RELATIONAL DATABASE MANAGEMENT SYSTEM OF RICE PLEDGING GOVERNANCE

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RELATIONAL DATABASE MANAGEMENT SYSTEM OF RICE PLEDGING GOVERNANCE

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ABSTRACT

The rice mortgage scheme occurred to help rice farmers to increase their revenues. This project is managed and coordinated with the government by governmental organizations, including the private sector. The Department of Internal Trade provides governance and monitors the work by a database that is integrated with the organizations. In the original system, the officers were assigned to fill the rice mortgage information into the database system. These data were gathered from databases of organizations that were separate. For the filling in of data there may have been errors from individuals, and there may have been data redundancy that made it difficult to monitor and control the rice mortgage. Recently, the Department of Internal Trade has changed the filling in of the data process to use the program for filling in data. However, using the program still has the data redundancy problem because databases of the organizations are still separate. For this reason, we developed the system that is called the "Relational Database Management System of Rice Pledging Governance". This system gathers a database from each organization to a centralized database for creating the relation of the organization's database and near real time data that can help it to make easy monitoring and governance. In addition, the centralized database can reduce data redundancy in the database.

KEY WORDS: DATABASE/ RELATIONAL DATABASE MANAGEMENT SYSTEM/ RICE/ GOVERNANCE

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ระบบเชื่อมโยงข้อมูลกำกับดูแลการรับจำนำข้าว

RELATIONAL DATABASE MANAGEMENT SYSTEM OF RICE PLEDGING GOVERNANCE

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บทคัดย่อ

โครงการรับจำนำข้าวเปลือก เกิดขึ้นจากความต้องการช่วยเหลือเกษตรกรให้มีรายได้ที่ดีขึ้นของคณะรัฐบาล ซึ่งจะมีหน่วยงานต่างๆของภาครัฐและภาคเอกชน เป็นผู้ดำเนินการและประสานงานในโครงการ ได้แก่ กรมการส่งเสริมการเกษตร (สสก.), องค์การคลังสินค้า (อคส.), องค์การตลาดเพื่อเกษตรกร(อ.ต.ก.), ธนาคารเพื่อการเกษตรและสหกรณ์ (ธ.ก.ส.), โรงสี, คลังสินค้า และคณะอนุกรรมการพิจารณาการระบายข้าว (คณะกรรมการนโยบายข้าวแห่งชาติ หรือ กขช.) โดยมีกรมการค้าภายใน กระทรวงพาณิชย์ เป็นผู้กำกับดูแลและตรวจสอบการทำงาน ผ่านทางฐานข้อมูลที่รวบรวมมา ในระบบเดิมนั้น กรมการค้าภายใน กระทรวงพาณิชย์ จะให้เจ้าหน้าที่กรอกข้อมูลที่รวบรวมจากฐานข้อมูลของหน่วยงานต่างๆ ที่แยกออกจากกัน ซึ่งอาจเกิดความผิดพลาดจากบุคคลได้ในระหว่างทำการกรอกข้อมูลและเกิดความซ้ำซ้อนของข้อมูล ทำให้ยากต่อการตรวจสอบและกำกับดูแล ปัจจุบันกรมการค้าภายในได้เปลี่ยนวิธีการกรอกข้อมูล โดยจะทำการกรอกข้อมูล ผ่านโปรแกรมเข้าสู่ระบบฐานข้อมูล ซึ่งยังคงเกิดความซ้ำซ้อนข้อมูล เนื่องจากฐานข้อมูลของแต่ละหน่วยงานยังคงแยกออกจากกัน ด้วยเหตุนี้จึงได้ทำการปรับปรุงระบบใหม่ เรียกว่า “ระบบเชื่อมโยงข้อมูลกำกับดูแลการรับจำนำข้าว” ที่นำฐานข้อมูลของแต่ละหน่วยงานมารวมเป็นฐานข้อมูลกลาง เพื่อให้ฐานข้อมูลของแต่ละหน่วยงานเชื่อมโยงเข้าด้วยกันและได้ข้อมูลใกล้เคียง Real Time ซึ่งทำให้ตรวจสอบและกำกับดูแลได้ง่ายมากขึ้น อีกทั้งสามารถลดความซ้ำซ้อนในการจัดเก็บข้อมูลได้

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CHAPTER I
INTRODUCTION

1.1 Statement of the problems

Rice mortgage scheme is a project initiated specifically to help rice farmers. For this reason, the Department of Internal Trade in collaboration with relevant organizations including the Department of Agriculture Extension, Public Warehouse Organization, Marketing Organization for Farmers, and Bank for Agriculture and Agricultural Co-operatives have commenced database and rice mortgage scheme integration process, including developing a centralized database system to serve the rice mortgage scheme practiced by various organizations by preparing evaluation and analysis reports for executive level, personnel, and other relevant parties. These reports are to be used as reference in determining a policy, work schedule, and to keep track of the rice mortgage scheme efficiently and accurately, which can enhance the efficiency of both inspection and monitoring process.

In the original system, data of the organizations collected in their databases that they have not relation of data between the organizations. The Department of Internal Trade must assign to the officers to fill data of each the organizations to the Department of Internal Trade's database for gather data to monitor and control the rice mortgage scheme. These gathering data had errors and use many times for the filling data of the officers. Including, in the process of the gathering and filling data can edit data that it affects the monitoring, the performance and rightness in the checking process, and the governance of rice mortgage scheme. Later, the Department of Internal Trade changes the filling data process of the original system to fill data by the program into the database for reduce errors and times in the filling data process. But, this program cannot reduce the data redundancy and protect to edit some data what affect the performance of monitoring, governance, and checking backward data in the rice mortgage scheme.

From problems about the data redundancy, editing data, and performance of checking backward data occur in the original and current system, we develop the system for store data of rice mortgage scheme from the organizations to be a centralized database. This system helps to resolve problems in the old system and increase performance of checking some kind of corruption in rice mortgage scheme.

1.2 Objectives

1.2.1 To create a network lining all rice mortgage data collected from relevant organizations and creates a centralized database system for unified evaluation process. This helps to obtain data of the same standard.

1.2.2 To evaluate and analyze the data from central database in order to establish Real-Time online reports, which can be used to efficiently keep track of the rice mortgage scheme.

1.2.3 To develop a centralized database system for reporting the results of the rice mortgage scheme.

1.2.4 To establish a system that promotes transparency of rice mortgage scheme so that rice farmers can truly benefit from the program.

1.3 Framework

1.3.1 Study and Data Analysis

1.3.1.1 To study and analyze standard set of data in connecting all rice mortgage scheme data.

1.3.1.2 To study and determine the method for exchanging information with relevant organizations which include Department of Agriculture Extension, Public Warehouse Organization, Marketing Organization for Farmers, and Bank for Agriculture and Agricultural Co-operatives.

1.3.1.3 To study and analyze the reporting requirements in order to determine an appropriate data analysis and evaluation approach for rice mortgage scheme.

1.3.2 Verification of information

1.3.2.1 To verify agricultural pledging data (wet-season rice 2011/2012, dry-season rice 2012, and production year 2012/2013).

1.3.2.2 To verify the data obtained from Public Warehouse Organization/Marketing Organization for Farmers.

1.3.2.3 To verify and display any information that did not comply with the requirements of the rice mortgage scheme in terms of monitoring farmers, rice mills, and central warehouses.

1.3.2.4 To develop a model system for rice mortgage scheme to help in auditing process and to prevent IT rice mortgage corruptions.

1.4 Expected benefits

1.4.1 The new system can develop to be a prototype for improvement the rice mortgage scheme system.

1.4.2 The new system can help to checking data in for protect some kind of corruption in the rice mortgage scheme.

1.4.3 Can be the guideline for develop the old system that store data in the separated database to a centralized database.

1.4.4 Help to increase the performance and reduce the data redundancy in the storing data process.

1.5 Study phases and timeline

Table 1.1 Study phases and timeline

Phases	May. 56				Jun. 56				Jul. 56				Aug. 56				Sep. 56				Oct. 56				Nov. 56				Dec. 56				Jan. 57			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Initiate	←							→																												
1.1 Study rice mortgage scheme process			←						→																											
1.2 Study and analyze old system							←					→																								
1.3 Study corruption in rice mortgage scheme							←									→																				
1.4 Study to design system													←			→																				
1.5 Study to use Microsoft Access									←											→																
2. Design System																																				
2.1 Design structure of system													←									→														
2.2 Design table in database and relational of database															←							→														
2.3 Define column to check data for corruption																		←				→														
2.4 Design form																		←							→											
3. Implement System																																				
3.1 Implement Database																						←						→								
3.2 Implement form																									←						→					
4. Testing																										←						→				
5. Documentation																																	←			→

CHAPTER II
LITERATURE REVIEW

2.1 Rice Mortgage

2.1.1 Definition

Rice mortgage is a practice when rice farmers takes his cropped yields from the paddy field, either owned by the farmer or rented, to one of the participating rice millers for mortgage. The farmer is expected to pay the mortgage within a specific period (4 months). If the market price is higher than the mortgage price and the farmer has never made any previously mortgage payment, that batch of rice will automatically be transferred to the government. Under the mortgage program, the participating rice miller act as representatives of the government in hold the mortgage and at the same time are hired by the government to mill the collected paddy into rice and deliver the output to the government. Rice farmers are to receive money given by the government through Bank for Agriculture and Agricultural Co-operatives account.

2.1.2 Objectives

2.1.2.1 To offer an alternative marketing channel for rice farmers and to increase their negotiating power regarding the selling of paddy.

2.1.2.2 To raise farmer income, reduce income gap, and encourage higher consumption among farmers.

2.1.2.3 To enhance the country's economic growth by expanding domestic consumption, including strengthening and creating a more stabilized economy by promoting domestic consumption and self-sufficiency.

2.1.3 Rice Mortgage Procedure

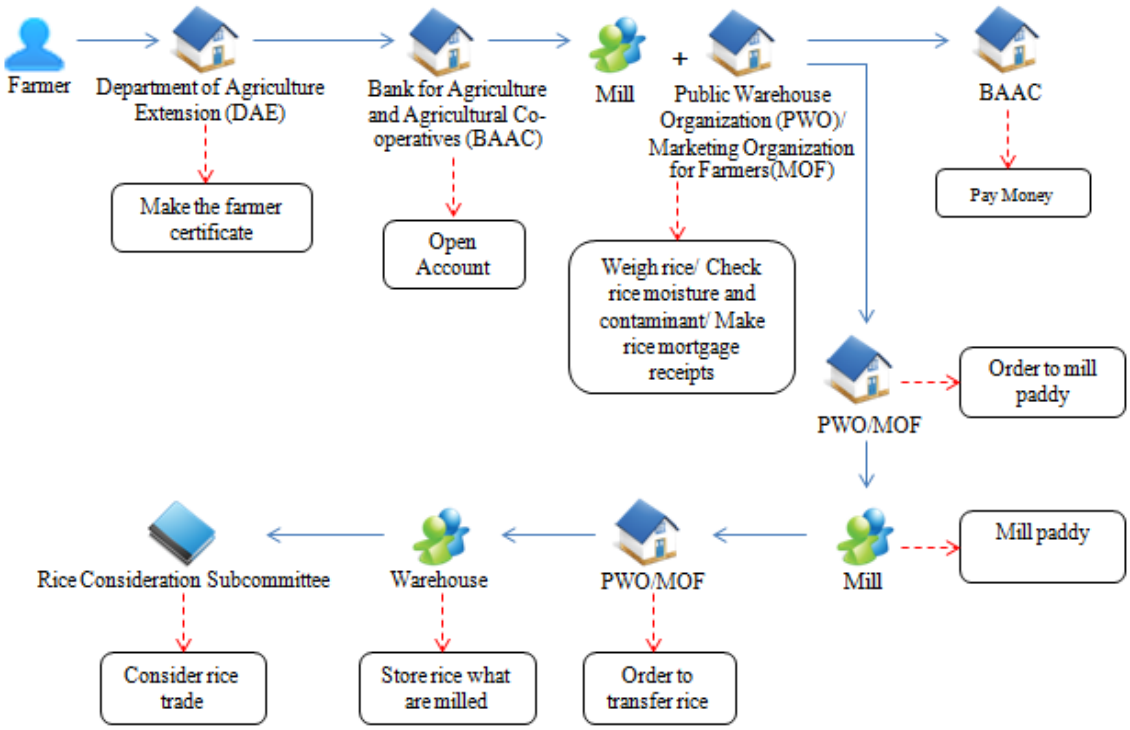

Figure 2.1 Rice Mortgage Procedure

2.1.3.1 Rice Mortgaging

1) Legible rice farmers are allowed to enter rice mortgage program not more than twice/field/person. Each farmer is required to meet the following criteria:

- Must have a Farmer Certification Letter issued by the Department of Agriculture Extension.
- Must be the one growing the paddy and the one to enter the mortgage program. The mortgaging quantity allowed for each farmer shall be determined by the size of the field and the average yield per province based on the information provided by the Office of Agricultural Economics and total yield of the farmer as per stated in Farmer Certification Letter issued by the Department of Agriculture Extension.
- Must hold an account of the Bank for Agriculture and Agricultural Co-operatives.

2) Rice Mortgage Point: rice farmers are only allowed to enter rice mortgage program within their provincial area, with the exception of those living in Tambol (sub-district) which borders between their residency and the mortgage point.

- Cross-province Rice Mortgage was established to help rice farmers who need to enter cross-province rice mortgage beyond bordering Tambol (sub-district) level. This, however, can only be done with an approval of the Provincial Rice Mortgage Sub-Committee who is responsible for monitoring the rice mortgage program within the provincial area of that particular farmer.
- Farm Group Rice Mortgage: Public Warehouse Organization or Marketing Organization for Farmers shall accept rice from Farm Group or farmers group and then issue bai pratuan document (warrant document) to each farmer for entering of contract and receiving money transfer from the Bank for Agriculture and Agricultural Co-operatives. This is to prevent rice mortgage subrogation (the money will be transferred directly to the farmer's account by the bank).
- Cross-mill Rice Mortgage: the Provincial Sub-Committee is responsible for surveying the amount of rice paddy in the market during each period in order to analyze, evaluate, and determine the proper number of rice mills needed for reserving the amount of rice in the market during each period.

3) Mortgaging

- Barn Mortgage: the Bank for Agriculture and Agricultural Co-operatives is the main organization responsible for holding this type of rice mortgage. Here, only Hom Mali paddy and glutinous paddy are accepted for mortgage. The mortgage price is determined by the type of rice entered.
- Bai Pratuan Document Mortgage: either Public Warehouse Organization or Marketing Organization for Farmers will be the one to accept the deposit and issue bai pratuan document for the participating rice millers. The milled rice shall be kept at the central storage or warehouse on a rented by the Public Warehouse Organization or Marketing Organization for Farmers and/or deliver it to the purchasers. The Public Warehouse Organization or Marketing Organization for Farmers must ensure that the issued bai pratuan document of the merchandise

matches the facts provided by the farmer by specifying the type of rice, quantity of rice, rice moisture contents, contaminants contents, and measurement of rice in gram (applicable only with Hom Mali paddy, Hom Chang Wat paddy, and Pathumthani 1 paddy).

