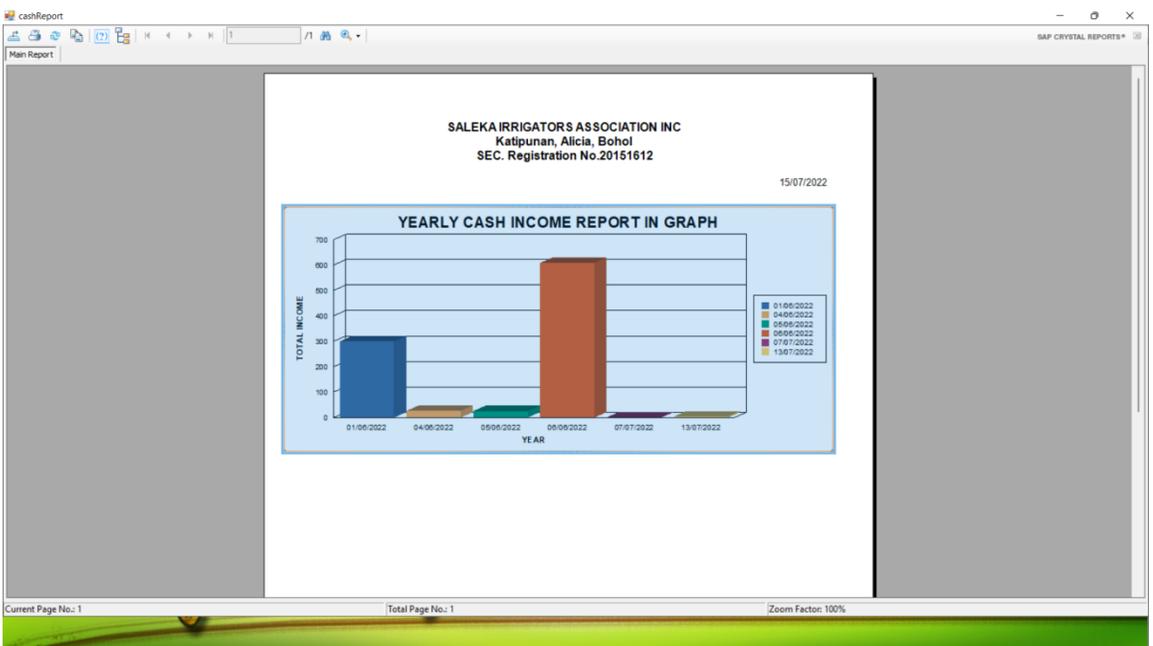
Preview 54 The Graphical Yearly Cash Income Report

Preview 55 shows the Yearly Sack Income Report
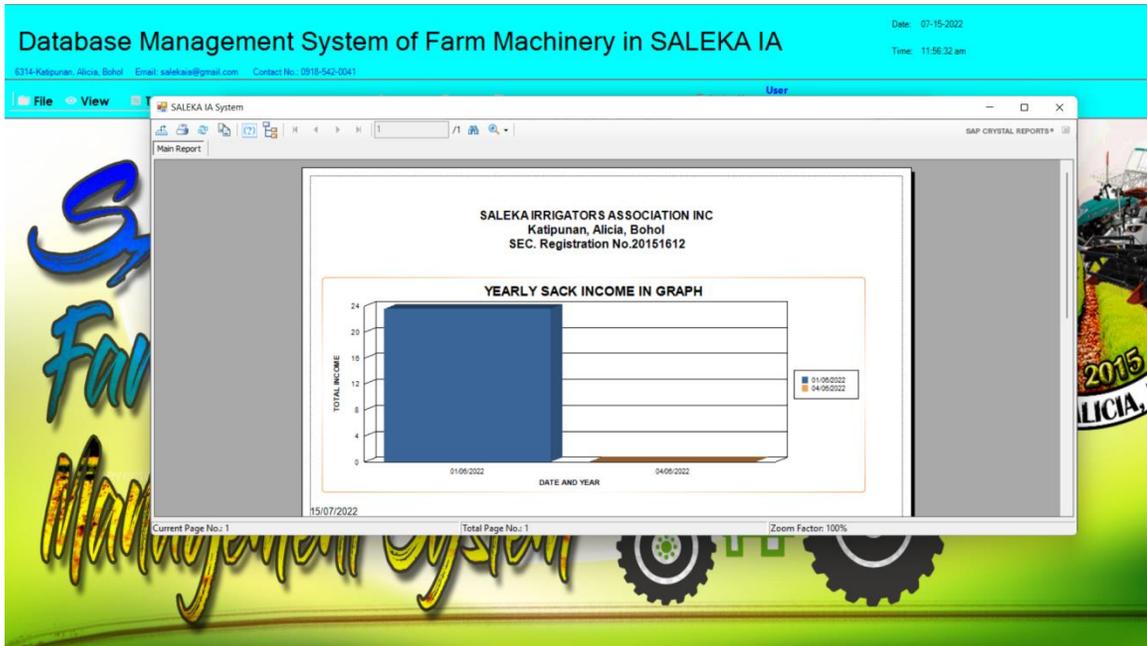
Preview 55 The Graphical Yearly Sack Income Report

Preview 56 shows the List of Farmer

Preview 56. The List of Farmer

Preview 57 shows the List of Farm Machinery

Preview 57 The List of Farm Machinery

Preview 58 shows the List of Rendered Services

Preview 58. The List of Rendered Services

Preview 59 shows the List of Return Farm Machineries

Preview 59. The List of Return Farm Machineries

Preview 60 shows the Membership Payment Collection

Preview 60. The Membership Payment Collection

Preview 61 shows the Farm Machinery Cash Income Report

Preview 61. Farm Machinery Cash Income Report

Preview 62 shows the Farm Machinery Sack Income Report

Preview 62. Farm Machinery Sack Income Report

Preview 63 shows the Farm Machinery Fix Rate
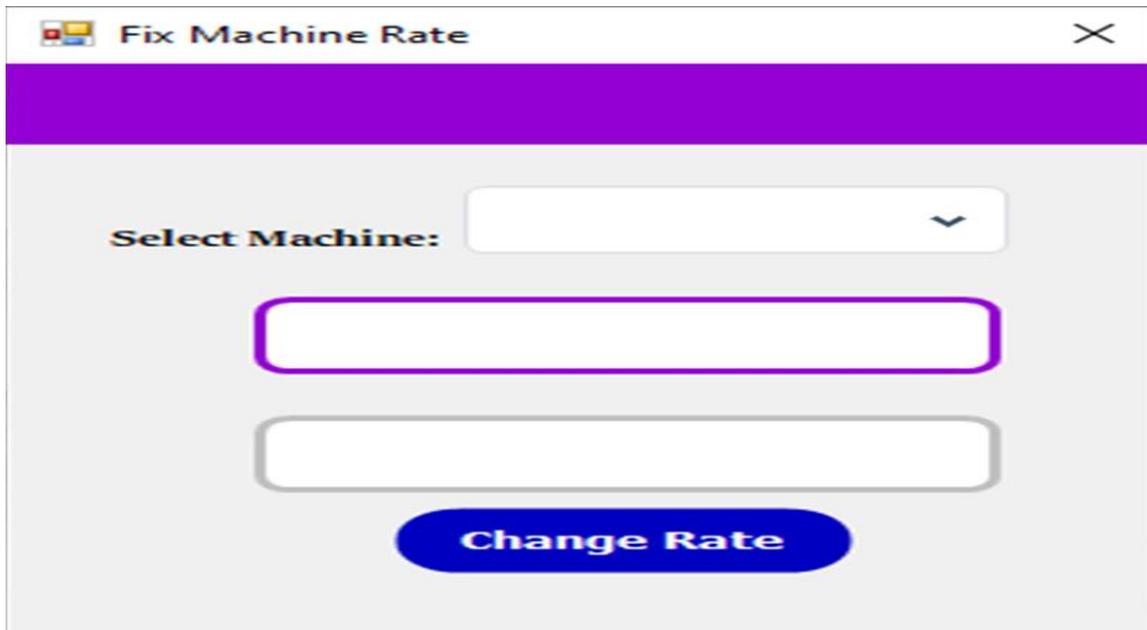
Preview 63. Farm Machinery Fix Rate

Economic Performance Evaluation

The SALEKA Irrigators Association Inc. may know the benefits brought by the Database Management System. This section determines the proposed budget of resources that would be used.

In the presentation of the economic performance evaluation, the length of time it takes for the new system to operate and the system usability and expenses is determined, in order for them to give an idea whether they could precede the computerized or not.