4) Rice Mills Participating in the Rice Mortgage Scheme

- Each rice miller is required to have weighing apparatus for trucks, including at least two rice moisture meters, adequate paddy quality assurance apparatus, an oven for reducing moisture or a drying area, and rice reserve within the vicinity of the rice mill. Also, there should be no outstanding debt/payment due to any previous programs joined by the rice mill.
- In the case of Agricultural Co-operative rice mills, the rice mill must be able to provide rice moisture reduction and rice milling service. Most importantly, the rice mill must be certified by the Department of Agricultural Extension and guaranteed by a complete quorum of Co-operative Committee.

5) Requirements for the Participating Rice Mills

- Participating rice mills must first receive permission from the Provincial Sub-Committee and then notify either the Public Warehouse Organization or Marketing Organization for Farmers in seeking an approval. Then, the Public Warehouse Organization or Marketing Organization for Farmers shall notify the Secretary of National Rice Policy Committee immediately afterwards.
- Participating rice mills shall accept mortgaged rice in an amount not exceeding 50 times the yield capacity, unless an exemption has been made by the National Rice Policy Committee.
- Participating rice mills shall accept paddy from farmers in compliance with the following: Weighing of rice must comply with the Weights and Measures Act B. E. 2542 (1999) - All weighing data must be properly documented and daily updated and ready to be audited at any time., Measure paddy moisture contents using Moisture Meter provided by the farmer and conduct random testing in order to determine three average values., Rice contaminants inspection must

comply with the determined criteria and correspond with the facts - Any paddy with contaminants contents exceeding 2 percent will not be accepted and no weight deduction is allowed., Rice gram quality inspection of Hom Mali paddy, Hom Chang Wat paddy, Pathumthani 1 paddy, and glutinous paddy must be done by measuring the weight of paddy after excluding contaminants and then test the paddy until completing 100 g/200 g before determining gram value of rice.

- Participating rice mills or mortgage points must accept every type of paddy entered based on the criteria or as per the resolution of the Rice Mortgage Monitoring Sub-Committee.
- Regarding mortgage security, two choices are allowed for the participating rice mills: 50% mortgage security or 30% mortgage security with cross-guarantee from other two rice mills, making a total of 20%. In the case of cross-mill rice mortgage, the participating rice mills are required to give 100% mortgage security.
- The participating rice mills must notify either the Public Warehouse Organization or Marketing Organization for Farmers of their rice reserves before entering the program.
- The participating rice mills are prohibited from accepting any paddy from farmers before bai pratuan document has been issued by either the Public Warehouse Organization or Marketing Organization for Farmers.
- The participating rice mills are not allowed to transfer the reserved rice belonging to either Public Warehouse Organization or Marketing Organization for Farmers to any other location outside their vicinity, which has been registered in the system of a provincial area.
- The participating rice mills are allowed to mill the mortgaged paddy only by the order of either the Public Warehouse Organization or Marketing Organization for Farmers and are responsible for delivering the milled rice within the fixed period.
- The participating rice mills are responsible for storing, caring, and ensuring the quality of the mortgaged paddy.
- The participating rice mills are not allowed to accept any paddy from farmers outside the mortgage point. Also, no officials of either

Public Warehouse Organization or Marketing Organization for Farmers are allowed to bai pratuan document to farmers beyond the mortgage point of the rice mill.

- The participating rice mills are strictly prohibited from entering any non-milled rice from the mortgaged paddy or milled rice from other rice mills for storage within the warehouse of either Public Warehouse Organization or Marketing Organization for Farmers and/or deliver it to the purchasers.

- The participating rice mills must provide computers for online recording and reporting of rice mortgage data and submit the information via online daily to the Department of Internal Trade as well as the Secretary of Provincial Sub-Committee (Provincial Internal Trade Office), including the Public Warehouse Organization and Marketing Organization for Farmers.

2.1.3.2 Rice Milling and Transferring

1) Participating rice mills are required to mill the reserved paddy as follows:

- Mill non-glutinous paddy every seven days at a rate of 100 percent of the mortgaged paddy starting from the day on which milling permission has been issued.

- Rice milling process shall be according to the resolution issued by the Rice Mortgage Monitoring Sub-Committee as they see fit under the current circumstances.

2) Transferring of milled rice: Rice mills must transfer all milled rice into central warehouses rented by the Public Warehouse Organization or Marketing Organization for Farmers and/or the purchasers for storage at the determined quantity and within the determined period of time.

3) Rice Milling and Delivery Sub-Committee is responsible for monitoring the milling process of mortgaged paddy as well as the transferring of milled rice from each mill to the central warehouse.

2.1.3.3 Rice Storage

1) All milled rice from mortgaged paddy must be stored at central warehouses rented by either the Public Warehouse Organization or Marketing Organization for Farmers. Both organizations are responsible for ensuring the quantity, type, and quality of the reserved rice until it is delivered to the purchasers.

2) Public Warehouse Organization or Marketing Organization for Farmers must provide and open sufficient number of central warehouses for reserving the mortgaged rice, including immediately notifying the Secretary of the National Rice Policy Committee to allow a timely monitoring, inspection, and prevention of rice mortgage corruptions.

3) Public Warehouse Organization or Marketing Organization for Farmers is responsible for reporting rice delivery data updates for both Provincial Sub-Committee and the Secretary of the National Rice Policy Committee for weekly monitoring until the reserved rice is delivered to the purchasers or the receiving person.

4) Public Warehouse Organization or Marketing Organization for Farmers is responsible for finding a Rice Quality Assurance Company with standardized rice fumigation process and at least three years of experience in the business. This excludes companies engaged in rice quality inspection business.

5) Provincial Sub-Committee or Public Warehouse Organization or Marketing Organization for Farmers must provide sufficient number of central warehouses for the mortgaged rice, including adequate number of staffs allocated at each central warehouse for maintaining proper rice transfer and storage.

2.1.3.4 Release of Mortgaged Rice

Rice release Sub-Committee is responsible for determining the requirements, quantity, price, method, and conditions applied for release of milled rice from the stock stored at central warehouses, including other remaining paddy and rice belonging to the government.

2.1.3.5 Mortgaged Rice Monitoring

1) Provincial Sub-Committee or Public Warehouse Organization or Marketing Organization for Farmers must provide sufficient number of mortgage points and central storage points to meet the farmers' demands, including planning an efficient inspection system for the rice mortgage scheme by clearly allocating the staffs at each specific area in order to ensure fair and equal treatment of farmers as well as preventing potential leakage.

2) Provincial Sub-Committee, Bank of Agriculture and Agricultural Co-operatives, and Department of Agricultural Extension in local level are the ones to elect a representative among the farmers, including the staffs to be allocated at each mortgage point. This is to ensure that rice farmers can truly benefit from the program. Each allocated staffs at the mortgage points must be able to help farmers in solving issues regarding rice mortgage.

3) Sub-Committee for system monitoring as well as ensuring fair treatment of farmers at each mortgage point comprises of the Department of Internal Trade, Ministry of Agriculture and Cooperatives, Bank of Agriculture and Agricultural Co-operatives, Public Warehouse Organization, and Marketing Organization for Farmers. The purpose of this Sub-Committee is to conduct random inspection of staff performance at each mortgage point.

4) Regional Division: Provincial Sub-Committee in collaboration with the Ministry of Interior, Ministry of Agriculture and Cooperatives, and Ministry of Commerce are responsible for planning the mortgaging system, public relation, arranging meetings regarding the progression of rice mortgage scheme, issuing certification letter for farmers, monitoring and certifying rice mills and warehouses, holding rice mill mortgaging, allocating bai pratuan document for each participating rice mill within a provincial area, inspecting central warehouses before making rice transfer, inspecting the rice stock reserved at each central warehouse, and releasing paddy.

5) Central Division: The secretary of the National Rice Policy Committee is responsible for notifying every resolution issued by the Committee, including determining practice approach, monitoring and coordinating with organizations relevant to the bordering provinces in order to prevent the use of

imported paddy from entering the mortgage program, determining the requirements for rice mortgage scheme, and measuring rice moisture and contaminants contents in order to ensure fair and equal treatment of farmers.

6) The Ministry of Interior is responsible for monitoring the performance of Provincial Sub-Committee.

7) Ministry of Agriculture and Cooperatives is responsible for monitoring the issuance of Farmer Certification Letter.

8) Special team or operation agency, which comprises of relevant organizations and police officers, is responsible for coordinating and auditing the government's rice mortgage scheme.

2.1.4 Advantages and Disadvantages of Rice Mortgage Scheme

2.1.4.1 Advantages – Farmer's income can effectively be raised in two following ways:

1) Participating farmers can benefit from the difference between the mortgage price and the market price.

2) Non-participating farmers with oversupply of rice in the market can sell their produce at higher price due to the centralized rice storage policy.

2.1.4.2 Disadvantages

1) Farmers directly benefited from the rice mortgage program are mostly from upper and middle classes. Poor farmers, which are the remaining majority, received only minimal benefit from the program. This is either because the latter group of farmers tends to reserve their yields for household consumption or there are no remaining yields to be sold.

2) Implementation of rice mortgage scheme requires a large amount of tax money collected from the citizens for distortion of rice market. Apart from having to pay higher price in purchasing the mortgaged rice compared to the market price, there are also expenses required for hiring rice mills for milling the mortgaged paddy, including warehouse rental expenses, rice maintenance expenses, surveyor expenses for inspecting the quantity as well as quality of rice,

expenses needed for state officials in implementing the policy, and losses due to selling of rice.

3) Rice mortgage scheme causes extensive leakage as well as losses. Firstly, the money for purchasing farmer's rice has partially leaked to the neighboring rice mills and farmers due to smuggling of imported rice and subrogation. Another cause of leakage is due to corruptions committed by relevant parties.

4) Rice mortgage scheme causes extensive damage. By this, it means that mortgaged rice was stored at the warehouses for too long, causing degrading rice quality. As a result, Thailand has lost its market in rice exports. Another cause of damage is due to the fact that most farmers, rice mills, and warehouses are mainly seeking profit from the program. In addition, the competitive rice trade system in the private sector has been destroyed and taken over by government rice trade system.

2.1.5 Rice Mortgage Corruptions

2.1.5.1 Buying of votes

Rice farmers gave their Farmer Certification Letter to middlemen or rice millers.

2.1.5.2 Accounting fraud

The Bank of Agriculture and Agricultural Co-operatives made some adjustments of the actual payment figures in the database system.

2.1.5.3 Subrogation

Rice farmers were registered in the mortgage program, but did not actually do the farming. Instead, they used poor quality rice to enter the program.

2.1.5.4 Excessive deduction of rice moisture and contaminants contents (%)

Rice millers raised the standard for moisture and contaminants measurement so that the quality of entered rice is lowered than its actual quality in order to profit from higher mortgage price.

2.1.5.5 Faking Rice Weight Certificate

Rice millers or middlemen issued fake weight measurement certificates so that they can profit from the difference.

2.1.5.6 Mixing poor quality rice with good quality rice

Poor quality rice was mixed with good quality rice and used for entering the mortgage program.

2.1.5.7 Smuggling of rice from stock

Rice weight was faked in order to be able to sell some rice from the stock.

2.1.5.8 Replacement of good quality rice

Poor quality rice was used to replace high quality rice.

2.1.5.9 No actual exportation of rice

Mortgaged rice was released from central warehouses in order to be used in pledging again.

2.2 System Planning

2.2.1 Definition of System

System means all processes within the same network that are interconnected in order to perform a determined task or goal successfully. Or, it could mean a group of elements that work together as a whole for the same objective.

2.2.1.1 Characteristics of System

1) It is a compiling of one or more relating items until forming a single unit to serve the same objective.

2) Its function constitutes of several smaller systems or functions that are incorporated together to support one another in performing a certain task to achieve a common or identical benefit or objective.

3) Each function of a system must be connected and coordinated with one another to achieve common or identical objective.

4) A system can be categorized into different types as the categorizing person sees fit such as opened system, closed system, and machinery system.

2.2.1.2 A system comprises of four following elements:

1) Input means data or data system for logging into a system. This can be used for ICT system for management or decision-making.

2) Processing includes all operational procedure, which can be divided into

3) Output means outcome or results of each operation.

4) Feedback means reversed data or effect of each operation.

2.2.2 System Development Life Cycle (SDLC)

2.2.2.1 System Development Life Cycle for general system can be divided into four following stages:

1) System Analysis

This stage involves a study of the existing system, problems of the existing system, business needs and requirements, including evaluation of various events in order to find appropriate solutions to the problems.

2) System Design and Planning

It is a stage following System Analysis in which System Analyst is required to plan the structure of the system in overall and in specific details, including clearly defining the details of each operational task or sub-systems of the planned system. After this is completed, a programmer will create software for real life operation based on the system design.

3) System Installation for Business or Users

In this stage, the system is installed for its users. In order to ensure that the system is fully operational based on the determined objective, system testing must be conducted together with education and training so that users can utilize the system efficiently and accurately.

4) Supports Implementation after System Installation

This stage involves having System Analyst providing advice for users regarding the use of the newly installed system, which users

may not yet be familiarized with. This is to help users in operating the system. System Analyst is also required to assist users in case there are any additional requirements or changes occurred after the installation. This is usually pertaining to system maintenance and improvement. Once needs and requirements have been changed and the existing system is in need of improvement, System Analyst must repeat the entire cycle starting from stage 1 again. This life cycle is to be repeated every time changes occurred in the system.

2.2.2.2 System Development Life Cycle for ICT system has been developed. This particular System Development Life Cycle is different from the one applied for general system in terms of system development which comprises of the following 7 stages as follows:

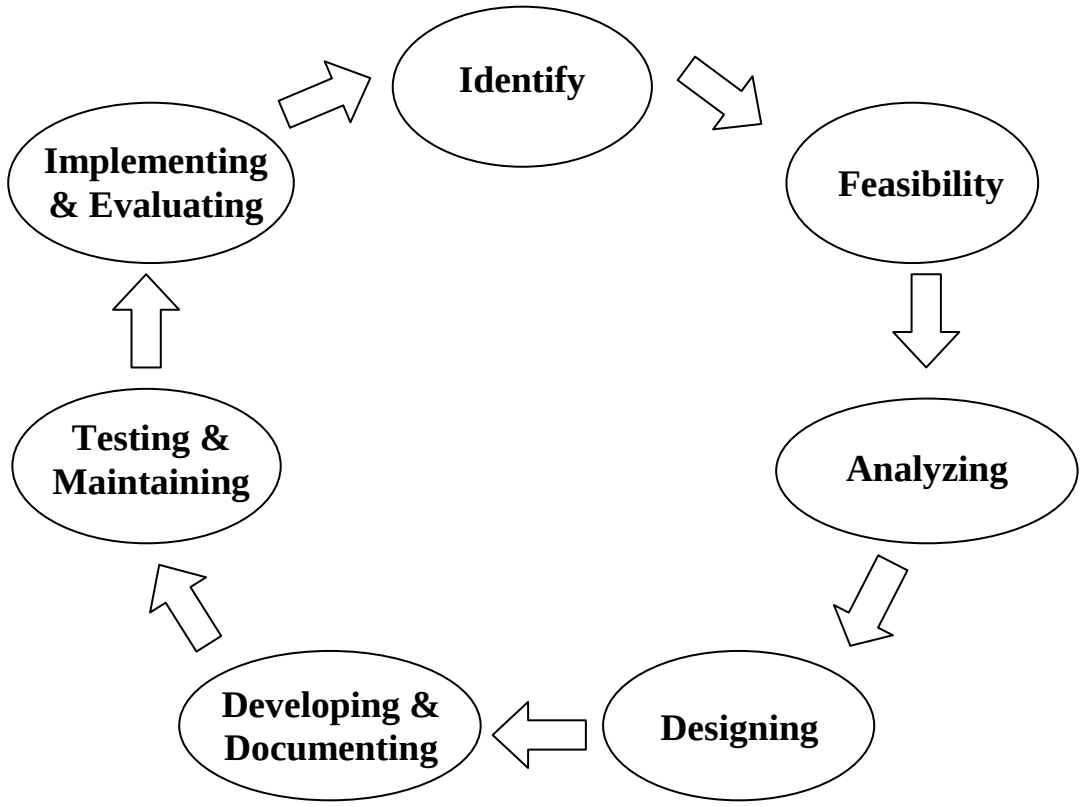

Figure 2.2 Different stages of System Development Life Cycle

1) Identifying

An ICT system can only be established when the executive level or users realized that such system is needed or system improvement is needed. This stage can be conducted by the following steps:

- System Analyst and Designer must thoroughly study the system in order to understand the problems arising within the organization.
- Try to find an opportunity to fix or improve the procedure through a computerized system.
- System Analyst and Designer must clearly identify the objective in order to be able to guide the system into the direction that meets the requirement of the determined objective.

2) Feasibility

- First, identify the problems. Then, decide whether to develop a new ICT system or rectify the existing system. Weigh the possibility by putting minimal cost and time into account.
- System Analyst and Designer must be able to determine the technical possibility of the solution, including personnel and economic possibilities.

3) Analyzing

- Begin from studying the operation of the current business.
- Determine the needs of the new system
- Apparatus: Data Dictionary, DFD, Process Specification, Data Model, Prototype
- Personnel and Role: user's cooperation is needed.
- System Analyst and Designer must study all existing files and documents, including the existing system in order to understand its functions.
- System Analyst and Designer prepare a report for new system needs.
- System Analyst and Designer draw DFD for the existing and the new systems.
- System Analyst and Designer create a Prototype.

4) Designing

- Design a new system to match the needs or requirements of users and the executive level.
- Personnel and Role: System Analyst and Designer decide which hardware and software to be used; including designing data screen display as well as the database system, and determine the number of personnel required in the system.

5) Developing and Documenting

- Create software, prepare Operation Manual for the software, and train all relevant persons.
- Personnel and Role: System Analyst and Designer prepare a location for installation and install computers. System Analyst and Designer plan the system and monitor the development of software. Programmers are responsible for developing the software. System Analyst and Designer are responsible for the preparation of Operation Manual for the software and staffs training.

6) Testing and Maintaining

- System Analyst and Designer and software testing team
- Users check whether the software is functioning as needed.
- In case of any errors, rectify the problems.
- If the system did not function as required after testing, system improvement may be needed.
- System maintenance: this mainly involves system improvement after use.

7) Implementing and Evaluating

- Install the system.
- Replace the existing system with a new one.
- Use the new system together with the former one for a certain period of time and see if the result matches. If the performance of the new system is acceptable, it can be used to entirely replace the former system.

- System Analyst and Designer evaluate the system in order to determine user's satisfaction, identify areas needed for improvement or any problems occurred.

2.2.3 Procedure and Methods for Analyzing and Designing System

Before analyzing and designing a system, procedure and methods required for analysis and designing must first be realized. This means conducting existing system analysis for problem finding, problem definition, and problem solving. Each procedure constitutes of various methods which can be applied in analyzing and designing a system, depending on the judgment of System Analyst as he sees appropriate.

2.2.3.1 Finding Problems of the Existing System

To determine whether there is any problem with the existing organizational system, System Analyst must first differentiate between actual problems and problems based on the observation of personnel of that organization. System analysts must have keen judgment in differentiating between the two types of problems and understand the true problems and its effects.

2.2.3.2 Planning for Studying of Problems

After System Analyst has found the root cause of the problem, problem definition can be implemented. There are three important steps to carry out as a fundamental basis for future planning including:

1) Identifying Subject of the Problem

This step is considered as the heart of Problem Definition. System Analyst can only gain true understanding of the problem only when he/she can differentiate symptoms of the problem from the actual problem itself. However, for new and inexperience System Analysts or even system analysis students, clearly identifying subject of the problem can be a difficult task for achieving a good understanding of the problem. Thus, extreme caution is highly needed in this procedure since it the starting point of the entire study of the system.

2) Identifying scope of the problem

Scope of problem needed to be determined after the subject of the problem has been identified. This includes identifying the starting

and ending points of study. System Analyst must specifically determine which organizational division is going to be studied or which personnel group is going to be interviewed or studied. This helps to scope down the framework of study. Moreover, System Analyst may encounter cost, time, and even organizational characteristics limitations. Thus, identifying scope of the problem can be helpful in analyzing the system.

3) Identifying objectives of study

The objectives must not be too complicated or having too much limitations. Also, the identified objectives must display results that can be measured by numbers or physically visible so that the management level of the organization or businessmen hiring the System Analyst and Designer can decide whether the system performance meets the required objectives or not.

2.2.3.3 Study the Effect of the System

Since a system has been developed and the study of problems, needs, and feasibility of the system has already been included in System Analysis stage, finding scope as well as effect of the system must be done simultaneously in the same stage. The study of system effect can be divided into two sections: “Who will be affected?” and “What are the effects?”

System Analyst must be able to determine who will be affected by the developed system and in which business position. This is because sometimes a newly developed system may cause some positions to become an unnecessary position in the system, resulting in either transferring of position or removal of that position. This can lead to a tremendous damage. System Analyst must therefore coordinate or keep constant communication with the management level until all problems are solved.

2.2.3.4 Reporting Subject of the Problem

This is a brief report describing the progress of initial study of system analysis, including identifying the main subject of the system. In this report, System Analyst must provide a clear explanation regarding the problems found. If, however, this cannot be done, it may cause the person hiring the Analyst or the executives to question the competency of that particular Analyst.

Normally, it is the executive who will judge or evaluate the performance of a System Analyst according to his level of satisfaction in the output of system analysis. If the System Analyst shows a lack of confidence in their performance, there is a high tendency that the executive will anticipate that the output given by that Analyst is probably incorrect or a failure. Thus, reporting subject of the problem is highly significant as it provides a clear explanation to the person hiring the Analyst or the executive so that they can understand the new image of the system and expect potential changes in their business concepts.

2.2.3.5 Drawing of Schedule Chart

During the stage of system planning and analysis, System Development Life Cycle (SDLC) is created to display an overview of system analysis study. The planned schedule is subjected to changes at any period of time. It is, however, only a brief guide for System Analyst in determining which procedure or task comes first or after. Thus, before drawing a schedule chart, the System Analyst must first truly understand the existing problems, or rather understanding the problem definition. In addition, System Analyst must conduct Feasibility Study on the system to be able to determine successful possibility of the system and use the data collected from this study in preparing work plan and schedule. There are various ways to draw up a schedule and one of the most widely used methods is using Gantt Chart.

2.2.3.6 Suitability Study

This study is part of initial analysis conducted to help in deciding whether to improve the efficiency of the existing system or to develop an entirely new system. This study is done during the stage in which System Analyst is required to understand the current working environment such as entirely replacing the existing system with a new one and have users of the existing system evaluate whether the new system is suitable for not. Or, partially replace the existing system with a new one under a condition that the replaced segment must be a heavy duty segment. The prescribed suitability evaluation is highly essential since transforming of existing system into a computerized system without creating an understanding with the current users may bring failure upon System Analyst. Suitability Study comprises of the following procedure:

1) Interview

This interview involves questioning factual information regarding the existing problems or user's requirements who wants to see changes or improvement of the existing system. It is the responsibility of System Analyst to identify the problems as well as its root causes. This, however, can be quite complicated since pressure upon users in demanding of answers can lead to conflicts. Nevertheless, this can be avoided by conducting an observation of the existing environment instead of conducting direct interview on each individual user. System Analyst must also try to gain trust from users who are within the scope of study by making them see his honest intention of wanting to help improving the system and not to detect any defects or mistakes. An interview should begin from upper hierarchy of an organization which is the executive level, followed by Assistant Manager, and so on.

2) Study from documented data and reports

This is relevant to the subject of study in terms of whether the items within the scope of study contain any documents or collected data, including how those documents were compiled and by whom.

3) Study of System Implementation

This can be conducted by studying the Operation Manual or any other relevant documents. This method can efficiently reduce the time length required for individual interview. These documents can be accessed by requesting permission from the executive during interviewing stage.

4) Draw Data Flow Diagram or System Flow Chart

This diagram displays the work flow to help us better understand the subject of study. Data Flow Diagram (DFD) shows the overall work flow of the existing system.

5) Revision of subject, scope, and objective

A revision is needed since sometimes new problems that were not mentioned in Problem Definition can be found after Feasibility Study was conducted. It is therefore crucial for system analyst to review the identified subject, scope, and objective, including conclusions which is going be proposed to the executive level of an organization. This is to confirm that the System Analyst truly

understands the problems at this stage of the process. Otherwise, it may leave the executives questioning or doubting the advice given by the System Analyst.

6) Arrange meetings between relevant persons including the executive level

In this stage, System Analyst must present his/her knowledge gained from the study, including briefly give conclusion and suggestion regarding the solutions, method, time, cost, and benefits by persuading all relevant parties to see the needs of adjustment or improvement of system as previously proposed. This stage is considered the utmost important procedure since approval from the executive level is necessary. In addition, all relevant persons must be informed immediately in case of any changes occurred during system planning and development stage.

7) After an approval has been granted, a concluding report for system development in terms of cost, expenses, time, and resources must be prepared.

This involves purchasing computer hardware and software, which will be proposed to the executives afterwards. This is considered as the last procedure of Feasibility Study.

2.2.3.7 Feasibility Study Report

Feasibility Study Report is a document submitted to the executive level for providing explanation of the existing problems and its causes.

In this report, solutions to the problems are also included as well as other advice needed. The contents of Feasibility Study Report comprise of the following:

1) Clear identification and description of the problems by System Analyst.

2) Description of the scope of problem and initial solutions.

3) Report of Suitability Study results – this is to show the possibility in each aspect such as the objective possibility, economic possibility, and system operational possibility.

4) Description of organizations that are highly relevant to the system, including how these organizations relate to the problems.

5) Explanation of the overall system by describing both the existing system and the new system that will be used to rectify the problems found in the existing system.

6) Comparison details between costs and benefits.

7) The report must also include suggestions or advice and reasons.

8) Suggestions for system planning and development schedule, including identifying all significant check points on the schedule for each procedure.

9) Appendix section of this report must include all figures, diagrams, and outlines that have not been included in the report.

2.2.3.8 Understanding of the Existing System

Another main challenge that a System Analyst must come across is not system development or system structural analysis, but how to incorporate the analyzed items with the needs and requirements of a business system for improvement. This is why it is necessary for System Analyst to thoroughly understand the entire existing system before developing a new one. The main goal of this stage is to really understand how the existing system operates.

2.2.3.9 Identifying the Requirements of the New System

This is actually a starting point for designing a new system. In this stage, information from previous studies is gathered including problem definition, feasibility study, and understanding existing system by compiling input, output, operational procedure, and available resources together. This is to meet the current as well as future needs and requirements of an organization.

2.2.3.10 Designing of New System

This is a preparation stage before drawing up the procedure or diagram to explain the objective or goal of the system. In order to design a new system, basic information must be collected from previous stages of the study. In conclusion, the designing of a new system must comprise of the following: Clear

subject of the problem, Diagram and details of different elements of the existing system, Needs and requirements of the new system.

System design involves connecting all activities and processes within an organization together with equipment and technology in order to accomplish the determined organizational goal or objective. It is the responsibility of System Analyst to select these elements for the new system.

1) Designing of Report Forms

Most of the new report forms are the ones that have just been implemented. Before designing any report forms, objectives of that form must clearly be understood first. The objectives of designing a report form include:

- Simple and can be applied efficiently
- Able to easily add additional information either by writing or typing
- Easy to read and understand, uncomplicated, and time saving

2) Procedure Writing

This is another important element of a system because Procedure Writing helps to explain all system functions in details. There are four fundamental reasons why Procedure Writing is required:

- To record organizational procedure from the past until present. Here, strengths and weaknesses of the procedure can be identified. Also, it helps to reduce cost in system audit as well as helps to prevent repetition of errors that have already occurred.
- It allows easier training and educating for new users and at the same time helps the current users to have a better understanding of the new system. What's more, is can help to create a more standardized and professional performance and allows users to better understand the existing system.
- Procedure Writing can help us visualize an overview of the entire system as well as understanding the responsibility assigned to each user, which allows the executive level to be able to inspect and evaluate operational performance.

- Procedure Writing can be used to check the efficiency of system performance.

3) Designing of data files and database

Data files or database is where all system data is collected to allow easy access when those data or information is needed. In other words, data files are files containing data that can be easily accessed from different subsystems. System Analyst must not only analyze the system but also conduct system maintenance, and adjustment or rectification regarding the data files and database of the system. Here, limited data of standard files must be put into account in order to find the best output of how the data files or database should be designed.

Every computerized system today requires a timely and easily access of information. System Analyst must therefore try to deign a database that is not only convenient to access but also with less data complexity. This is to reduce maintenance complications of the database. Today, database has become more widely used in replacement of standard files. Nevertheless, for a database to be used efficiently, its design must be compatible with the computer system it is incorporated in terms of hardware and software. For example, the computer must have sufficient memory and the computer must have Database Management system (DBMS) as a medium linking between the computer system and the database.

2.2.3.11 Revision of the Designed Procedure

After the designing process of the procedure is completed, System Analyst must review the entire design and then prepare a report as well as presentation for the executives and system users.