Table 16

Initial Investment Annual Operating Cost

Item	Qty	Unit	Unit Price	Total
A. Initial Investment				
1. Hardware				
Desktop Computer	1	Set	₱ 17,000.00	₱ 17,000.00
Printer	1	Unit	₱ 7,500.00	₱ 7,500.00
Router	1	Unit	₱ 3,000.00	₱ 3,000.00
			Sub-total	**₱ 27,500.00**
2. Software				
Software			₱ 15,000.00	₱ 15,000.00
Software			₱ 3,000.00	₱ 3,000.00
development			₱ 1,000.00	₱ 1,000.00
System installation				
			Sub-total	**₱ 19,000.00**
		Total Initial Investment Cost		**₱ 46,500.00**
B. Annual Operating Cost				
1. Office Supplies				
Bond paper	5	Reams	₱ 156.00	₱ 400.00
Ball Pen	3	Pieces	₱ 8.00	₱ 16.00
Stapler	1	Pieces	₱ 90.00	₱ 90.00
Folder	6	Pieces	₱ 6.00	₱ 36.00
Fastener	6	Pieces	₱ 2.00	₱ 12.00

Printer ink cyan	6	Pieces	₱ 275.00	₱ 1650.00
Magenta	1	Pieces	₱ 275.00	₱ 275.00
Yellow	1	Pieces	₱ 275.00	₱ 275.00
Black	1	Pieces	₱ 275.00	₱ 275.00
2. UTILITIES				
Electricity	12	Months	₱ 230.00	₱ 2,760.00
3. GENERAL SERVICES				
System Maintenance	4	Quarters	₱ 2,500.00	₱ 10,000.00
			Sub-total	**₱ 15,789.00**
			Total Annual Operating Cost	**₱ 62,289.00**

Testing and Evaluation

System testing of the application is usually done on complete application software to evaluate software's overall compliance with the business, functional, and end-user requirements. In system testing, a software test professional aims to detect defects or bugs both within the interfaces and also within the software as a whole. However, during integration testing of the application or software, the tester aims to detect the bugs or defects between the individual units that were integrated. During system testing, the focus is on the software design, behaviour and even the believed expectations of the customer. Thus, a significant aspect of the design should be developed to ensure that the artefact meets the specified

requirements, that is, the evaluation of the system. System usability was used as a parameter in this study.

System Usability

The researchers adopted a system usability questionnaire by Lewis, J. R. (1995). IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for use. The system usability test was conducted by the researchers at Katipunan, Alicia on May 28, 2022 from 8:00 A.M to 4:30 P.M in the afternoon. The respondents were the Irrigators Development Officer, Secretary, Farm Machinery In-Charge, President, Operators and Farmer of SALEKA Irrigators Association Inc. The researchers demonstrated how the system must be used for testing. They demonstrated the system in detail like the administration process, inquiry process, availing process, recording process, booking process, rental process, inventory, payment process and report generation. The researchers also presented monthly, yearly, cropping season transaction report and total income of every farm machinery. It took two and a half hours during the presentation and actual hands-on, they answered the system usability questionnaire.

Table 20

System Usability Result

Criteria for system usability	Weighted	Rating
1. Overall, I am satisfied with how easy it is to use this system.	Mean 6.2	Agree
2. It was simple to use this system.		Agree
3. I can effectively complete my work using this system.	6.2 6.1	Agree
4. I am able to complete my work quickly using this system.	6.3	Agree
5. I am able to effectively complete my work using this system.	6.2	Agree
6. I feel comfortable using this system.		Agree
7. It was easy to learn to use this system.	6.2	Agree
8. I believe I became productive quickly using this system.	6.0 6.8	Agree
9. The system gives error messages that clearly tell me how to fix problems.	6.1	Agree
10. Whenever I make a mistake using the system, I recover easily and quickly.	6.3	Agree
11. The information (such as online help, on-screen messages, and other documentation) provided with this system is clear.	5.9	Agree
12. It is easy to find the information I needed.		Agree
13. The information provided for the system is easy to understand.	6.1 6.5	Agree
14. The information is effective in helping me complete taskeds and scenarios.	6.3	Agree
15. The organization of this system screens is clear.	6.2	Agree
16. The interface of this system is pleasant,	6.1	Agree
17. I like using the interface of this system.	6.3	Agree
18. This system has all the functions and capabilities I expect it to have.	6.8	Agree
19. Overall, I am satisfied with this system.	6.3	Agree
AVERAGE WEIGHTED	**6.3**	**Agree**