CHAPTER III
DESIGN OF SYSTEM

3.1 Stakeholder

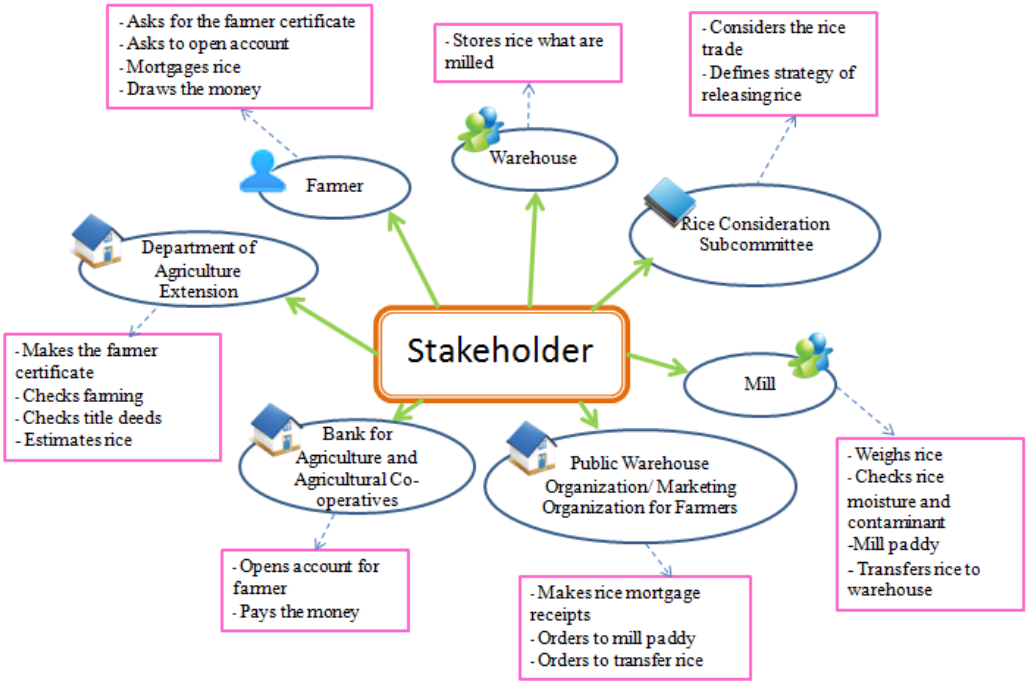

Figure 3.1 Stakeholder Diagram

Group of person and organization relate with rice mortgage scheme. Including:

3.1.1 Farmers are the persons who get advantages of rice mortgage scheme. They have the following roles:

3.1.1.1 Ask for the farmer certificate from the Department of Agriculture Extension.

3.1.1.2 Ask to open the account with Bank for Agriculture and Agricultural Co-operatives for drawing the money after the farmer mortgages rice.

3.1.1.3 Mortgage rice with Public Warehouse Organization or Marketing Organization for Farmers.

3.1.1.4 Draw the money that refers from the rice mortgage receipt with Bank for Agriculture and Agricultural Co-operatives.

3.1.2 The Department of Agriculture Extension has the following roles:

3.1.2.1 Make the farmer certificate to farmer in rice mortgage scheme for use as the evidence in rice mortgage.

3.1.2.2 Check the farmer's farming that is right or not.

3.1.2.3 Check the rightness of using the land for farming that follows the title deed from the Department of Lands.

3.1.2.4 Estimate the farmer's rice by calculating from average of rice value of each year for consideration and checking the farmer's rice mortgage.

3.1.3 Bank for Agriculture and Agricultural Co-operatives has the following roles:

3.1.3.1 Open the account for the farmer in the rice mortgage scheme.

3.1.3.2 Pay the money to the farmer.

3.1.4 Public Warehouse Organization and Marketing Organization for Farmers have the following roles:

3.1.4.1 Make the rice mortgage receipt to the farmer for use as the evidence in the rice mortgage.

3.1.4.2 Order to mill paddy to the Mill. This ordering is defined the quantity of paddy and estimated rice that is milled.

3.1.4.3 Order to transfer rice to the Mill that transfers rice to Warehouse.

3.1.5 Mills have the following roles:

3.1.5.1 Weigh rice, check rice moisture and contaminant in rice. The Mill, the Public Warehouse Organization and the Marketing Organization for Farmers collaborate in this role.

3.1.5.2 Mill paddy to rice that follows the order of the Public Warehouse Organization and the Marketing Organization for Farmer.

3.1.5.3 Transfer rice to Warehouse where the Public Warehouse Organization or the Marketing Organization for Farmer rents.

3.1.6 Warehouses have the following roles:

Store and preserve rice.

3.1.7 Rice Consideration Subcommittee (National Rice Policy Committee) has the following roles:

Plan and define the strategy to release rice from Warehouse for getting the maximum profit.

3.2 Corruption in the rice mortgage scheme

Corruption in the rice mortgage scheme has many method (refer from chapter 2). So, we say some methods that are prevented by using the process of information technology. It is the relational of data of each organization in rice mortgage scheme that is following Figure 3.2.

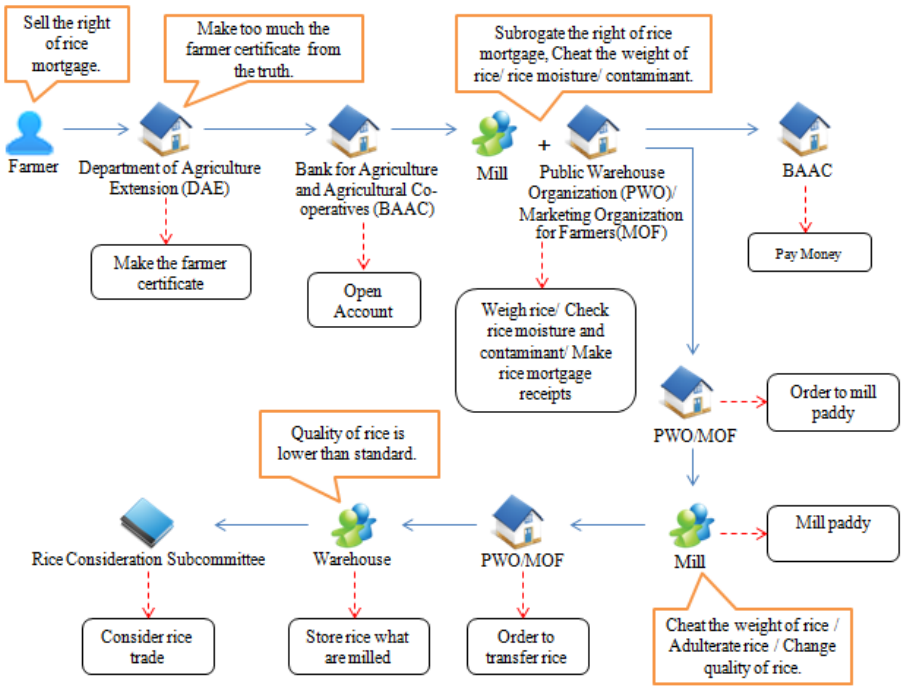

Figure 3.2 Corruption in the rice mortgage scheme procedure

3.2.1 The right of rice mortgage and the farmer certificate

3.2.1.1 Sell the right of rice mortgage.

- The farmer sells the farmer certificate and allows others to use this certificate.
- The mill buys the right of rice mortgage from the farmer
- The trader integrates the right of rice mortgage from farmers for sell to the Mill.

3.2.1.2 Make too much the farmer certificate from the truth.

- Sell to the mill for subrogate the right of rice mortgage.
- The farmer mortgages rice too much or take rice from another place.
- Use the right of rice mortgage to duplicates.
- Change types of rice.

3.2.1.3 Subrogate the right of rice mortgage.

- Have the farmer certificate but do not farming. And, take low quality rice to mortgage to the rice mortgage scheme.
- Take low quality rice from another place to replace high quality rice.
- Calculating rice yield per Rai is more than the farming. As a result, the farmer can take rice from another place to increase quantity of rice to equal quantity of rice in the farmer certificate.

3.2.2 Quality of rice

3.2.2.1 Subtract % of rice moisture and contaminant too much.

- The mill checks rice moisture and contaminant in rice that is low quality rice for selling at higher prices to the rice mortgage scheme.
- The mill takes rice from another place to subrogate the farmer's rice.
- Lower the price of rice that the farmer mortgage.

3.2.2.2 Cheat the weight of rice.

- The mill counterfeits the weighing document for the difference paid.
- Lower the price of rice that the farmer mortgage.

3.2.2.3 Adulterate rice.

- Mix low and high quality rice to mortgage in rice mortgage scheme.
- Change types of rice that the farmer mortgages.

3.2.2.4 Quality of rice is lower than standard.

- Take rice from another place to replace rice that is mortgaged.
- The storage rice is not in standard.

3.3 Workflow

3.3.1 Original System

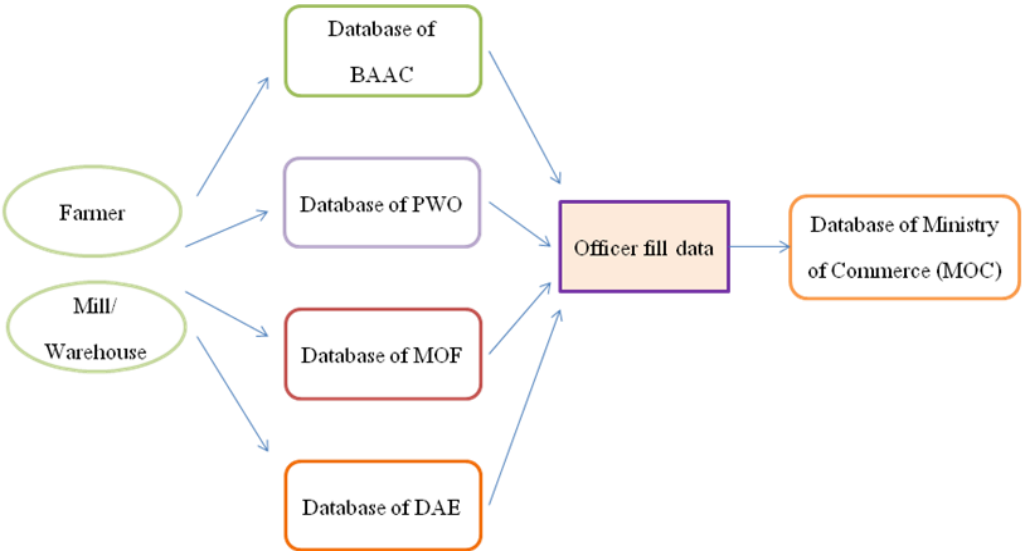

Figure 3.3 Original System Workflow

In this system, Database of each organization is separated. So, the officer must fill data of each organization to database of the Department of Internal Trade, Ministry of Commerce that has the role to check the work of organizations in the rice mortgage scheme. These filling data affects to be different and duplicate data, and occurs errors from the person.

3.3.2 Current System

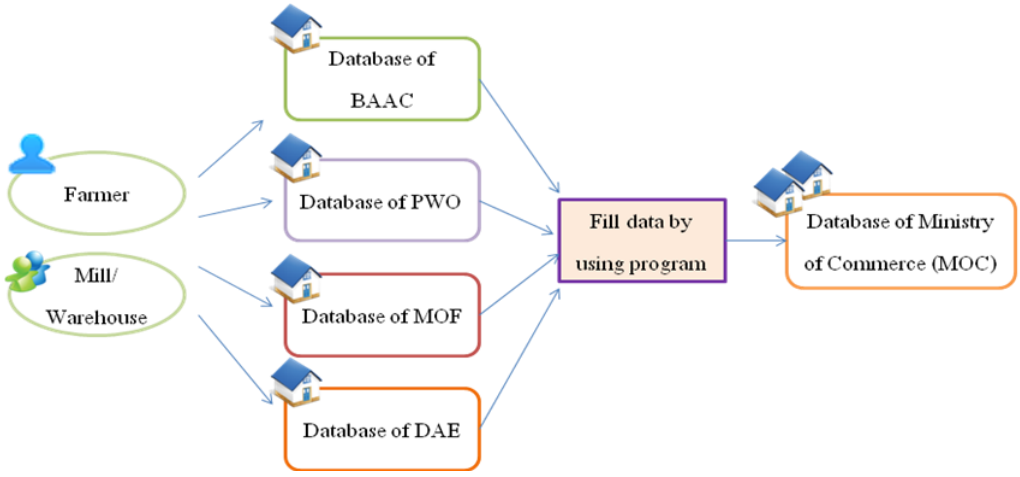

Figure 3.4 Current System Workflow

This system is used at the present. It is changed from the officer fills data to use the program to fill data into database of the Department of Internal Trade, Ministry of Commerce. Disadvantage of this system is database of each organization to be separated that data are not linked and checked backward too hard.

3.3.3 New System (Relational Database Management System of Rice Pledging Governance)

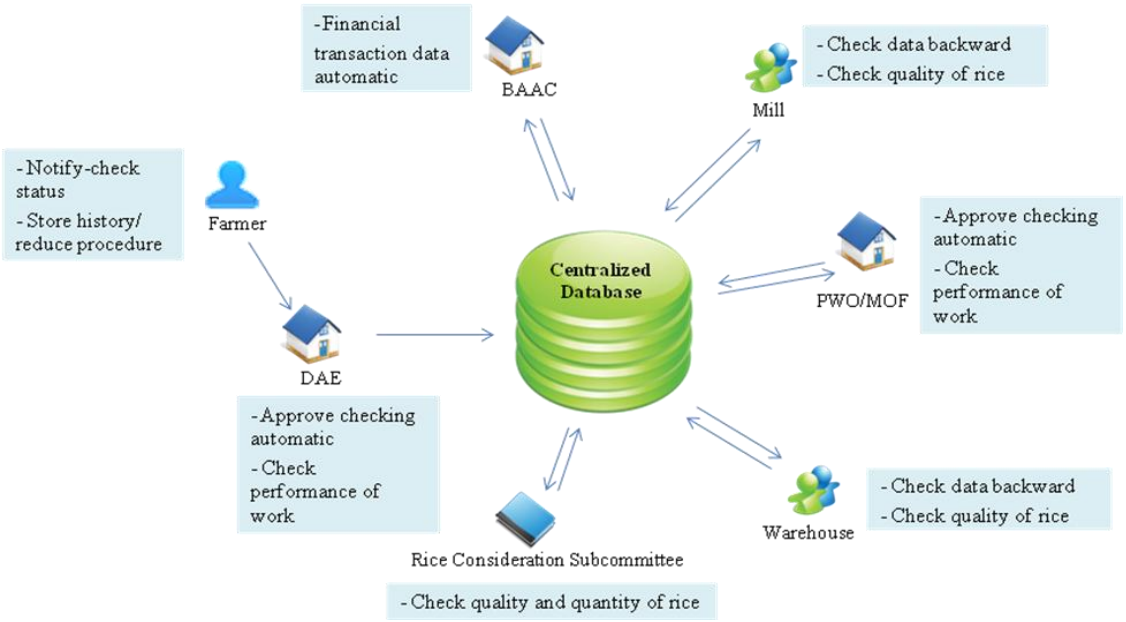

Figure 3.5 New System Workflow

The new system or Relational Database Management System of Rice Pledging Governance develops by changing from the original and current system. This system integrates database of each organization in the rice mortgage scheme to be the centralized database for creating link of data, reducing the data redundancy, reducing errors to load data, and increasing the performance of checking data backward.

3.4 System Diagram of New System

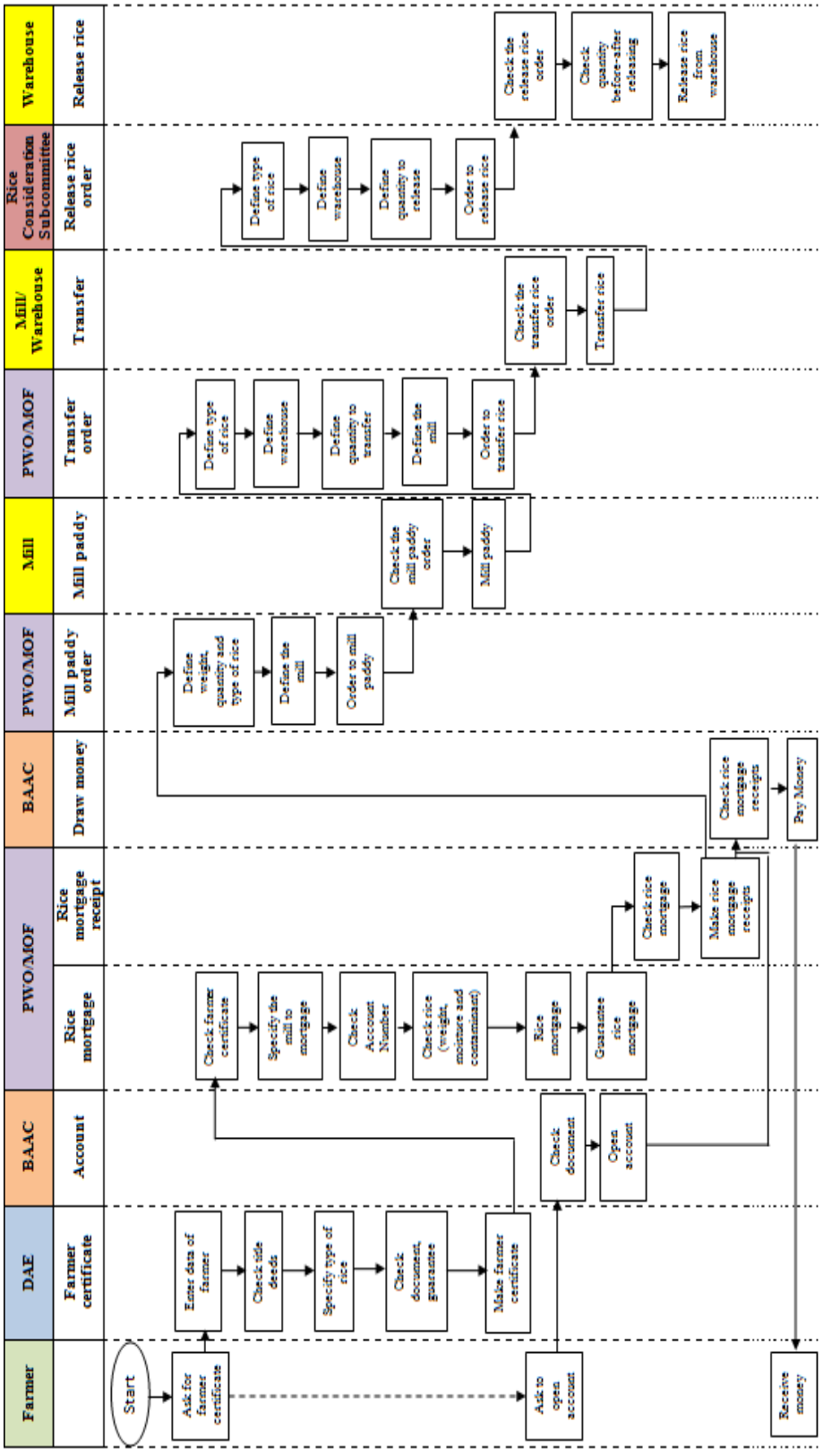

Figure 3.6 Activity Diagram of New System

3.5 Data Flow of New System

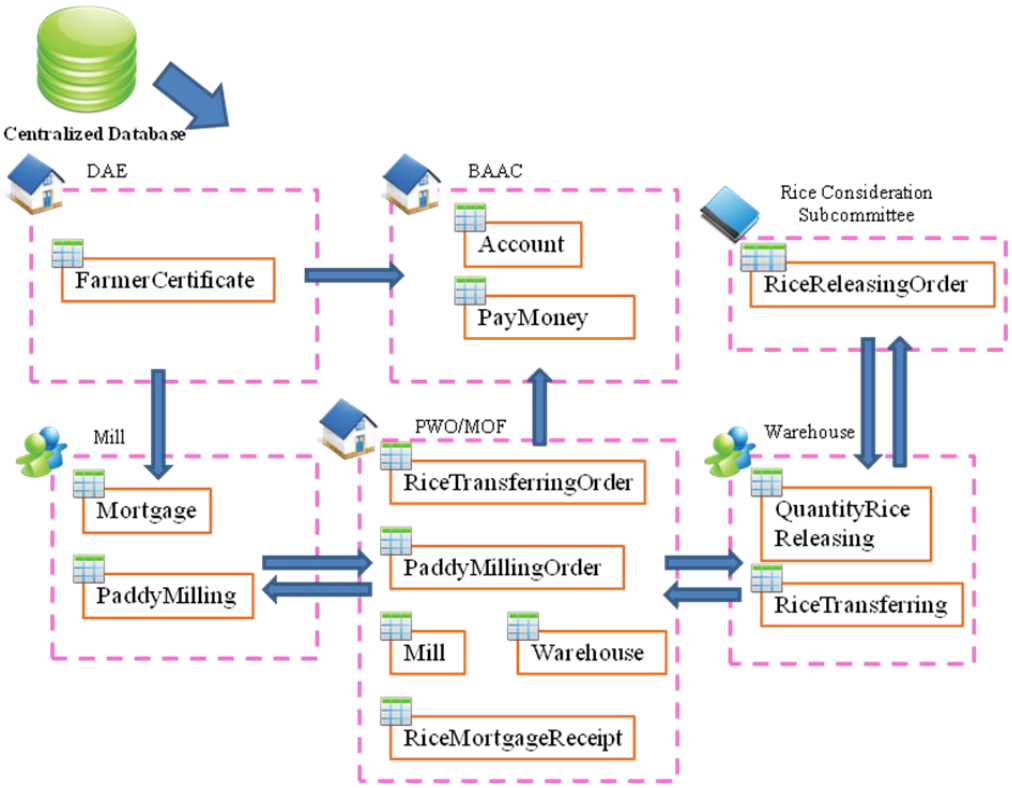

Figure 3.7 Data Flow of New System

For the corruption in the rice mortgage scheme follows the section 3.2, can prevent by using Information Technology (IT) to help to design the link of data in database of each table for monitor and check the existing data that following:

3.5.1 Check the area farming of farmer (Prevent to sell the right of rice mortgage)

Link data between a table ‘TitleDeed’ to a table ‘FarmerCertificate’ at a column ‘TitleDeedNo’, and a column ‘ActualPlantArea’ that value is not more than value of a column ‘TitleDeedArea’. A column ‘TitleDeedArea’ is the area that following the title deed of the Department of Lands.

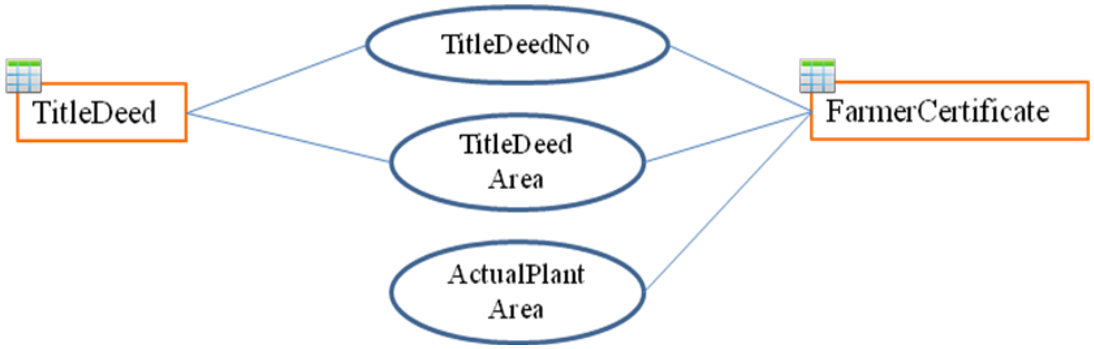

Figure 3.8 Linking data between 'TitleDeed' to a table 'FarmerCertificate'

3.5.2 Check data of the farmer (Prevent to subrogate the right of rice mortgage)

Link data between a table 'FarmerCertificate' to a table 'Account' at a column 'CardID'.

Figure 3.9 Linking data between 'FarmerCertificate' to 'Account'

3.5.3 Check the rice mortgage (Prevent to cheat the weight of rice, subrogate the right of rice mortgage, and change types of rice)

Link data between a table 'FarmerCertificate' to a table 'Mortgage' at a column 'FarmerCertNo', a column 'CardID', a column 'RiceType' that matches the data in the farmer certificate, column 'ExpectProduct' and 'RiceWeight' that weight of rice should be the criteria of yield rice estimating, column 'ExpectHarvestDate' and 'MortgageDate' that the date of mortgage should not be faster than the date of anticipated harvest rice.

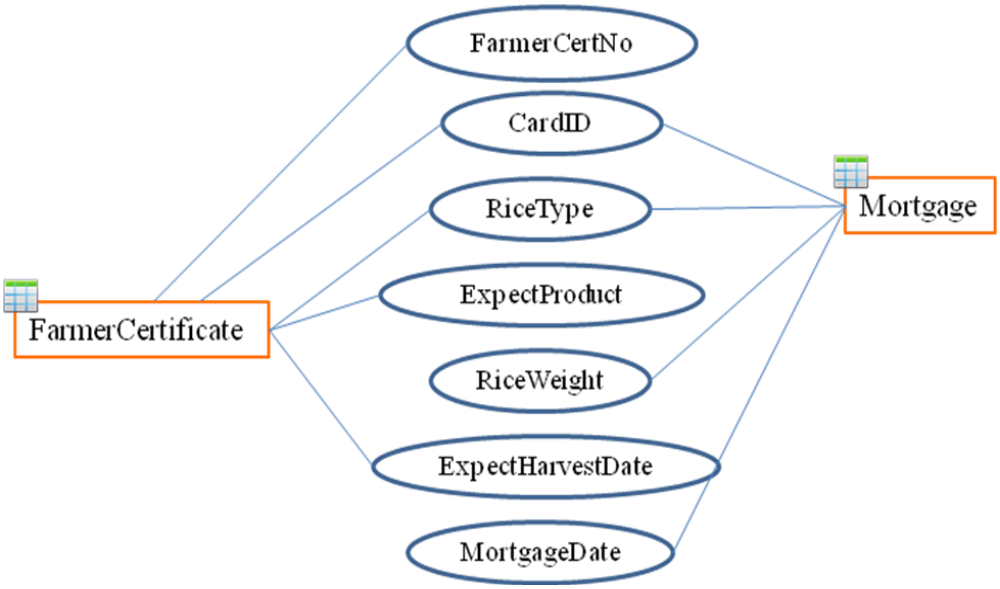

Figure 3.10 Linking data between ‘FarmerCertificate’ to ‘Mortgage’

3.5.4 Check to make the rice mortgage receipt (Prevent to cheat the weight of rice, rice moisture and contaminant, and adulterate rice)

Link data between a table ‘Mortgage’ to a table ‘RiceMortgageReceipt’ at a column ‘MortgageReceiptNo’, a column ‘MillName’, a column ‘FarmerName’, a column ‘RiceType’, a column ‘Moisture’, a column ‘Contamination’, a column ‘RiceWeight’, a column ‘SubWeightMoisture’, a column ‘SubWeightContamination’, a column ‘NetAmount’ , and a column ‘MortgageDate’.

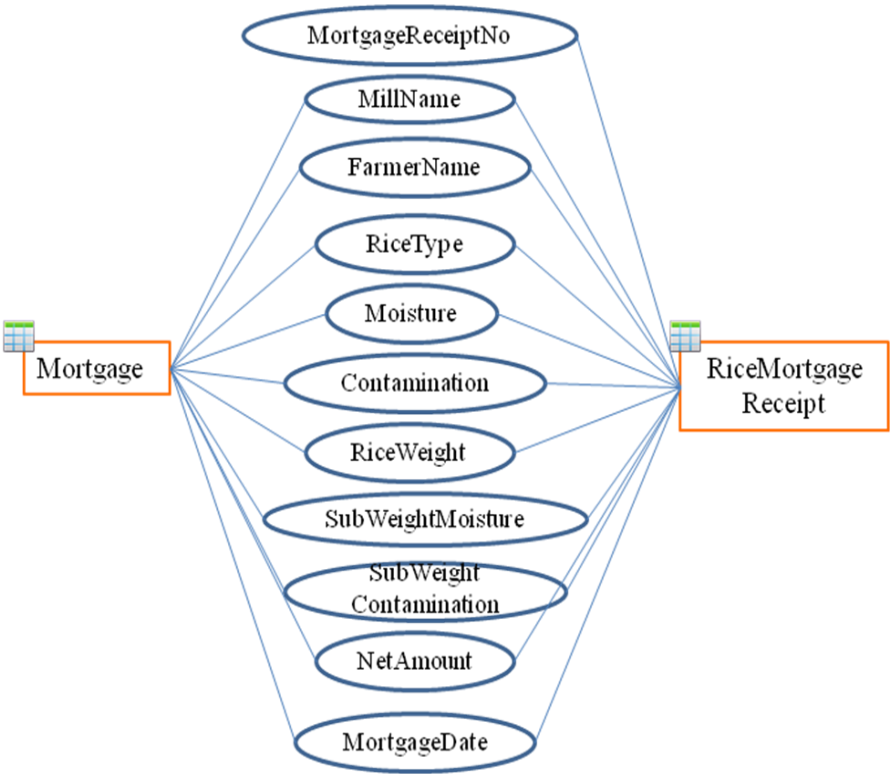

Figure 3.11 Linking data between 'Mortgage' to 'RiceMortgageReceipt'

3.5.5 Check to draw the money to follow the rice mortgage receipt (Prevent to subrogate the right of rice mortgage)

Link data between a table 'RiceMortgageReceipt' to a table 'PayMoney' at a column 'MortgageReceiptNo', column 'FarmerName' and 'AccountName' must match, and a column 'NetAmount'.