Chapter 3

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

Summary of Findings

The main objective of this study was to develop a Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. that is more efficient and synchronized than the current manual system. The new system could solve most of the problems that the existing system has. Based on the results of the study, the researchers found out that the SALEKA Irrigators Association Inc. uses the manual method which leads to the problems such as booking or renting of farm machineries which written only in the calendar, logbook, or any piece of paper that leads to duplication of entry/information, overbook, misplace the schedule, or write down incorrect (or incomplete) information, time consuming, and difficult in the generation of reports. In addition, there scheduling and liquidation are messy. The researchers came up with a solution that provide computerized Inventory and reservation management, Payment, Data management, Booking cancellation, Up to date and Secure list of records, Generate a cropping transaction report, monthly transaction report, and annual report, based on the defined problems and issues in documenting and managing records and farm machinery.

The tabulated result of the System Usability Evaluation done by the IDO, Secretary, Farm Machinery In-Charge, President of AI, Farmers and Operators presented an average weighted mean of 6.3 (Agree). This implies that the respondents strongly believe and are confident that the system is very usable.

Conclusions

Based on the identified needs, Database Management System of Farm Machinery in SALEKA Irrigators Association Inc. is developed with the following modules: administration, inquiry process, availment process, recording process, scheduling process, inventory, payment process, and generation of report. The developed framework was put through its paces and evaluated for usability. The respondents gave an "Agree" rating based on the evaluation results, suggesting that they were pleased with the features such as ease of use, visual clarity, language, and its implementation in general.

Recommendation

Based from the observations during implementation and on the aforementioned conclusions, the researchers have suggested the following for smooth system adaptation and operation, as well as for future development.

1. Concerned office must adjust to the developed system in order to enhance record keeping and identify any glitches or errors.

2. To familiarize and orient the target users with the functionality and function of the new system, a training and orientation seminar must be performed.

3. System maintenance must be done on a regular basis to ensure the protection of records and the system's dependability.

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APPENDICES

APPENDIX A

Letter of Intent

Republic of the Philippines

Bohol Island State University
Bilar Campus
Zamora, Bilar, Bohol

March 24, 2022

ALGERICA H. PILVERA

Irrigators Development Officer
SALEKA Irrigators Association Inc.
Katipunan, Alicia, Bohol
Ma'am:

Good day!

      We, the 4th Year Students of Bachelor of Science in Computer Science of Bohol Island State University Bilar Campus could conduct a System Development project (Thesis) as requirements for graduation for the degree of Bachelor of Science in Computer Science.

In this connection, we would like to asked permission to conduct a system study (thesis) basing on your Farm Machinery Operations and Management of this association as basis for our proposed computerization. This study would include interview, observation of transactions and review of documents significant for the study and development of the system. We anticipate to have implementation testing (bench marking) of the system developed as part of usability testing.

We assure you that we shall honor secrecy and privacy to all data and information we shall be handling as we go along with our study. Your approval could be a great help to the success of our study.

We anticipate your favorable response regarding this matter.

Thank you very much and more power!

Respectfully yours,

ROMEL P. MALNEGRO

LINO C. TUZON JR

JERICK C. ANGCOD

Researchers

Noted:

DARREL A. CARDAÑA   **CECILIA T. GUMANOY**

Subject Instructor   Thesis Adviser

Recommended by: Endorsed by:

SHEILA G. TABUNO   **ARLEN B. GUDMALIN, PhD**

Chairperson, DCoS   Dean, CTAS

Approved by:

ALGERICA H. PILVERA

Irrigators Development Officer

LETTER OF APPROVAL OF THE PROPOSED SYSTEM

Bohol Island State University

Bilar Campus

Zamora, Bilar, Bohol

Vision: A premier S&T university for the formation of a world class and virtuous human resource for sustainable development in Bohol and the Country. **Mission**: BISU is committed to prov ide quality higher education in the arts & sciences, as well as in professional & technological fields; undertake research & development, & extension services for the sustainable development of Bohol & the country.

College of Technology and Allied Sciences
Department of Computer Sciences

A P P R O V A L   S H E E T

This is to certify that the following researchers **Romel P. Malnegro , Jerick C. Angcod, Lino Jr. C. Tuzon,** Bachelor of Science in Computer Science students, would like to present their proposal entitled "Database Management System of Farm Machineries in SALEKA Irrigator's Association Inc. Katipunan, Alicia, Bohol". in partial fulfillment of the requirements for the subject Thesis 2(Thesis Writing) this could be presented on June 2, 2022 at 8:00am at IT Lab D.