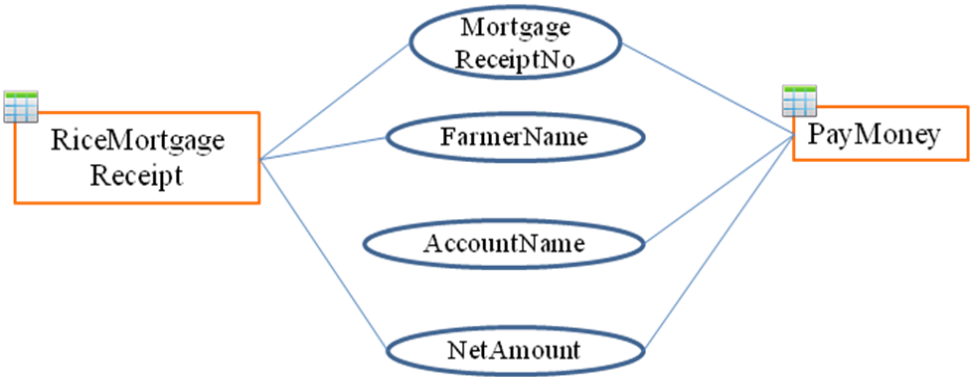

Figure 3.12 Linking data between 'RiceMortgageReceipt' to 'PayMoney'

3.5.6 Check the paying (Prevent to subrogate the right of rice mortgage)

Link data between a table ‘PayMoney’ to a table ‘Account’ at a column ‘CardID’.

Figure 3.13 Linking data between ‘PayMoney’ to ‘Account’

3.5.7 Check the paddy milling of the mill (Prevent to cheat the weight of rice, change types of rice)

Link data between a table ‘Mill’ to a table ‘PaddyMillingOrder’ at a column ‘MillNo’, and link data between a table ‘PaddyMillingOrder’ to a table ‘PaddyMilling’ at a column ‘MillingOrderNo’, a column ‘MillingOrderRiceType’, a column ‘MillimgDate’, a column ‘MillingOrderWeight’, column ‘RiceWeight’ and ‘ExpectRice’ that the weight of paddy should be the criteria of milled rice estimating, and a column ‘ReduceAverageRate’ and ‘ReduceRate’ that the both of value should be in the same range.

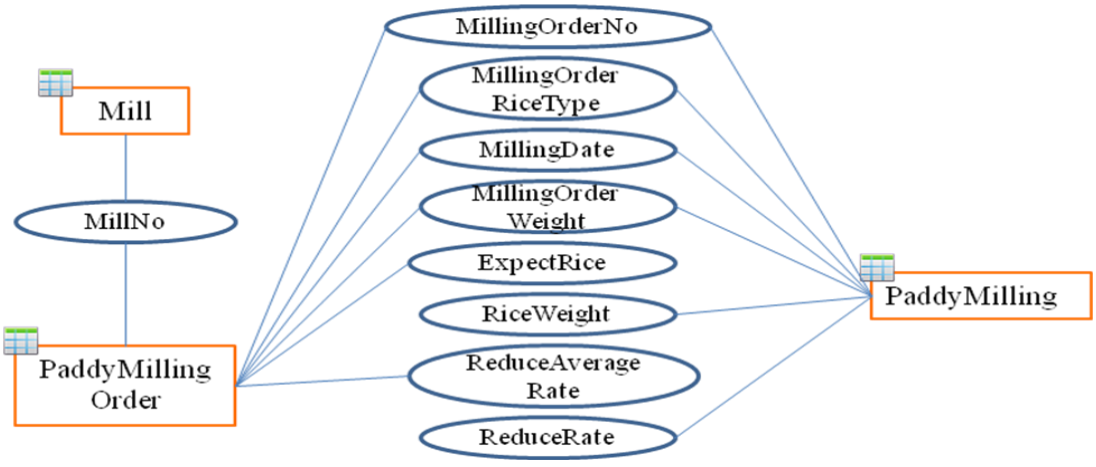

Figure 3.14 Linking data between ‘Mill’, ‘PaddyMillingOrder’, and ‘PaddyMilling’

The average of milling, if paddy is 1,000 kilograms, will get rice in percentage to be 5 (5%). It is following Figure 3.15 to show the quantity of milled rice. It can use to calculate the reduce average rate.

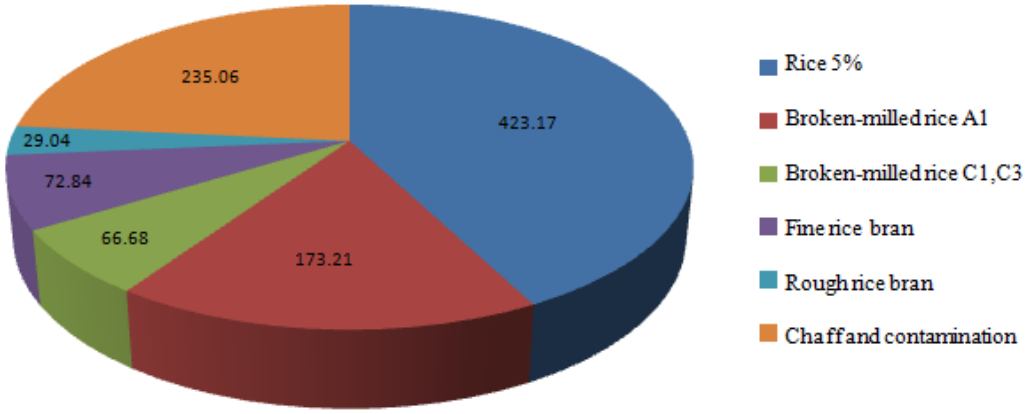

Figure 3.15 Show rice milling rate in graph (From National Statistical Office, Thai Rice Millers, and Department of Business Economics)

3.5.8 Check to transfer rice into warehouse (Prevent to cheat the weight of rice and change types of rice)

Link data between a table 'Warehouse' to a table 'RiceTransferringOrder' at a column 'WarehouseNo', and link data between a table 'RiceTransferringOrder' to a table 'RiceTransferring' at a column 'RiceTransferOrderNo', a column 'RiceType', and column 'TransferringOrderWeight', 'SourceWeight' and 'DestinationWeight' that each weight must be equal.

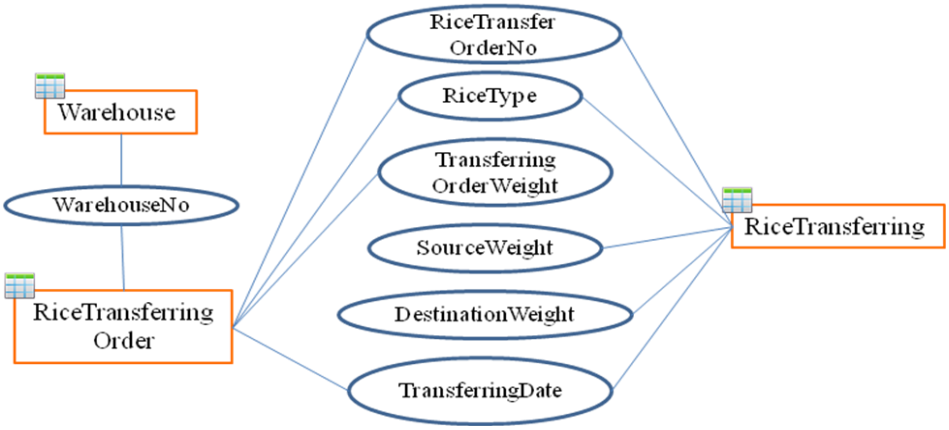

Figure 3.16 Linking data between 'Warehouse', 'RiceTransferringOrder', and 'RiceTransferring

3.5.9 Check the quantity to release rice (Prevent to cheat the weight of rice)

Link data between a table ‘Warehouse’ to a table ‘RiceReleasingOrder’ at a column ‘WarehouseNo’, and link data between a table ‘RiceReleasingOrder’ to a table ‘QuantityRiceReleasing’ at a column ‘RiceReleaseOrderNo’, and column ‘QuantityReleasingOrder’, ‘BeforeReleasing’ and ‘AfterReleasing’ that ‘QuantityReleasingOrder’ must be equal the value of ‘BeforeReleasing’ subtract ‘AfterReleasing’.

Figure 3.17 Linking data between ‘Warehouse’, ‘RiceReleasingOrder’, and ‘QuantityRiceReleasing’

CHAPTER IV
SYSTEM DEVELOPMENT

4.1 Relational Database Management System of Rice Pledging Governance (Prototype)

4.1.1 Asking for the farmer certificate

In this page, Officers of the Department of Agriculture Extension fill data of a farmer who asks for the farmer certificate.

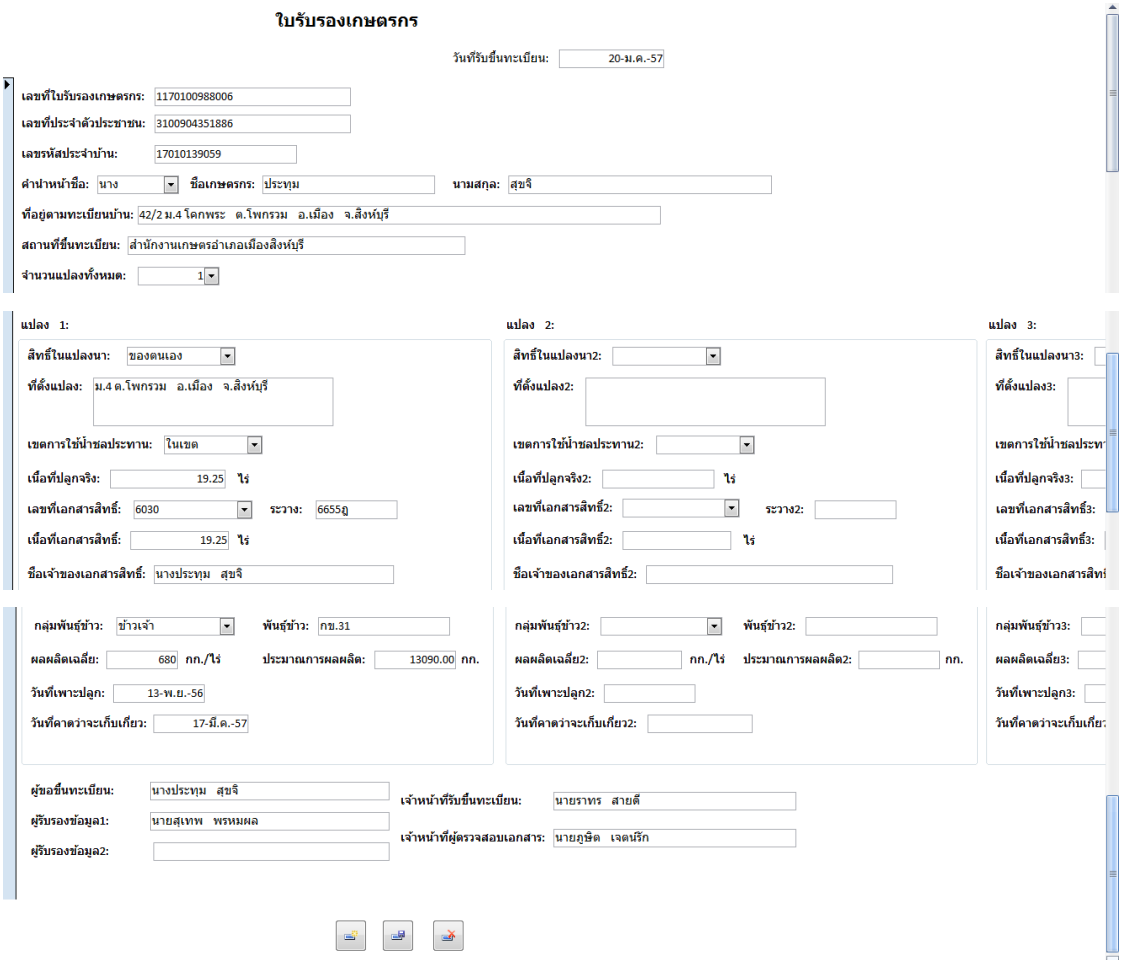

Figure 4.1 The Farmer Certificate Page

4.1.2 Opening account for farmer

In this page, Officers of Bank for Agriculture and Agricultural Co-operatives fill data of farmer in rice mortgage scheme.

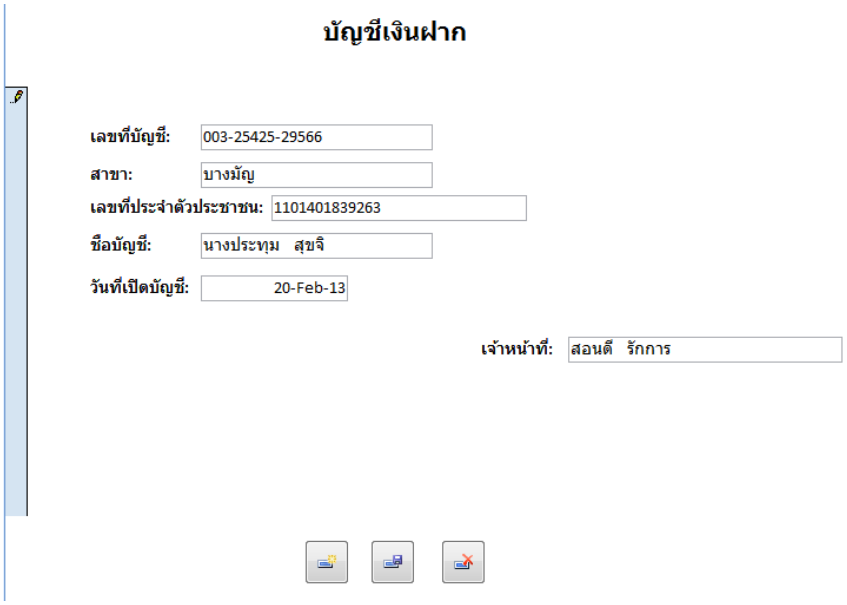

Figure 4.2 Account of Farmer Page

4.1.3 Mills

This page for filling data of mills that is in rice mortgage scheme.

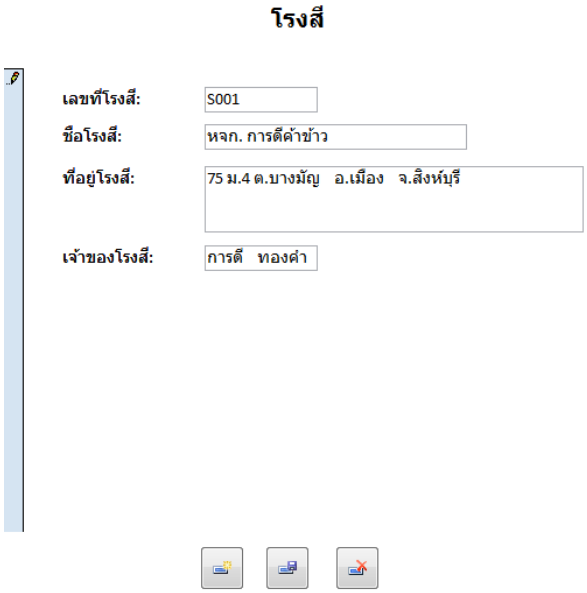

Figure 4.3 Detail of Mill Page

4.1.4 Rice mortgage

For this page, Officers of Public Warehouse Organization or Officers of Marketing Organization for Farmers fill data about rice mortgage from a farmer for use to make rice mortgage receipt.

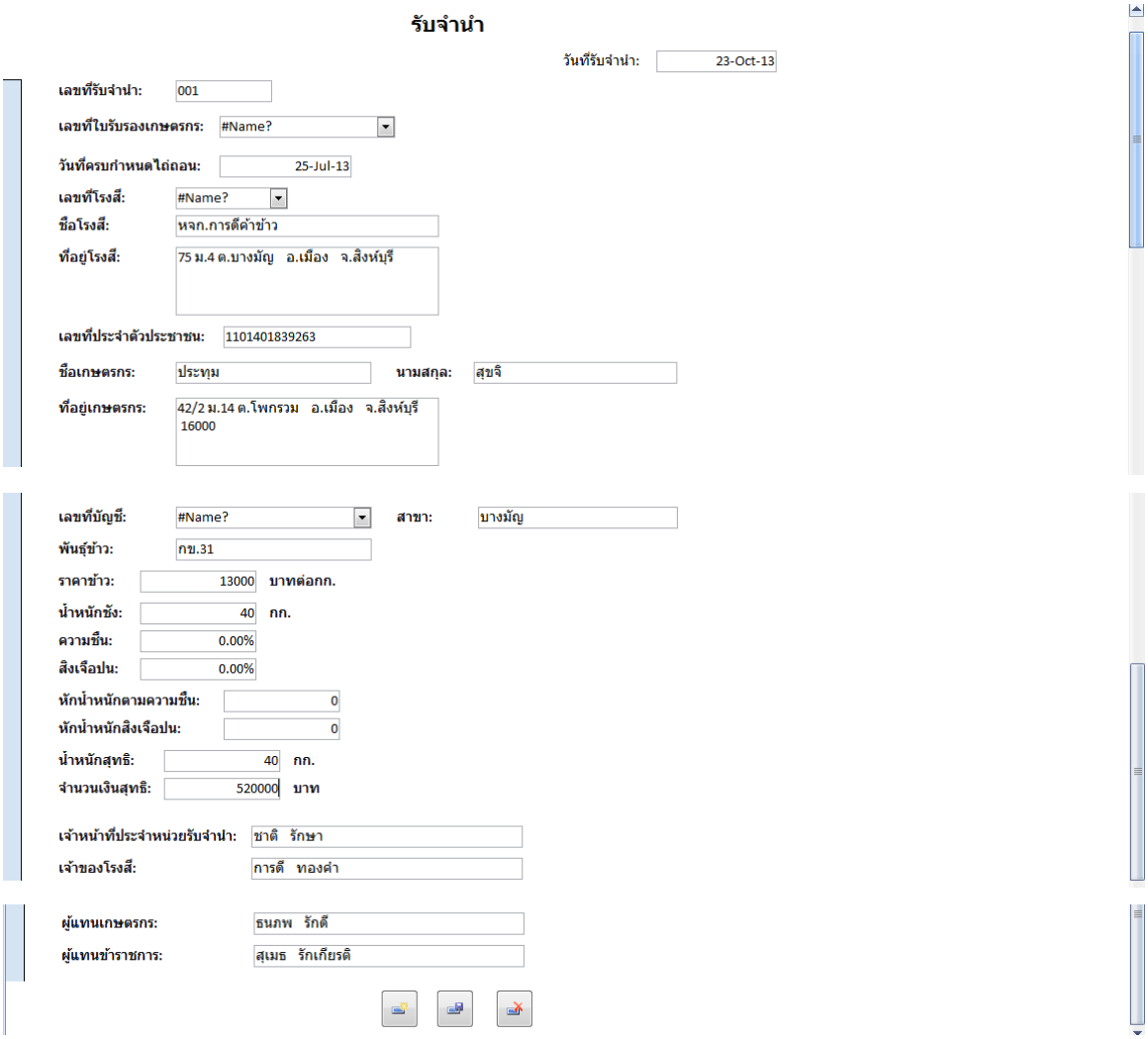

Figure 4.4 Rice Mortgage Page

4.1.5 Making the rice mortgage receipt

For this page, Officers of Public Warehouse Organization or Officers of Marketing Organization for Farmers make the rice mortgage receipt for the farmer. A government representative is a guarantor for making the rice mortgage receipt that it use to be evidence for receiving money from Bank for Agriculture and Agricultural Co-operatives.

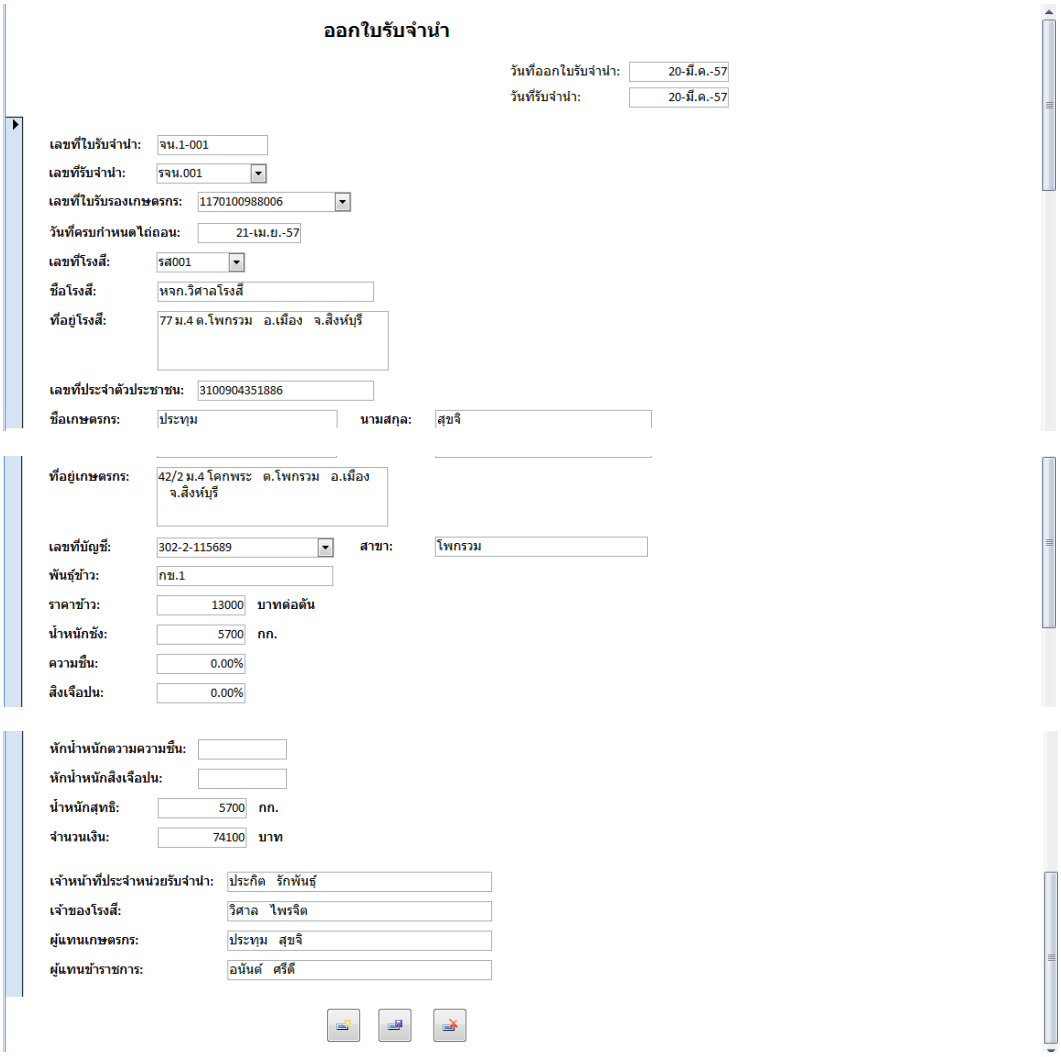

Figure 4.5 Rice Mortgage Receipt Page

4.1.6 Paying the money to the farmer

For this page, Bank for Agriculture and Agricultural Co-operatives fills data for paying the money to the farmer who takes the rice mortgage receipt to draw the money.

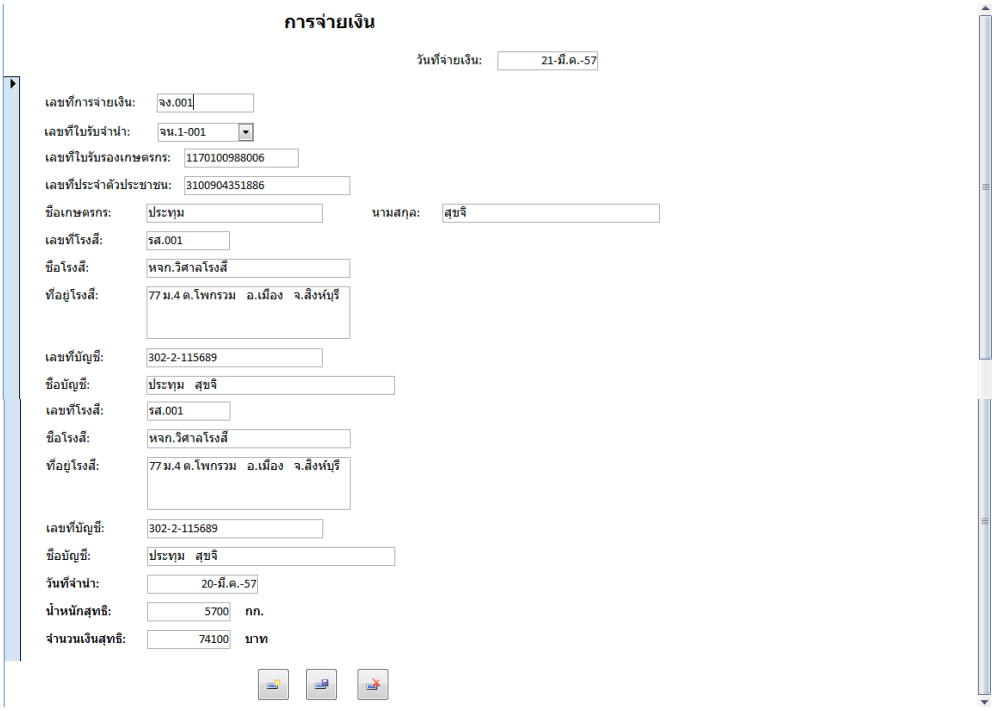

Figure 4.6 Paying Money Page

4.1.7 Warehouse

This page stores description of warehouse in rice mortgage scheme.

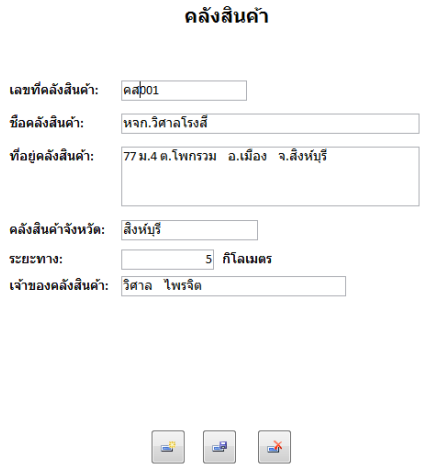

Figure 4.7 Detail of Warehouse Page

4.1.8 Ordering to mill paddy

This page is ordering to mill paddy to the mill that it specifies type of rice, weight of paddy, estimate of rice, average rate of reduced paddy per 1,000 kilograms, and average rate of mill paddy per 1,000 kilograms.

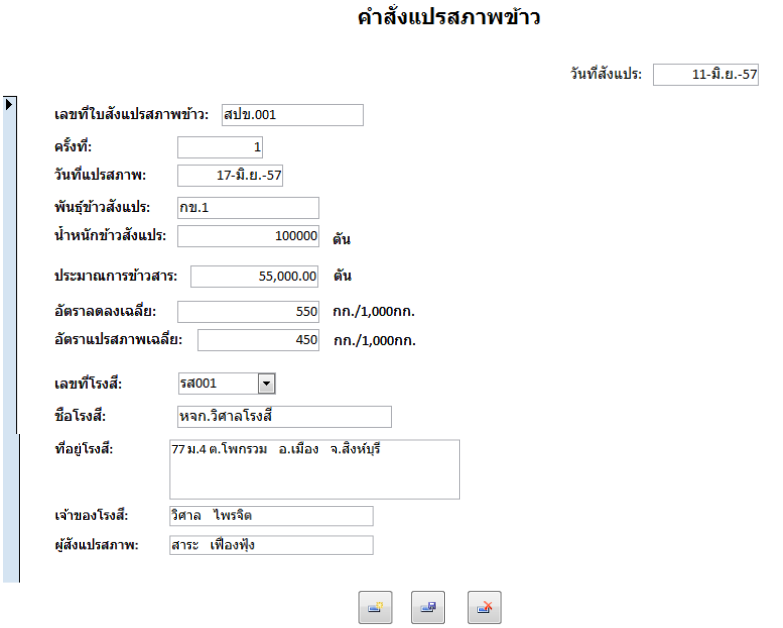

Figure 4.8 Mill Paddy Order Page

4.1.9 Paddy milling of the mill

This page uses to fill the detail of paddy milling. It specifies quantity of paddy, quantity of rice, reduced rate of paddy milling per 1,000 kilogram, and paddy milling rate per 1,000 kilogram.

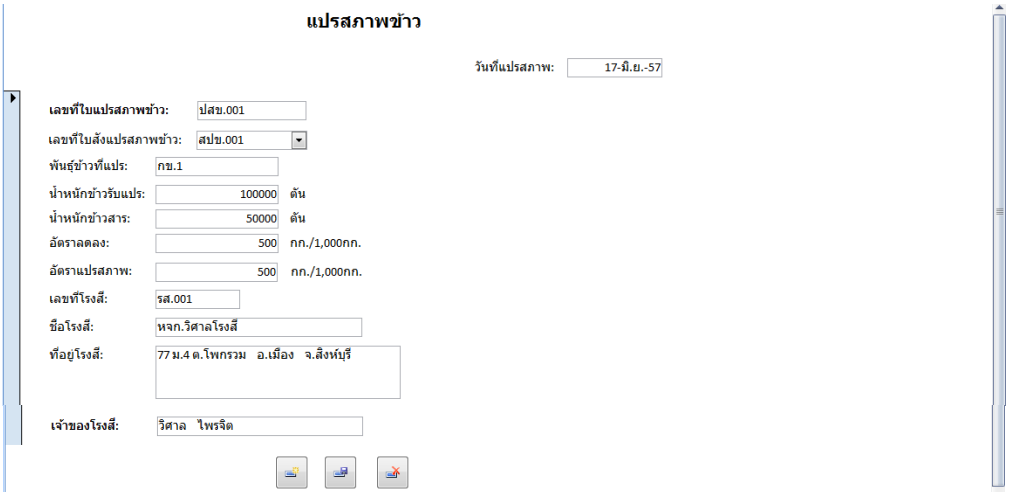

Figure 4.9 Paddy Milling Page

4.1.10 Ordering to transfer rice

This page uses to fill the detail about rice transferring from the mill to warehouse. It is managed by Public Warehouse Organization, Marketing Organization for Farmers, and the mill. The main detail in this page is the detail of warehouse, weight of transferring, quantity of rice bag, the mill, etc.