The Thesis Committee: Date   Signature

Recommending Approval:

CECILIA T. GUMANOY   _____   _____

Thesis Adviser

SHIELA G. TABUNO   _____   _____

REX VINCENT D. TEJADA   _____   _____

Panel

DANIE D. BALDESCO   _____   _____

Panel

DARREL A. CARDAÑA   _____   _____

                                                    _____

Subject Instructor

ARLEN B. GUDMALIN Ph.D _____   _____

Dean, CTAS

LETTER OF APPROVAL OF QUESTIONER DISTRIBUTION AND

IMPLEMENTATION

May 28, 2022

ALGERICA H. PILVERA
Irrigators Development Officer
Katipunan, Alicia, Bohol

Dear Maam,

Greeting!

      It is our pleasure to inform you that the system application "Database Management System of Farm Machineries in SALEKA Irrigator's Association Inc. Katipunan, Alicia, Bohol" is now in its final phase. With this, we would like to conduct benchmarking activities as part of implementation.

This well conducted on May 28, 2022 in your office at any time of your convenience. This activity could allow you to assess our developed system and give feedback as well.

By this time, we would like to express our gratitude for allowing us to conduct our thesis study. We are hoping for future collaboration with you our dear client. May the good Lord continually bless you and your office.

Thank you and more power!

Very truly yours,

ROMEL P. MALNEGRO

JERICK C. ANGCOD

LINO C. TUZON JR.
Researchers

Endorsed by:

CECILIA T. GUMANOY

Thesis Adviser

Recommending Approval:

ARLEN B. GUDMALIN, Ph.D   **SHIELA G. TABUNO**

Dean, CTAS   Chairperson, DCoS

Approved by:

ALGERICA H. PILVERA

Irrigators Development Officer

APPENDIX B

System Usability Questionnaire

Instructions:

- Please rate the system questionaire

- Try to respond to all of the items

- For items that are not applicable, use N/A

- Make sure these fields are filled in

Rating Scale:

7 – Strongly Agree

6 – Agree

5 – Tend to Agree

4 – Neither Agree or Disagree

3 – Tend to Disagree

2 – Disagree

1 – Strongly Disagree

Criteria for System Usability	Rating	Comment
1. Overall, I am satisfied with how easy is to use this system.		
2. It was simple to use this system.		
3. I can extremely complete my work using this system.		
4. I am able to efficiently complete my work using this system.		
5. I can effectively complete my work using this system.		
6. I feel comfortable using this system.		
7. It was easy to learn to use this system		
8. I believe I became productive quickly using this system.		
10. Whenever I make a mistake using the system, I recover easily and quickly.		

11. The information (such as online help, on screen messages, and other documentation) provided with the system is clear.		
12. It is easy to find information I needed.		
13. The information provided for the system is easy to understand.		
14. The information provided is effective in helping me complete the tasked and scenarios.		
15. The organization of the information on the system screens is clear.		
16. The interface of this system is pleasant		
17. I like using the interface of this system.		
18. This system has all the functions and capabilities I expect it to have.		
19. Overall, I am satisfied with this system.		

Based on Lewis J.R (1995) IBM Computer Usability Satisfaction Questioners:
Psychometric Evaluation & Instruction for Use

APPENDIX B

INTERVIEW GUIDE QUESTIONS

Researchers' guide for conducting the interview with the respondents:

1. How is the present manual process of SALEKA Irrigators Association Inc. done?

2. What are the problems that you've encountered with the present process?

3. What are the services that the SALEKA Irrigators Association Inc. offer?

4. Who can avail the services?

5. What are the requirements in order to avail the different services?

6. What are the records that need to be saved and retrieved?

7. Where do you keep the records? Who is responsible in gathering all information?

9. How long does it take to retrieve the records?

10. Have you encountered difficulties pertaining in recording of information?

11. How is the payment process usually done?

12. What are the problems that you've encountered during the payment process?

11. What are the effects of these problems to association?

12. What is the information needed for the different commodities?

13. What are the reports needed for the different commodities?

14. Are you coulding to accept new technology such as computerization?

APPENDIX C

User's Manual

A. Login Form

Step:

1. On login form enter the password and username

2. Enter counter number. Then click the "Login" button

B. Adding Farmers

Step:

1. Click "Transactions" tab on Main form

2. Click "Manage Farmer"

3. Input Farmers Information

4. Click "F3" on keyboard to open the camera

5. Click "OK"

6. Click "Capture"

7. Click "Save" button to proceed

8. Confirmation "Successfully Saved!"

C. Adding Farm Machinery

Step:

1. Click "Transactions" tab on Main form

2. Click "Farm Machinery"

3. Input Farm Machinery Information

4. Click "Import" to select picture

5. Click "Open"

6. Click "Save" button to proceed

7. Confirmation "Successfully Saved!"

D. Adding Operator

Step:

1. Click "Transactions" tab on Main form

2. Click "Manage Operator"

3. Input Operators Information

4. Click "F3" on keyboard to open the camera

5. Click "OK"

6. Click "Capture"

7. Click "Save" button to proceed

8. Confirmation "Successfully Saved!"

E. Booking Farm Machinery Service

Step:

1. Click "Availment" tab on the Main form

2. Click "Booking Service".

3. Click "Find" button to search farm machinery they want to avail

4. Select Farm Machinery

5. Click "Find" button near the operator text box to view operator list

6. Select Operator.

7. Click "Find" button on the farmer info panel and search the farmer who currently availing

8. Select Farmer

9. Click "Save" button to proceed

10. Confirmation "Successfully Saved!"

F. Rent Farm Machinery

Step:

1. Click "Availment" tab on the Main form

2. Click "Rent Machinery".

3. Click "Find" button to search farm machinery they want to avail

4. Select Farm Machinery.

5. Click "Find" button on the farmer info panel and search the farmer who currently availing

6. Select Farmer

7. Click "Save" button to proceed

8. Confirmation "Successfully Saved!"

G. Rendered Services

Step:

1. Click "Transactions" tab on the Main form

2. Click "Rendered Services".

3. Select transaction that is already rendered in the datagridview on the "Unrendered Service Booking" tab

4. Click "Render" button

5. Confirmation "Successfully Saved!"

H. Returned Machinery

Step:

1. Click "Transactions" tab on the Main form

2. Click "Returned Machinery".

3. Select transaction that is already rendered in the datagridview on the "Unrendered Service Booking" tab

4. Click "Return" button

5. Confirmation "Successfully Saved!"

I. By Sack Payment Method

Step:

1. Click "Payments" tab on the Main form

2. Click "Farm Machinery Payment" tab

3. Click "By Sack"

4. Click "Find" button to view Search Form

5. Select the type on the Combo Box it is either "Rented Machine or Booked Service"

6. Select the transaction on the datagridview

7. Click "OK"

8. Type the Total Sack Harvest on the textbox

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Confirmation "Successfully Saved!"

J. By Hour Payment Method

Step:

1. Click "Payments" tab on the Main form

2. Click "Farm Machinery Payment" tab

3. Click "By Hour"

4. Click "Find" button to view Search Form

5. Select the type on the Combo Box it is either "Rented Machine or Booked Service"

6. Select the transaction on the datagridview

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Confirmation "Successfully Saved!"

K. By Hectare Payment Method

Step:

1. Click "Payments" tab on the Main form

2. Click "Farm Machinery Payment" tab

3. Click "By Hectare"

4. Click "Find" button to view Search Form

5. Select the type on the Combo Box it is either "Rented Machine or Booked Service"

6. Select the transaction on the datagridview

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Confirmation "Successfully Saved!"

L. By Day Payment Method

Step:

1. Click "Payments" tab on the Main form

2. Click "Farm Machinery Payment" tab

3. Click "By Day"

4. Click "Find" button to view Search Form

5. Select the type on the Combo Box it is either "Rented Machine or Booked Service"

6. Select the transaction on the datagridview

7. Click "OK"

8. Type the total hour, discount, amount tender on the "textbox"

9. Click "Enter" on the keyboard

10. Click "Save" button

11. Confirmation "Successfully Saved!

M. Membership Fee

Step:

1. Click "Payments" tab on the Main form

2. Click "Membership fee"

3. Click the "Search" link on the Membership Fee form to view search farmer

4. Double click the selected farmer on the datagridview

5. Type onto the Membership Fee form the membershipvfee and amount
tender

6. Click "Enter" onto the keyboard

7. Click "Save" button

8. Confirmation "Successfully Saved!"

N. Farm Machinery Fix Rate

Step:

1. Click "Utilities" tab on the Main form

2. Click the "Fix Rate" tab

3. Select "Farm Machineries"

4. Select from the "Combo Box" the Farm Machinery you want to change the
rate

5. Type the new rate to the Text Box

6. Click "Change Rate"

7. Confirmation "Successfully Update!"

O. Membership Fee Fix Rate

Step:

1. Click "Utilities" tab on the Main form

2. Click the "Fix Rate" tab

3. Select "Membership Fee"

4. Type the new rate to the Text Box

5. Click "Change Rate"

6. Confirmation "Successfully Update!"

P. Open Camera

Step:

1. Click "Camera" on the form

2. Open a camera.

3. Click "Capture"

4. Capture image

5. Click "Save"

6. Save the capture image to add form

Q. Add User

Step:

1. Click "Manage User" tab on the Main form

2. Fill the information required on the text box

3. Choose user type onto the combo box

4. Click "Register" button

5. Confirmation "Successfully Saved!"

R. Update User

Step:

1. Click "Manage User" tab on the Main tab

2. Change/Update the information on the text box

3. Click "Register" button

4. Confirmation "Successfully Update!"

S. Update Farmer

Step:

1. Click "Transactions" tab on the Main form

2. Click "Manage Farmer"

3. Select farmer onto the datagridview to be updated its information

4. Change the information on the form

5. Click "Update" button

6. Confirmation "Successfully Update!"

T. Update Farm Machinery

Step:

1. Click "Transactions" tab on the Main form

2. Click "Farm Machinery"

3. Select farm machinery onto the datagridview to be update its information

4. Change the information on the form

5. Click "Update" button

6. Confirmation "Successfully Update!"

U. Update Operator

Step:

1. Click "Transactions" tab on the Main form

2. Click "Manage Operator"

3. Select operator onto the datagridview to be update its information

4. Change the information on the form

5. Click "Update" button

6. Confirmation "Successfully Update!"

V. Delete User

Step:

1. Click "Manage User" tab on the Main form

2. Select user onto the datagridview that to be deleted

3. Right click onto the mouse or touchpad

4. Select "Delete"

5. Click "Yes"

6. Confirmation "Successfully Deleted!"

W. Delete Farmer

Step:

1. Click "Transactions" tab on the Main form

2. Click "Manage Farmer"

3. Select farmer onto the datagridview that is to be deleted

4. Right click onto the mouse or touchpad

5. Select "Delete"

6. Click "Yes"

7. Confirmation "Successfully Deleted!"

X. Delete Farm Machinery

Step:

1. Click "Transactions" tab on the Main form

2. Click "Farm Machinery"

3. Select farm machinery onto the datagridview that is to be deleted

4. Right click onto the mouse or touchpad

5. Select "Delete"

6. Click "Yes"

7. Confirmation "Successfully Deleted!"

Y. Delete Operator

Step

1. Click "Transactions" tab on the Main form

2. Click "Manage Operator"

3. Select operator onto the datagridview that is to be deleted

4. Right click onto the mouse or touchpad

5. Select "Delete"

6. Click "Yes"

7. Confirmation "Successfully Deleted!"

Z. Printing of Reports

Step:

1. Click the "File" tab on the Main form

2. Select the "Printing of Report"

3. Select either "Sack Report" or "Cash Report" tab

4. Select "Daily" from combo box

5. Generate a transaction report from day to day

6. Select "Monthly" combo box

7. Generate a transaction report by monthly

8. Select "By Cropping Season" combo box

9. Generate a transaction report by cropping season

10. Select "Yearly" combo box

11. Generate a graphical report yearly

12. Choose date "From" datetimepicker

13. Choose date "To" datetimepicker

14. Click "Load" button to display the date on dategridview

15. Click "Print Logs" to view print lay-out

16. Click "Print"

AA.   Printing of List

Step:

1. Click the "File" tab on the Main form

2. Select the "Printing of List"

3. Select "Farmer List" from radio button

4. Generate a Farmer List

5. Select "Membership Payment Collection" from radio button

6. Generate a Membership Payment Collection

7. Select "List of Farm Machinery" from radio button

8. Generate a List of Farm Machinery

9. Select "List of Rendered Services" from radio button

10. Generate a List of Rendered Services

11. Select "List of Return Farm Machinery" from radio button

12. Generate a List of Return Farm Machinery

13. Select "Waiting List" from radio button

14. Generate a Waiting List

15. Then click "Print"

<u>APPENDIX D</u>

Modeling Tools
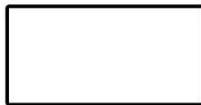
SYSTEM	NOTATION	DEFINITION
▭	**TERMINATOR**	An external entity referred to a person, group of people and other system organization which the communicates.
◯	**PROCESS**	A symbol that describes a part of a system that is used for the processing into useful information and transform inputs into
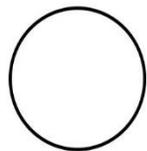
outputs in same
way

STORAGE

It is an opened-end
rectangle which
indicates as data
storage.
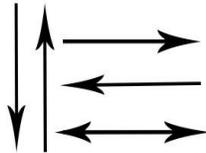
FLOWS

Represents the
information that process
requires an inputs and
other information as
output or movement of
the flow of the data into
the system

CURRICULUM VITAE

Name   : Romel P. Malnegro
Nickname   : Melmals
Place of Birth   : Katipunan, Alicia, Bohol
Age   : 22
Home Address   : Katipunan, Alicia, Bohol
Email Address   : romelpmalnegro@gmail.com
Religion   : Roman Catholic
Citizinship   : Filipino
Father's Name   : Romulo C. Malnegro Sr.
Mother's Name   : Myrna P. Malnegro

EDUCATIONAL BACKGROUND

Primary   : Katipunan Elementary School
                           Katipunan, Alicia, Bohol
                           S.Y. 2011-2012
Secondary
Junior High School   : Virgen del Pilar Academy
                           Poblacion, Pilar, Bohol
                           S.Y. 2015-2016

Senior High School   : Virgen del Pilar Academy
                           General Academic Strand.
                           Poblacion, Pilar, Bohol
   S.Y. 2017-2018

Tertiary   : Bohol Island State University- Bilar Campus
                           Zamora, Bilar, Bohol
                           S.Y. 2021-2022

Degree Earned   : Bachelor of Science in Computer Science
Work Experience   : On the-Job training
                           Municipality of Alicia
                           Alicia, Bohol
                           August-September 2021

Name   **:** Lino C. Tuzon Jr.

Nickname   **:** lolong/longlin'z

Place of Birth **:** Bagumbayan, Pilar, Bohol

Age   **:** 25

Home Address **:** Bagumbayan, Pilar, Bohol

Email Address   **:** linojr96tuzon@gmail.com

Religion   **:** UCCP

Citizinship   **:** Filipino

Father's Name **:** Lino C. Tuzon Sr.

Mother's Name **:** Sabeniana L. Cabanig
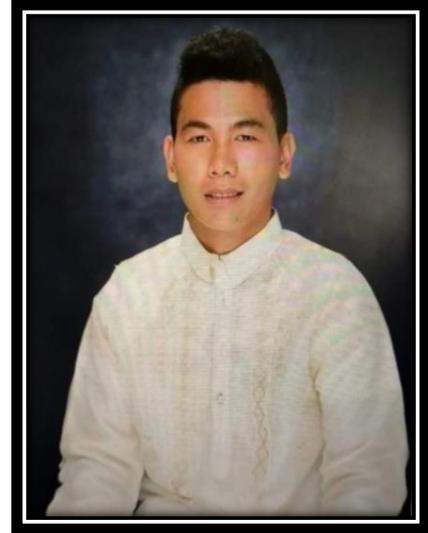
EDUCATIONAL BACKGROUND

Primary   : Bagumbayan Elementary School

                    Bagumbayan, Pilar, Bohol

                    S.Y. 2009-2010

Secondary   : Pilar Technical Vocational High School

                    Poblacion, Pilar, Bohol

                    S.Y. 2014-2015

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                    Zamora, Bilar, Bohol

                    S.Y. 2021-2022

Degree Earned : Bachelor of Science in Computer Science

Work Experience : On the-Job training

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                    Pilar, Bohol

                    August-September 2021

Name   : Jerick C. Angcod

Nickname   : Jake/J/Angs

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Citizinship   : Filipino

Father's Name   : Danny T. Angcod

Mother's Name : Jolie C. Angcod

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Primary   : Estaca Elementary School

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                      S.Y. 2011-2012

Secondary

Junior High School : Pilar Technical Vocational High School

                      Poblacion, Pilar, Bohol

                      S.Y. 2015-2016

Senior High School : Pilar Technical Vocational High School

                      TVL Track- Computer System and Servicing.

                      Poblacion, Pilar, Bohol

                      S.Y. 2017-2018

Tertiary   : Bohol Island State University- Bilar Campus

                      Zamora, Bilar, Bohol

                      S.Y. 2021-2022

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                      Pilar, Bohol

                      August-September 2021