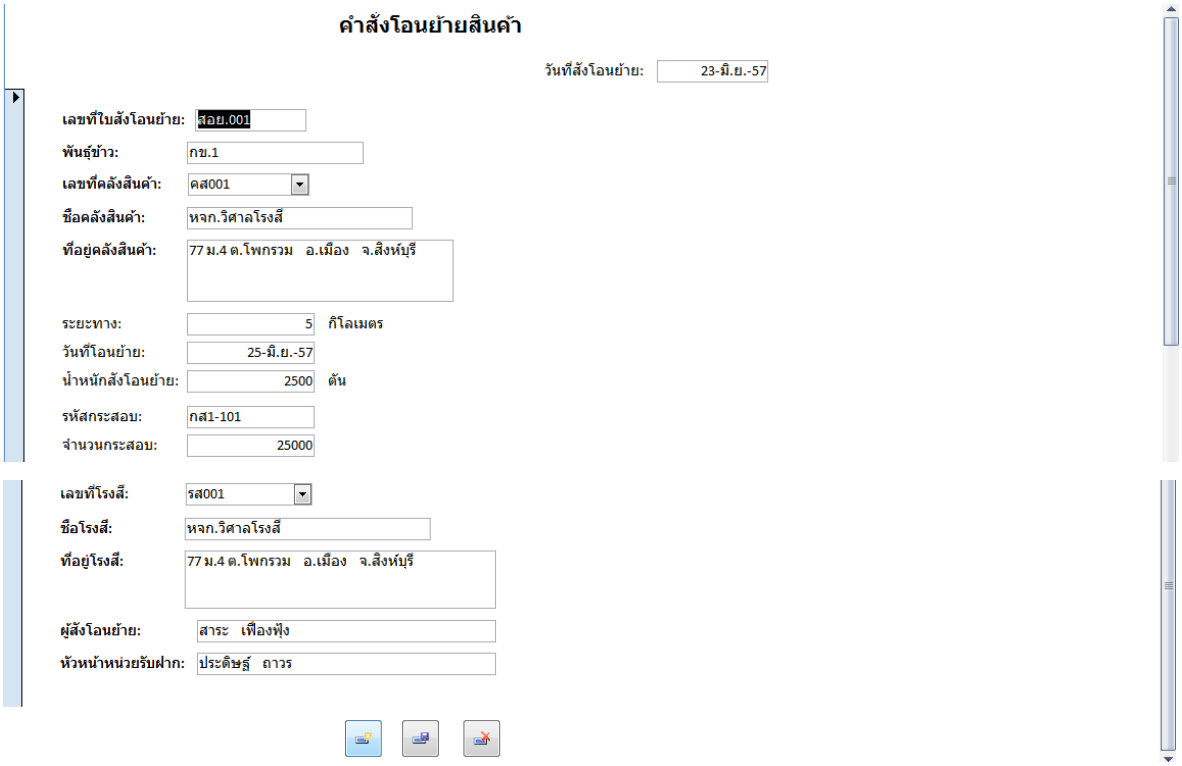

Figure 4.10 Transfer Rice Order Page

4.1.11 Rice transferring from the mill to warehouse

This page uses for filling the detail of rice transferring from the mill to warehouse. It specifies the source weight and the destination weight for using to check transferring.

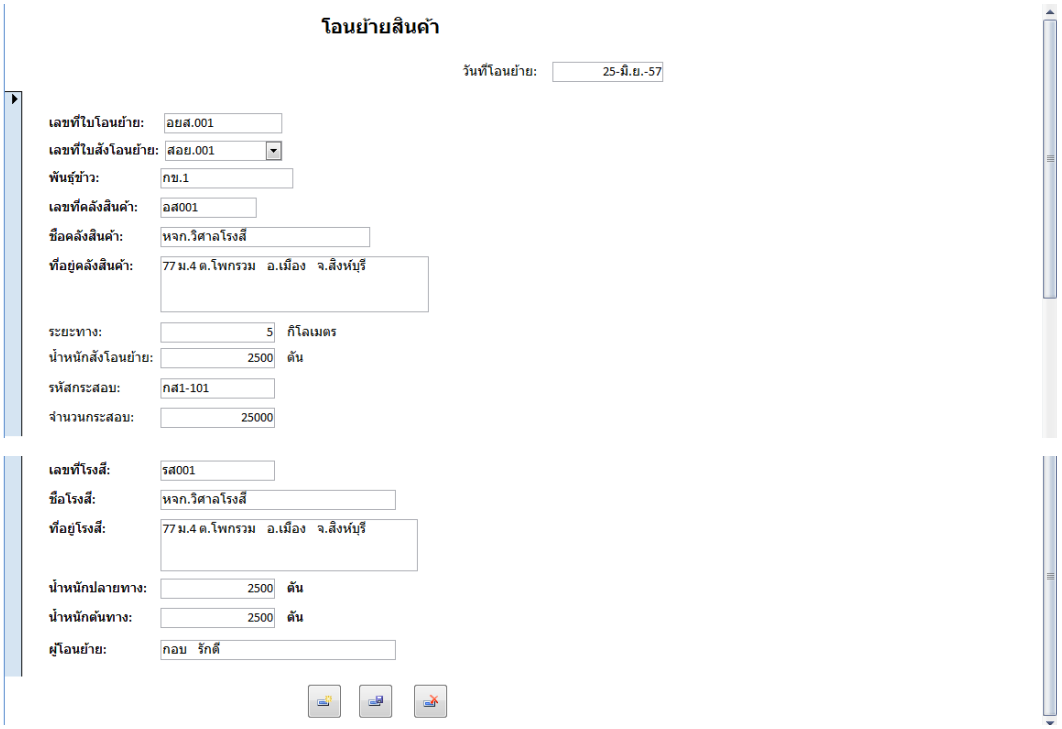

Figure 4.11 Rice Transferring Page

4.1.12 Ordering to release rice

This page uses to order to release rice that it is in warehouse for delivery to customer. In this process, Rice Consideration Subcommittee (National Rice Policy Committee) has responsibility to consider rice releasing and define the policies.

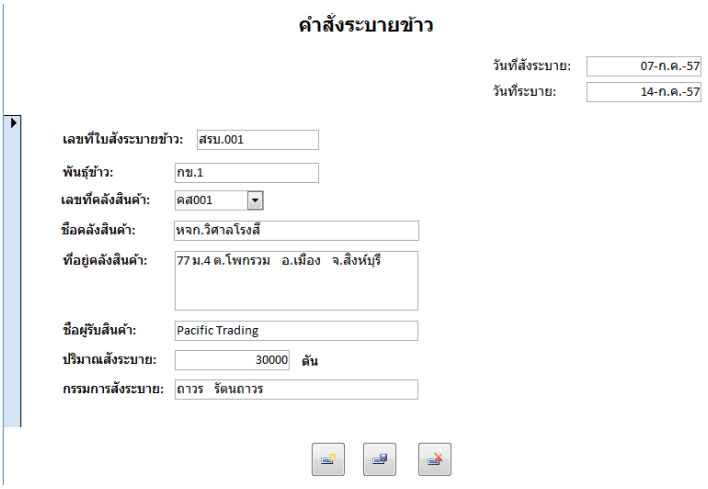

Figure 4.12 Release Rice Order Page

4.1.13 Rice releasing

This page uses to fill the detail about rice releasing from warehouse to customer. The main detail in this page is the balance amount before rice releasing and the balance amount after rice releasing for checking rice releasing.

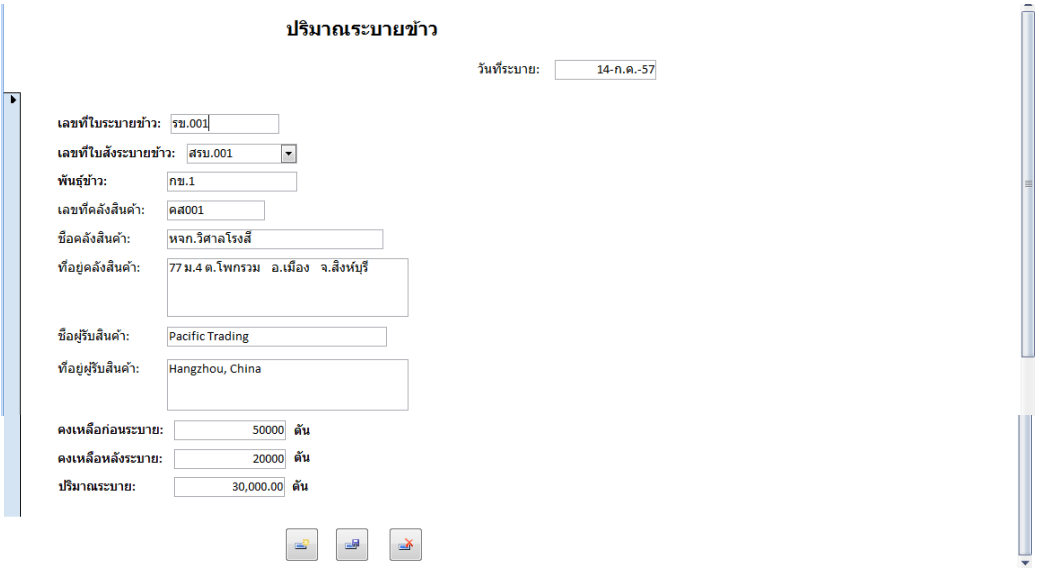

Figure 4.13 Rice Releasing Page

4.2 Table of database

This system is developed by using Microsoft Access 2007 for database system. Database system consists of the following table:

Table 4.1 FarmerCertificate

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	FarmerCertNo	Primary Key	Char	50
2	CardID	Index (No Duplicates)	Char	13
3	HouseID	Index (No Duplicates)	Char	20
4	Title		Char	10
5	FarmerName		Char	100
6	FarmerSurname		Char	100
7	FarmerAddr		Char	255
8	RegisDate		Date/Time	

Table 4.1 (Cont.) FarmerCertificate

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
9	RegisPlace		Char	150
10	AllLandNo		Integer	
11	RightLand		Char	20
12	Location		Char	255
13	FieldWater		Char	100
14	ActualPlantArea		Decimal	10,2
15	TitleDeedNo		Char	20
16	RaWang		Char	100
17	TitleDeedArea		Decimal	10,2
18	TitleDeedOwner		Char	100
19	RiceGroup		Char	50
20	RiceType		Char	50
21	ProductAverage		Decimal	10,2
22	ExpectProduct		Decimal	10,2
23	PlantDate		Date/Time	
24	ExpectHarvestDate		Date/Time	
25	RightLand2		Char	20
26	Location2		Char	255
27	FieldWater2		Char	100
28	ActualPlantArea2		Decimal	10,2
29	TitleDeedNo2		Char	20
30	RaWang2		Char	100
31	TitleDeedArea2		Decimal	10,2
32	TitleDeedOwner2		Char	100
33	RiceGroup2		Char	50
34	RiceType2		Char	50
35	ProductAverage2		Decimal	10,2
36	ExpectProduct2		Decimal	10,2
37	PlantDate2		Date/Time	

Table 4.1 (Cont.) FarmerCertificate

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
38	ExpectHarvestDate2		Date/Time	
39	RightLand3		Char	20
40	Location3		Char	255
41	FieldWater3		Char	100
42	ActualPlantArea3		Decimal	10,2
43	TitleDeedNo3		Char	20
44	RaWang3		Char	100
45	TitleDeedArea3		Decimal	10,2
46	TitleDeedOwner3		Char	100
47	RiceGroup3		Char	50
48	RiceType3		Char	50
49	ProductAverage3		Decimal	10,2
50	ExpectProduct3		Decimal	10,2
51	PlantDate3		Date/Time	
52	ExpectHarvestDate3		Date/Time	
53	RegisApplicant		Char	100
54	CertificatePerson1		Char	100
55	CertificatePerson2		Char	100
56	CheckOfficer		Char	100
57	RegisOfficer		Char	100

Table 4.1 is the table for detail of the farmer certificate.

Table 4.2 Account

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	AccountNo	Primary Key	Char	20
2	Branch		Char	100
3	CardID	Index (No Duplicates)	Char	13
4	AccountName		Char	150
5	OpenDate		Date/Time	
6	Officer		Char	100

Table 4.2 is the table for open account of farmer.

Table 4.3 PayMoney

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	PayNo	Primary Key	Char	50
2	MortgageReceiptNo	Index (No Duplicates)	Char	50
3	FarmerCertNo	Index (No Duplicates)	Char	13
4	CardID	Index (No Duplicates)	Char	13
5	FarmerName		Char	100
6	FarmerSurname		Char	100
7	MillNo		Char	50
8	MillName		Char	150
9	MillAddr		Char	255
10	AccountNo	Index (No Duplicates)	Char	20
11	AccountName		Char	150
12	MortgageDate		Date/Time	
13	PayDate		Date/Time	
14	NetWeight		Decimal	18,2
15	NetAmount		Decimal	18,2

Table 4.3 is the table for detail of paying money.

Table 4.4 Warehouse

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	WarehouseNo	Primary Key	Char	50
2	WarehouseName		Char	150
3	WarehouseAddr		Char	255
4	WarehouseProvice		Char	100
5	Distance		Integer	
6	WarehouseOwner		Char	100

Table 4.4 is the table for detail of warehouse.

Table 4.5 Mill

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	MillNo	Primary Key	Char	50
2	MillName		Char	150
3	MillAddr		Char	255
4	MillOwner		Char	100

Table 4.5 is the table for detail of mill.

Table 4.6 Mortgage

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	MortgageNo	Primary Key	Char	50
2	MortgageDate		Date/Time	
3	FarmerCertNo	Index (No Duplicates)	Char	50
4	MaturityDate		Date/Time	
5	MillNo	Index (No Duplicates)	Char	50
6	MillName		Char	150
7	MillAddr		Char	255
8	CardID	Index (No Duplicates)	Char	13
9	FarmerName		Char	100
10	FarmerSurname		Char	100
11	FarmerAddr		Char	255

Table 4.6 (Cont.) Mortgage

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
12	AccountNo	Index (No Duplicates)	Char	20
13	Branch		Char	100
14	RiceGroup		Char	100
15	RicePrice		Decimal	18,2
16	RiceWeight		Decimal	18,2
17	Moisture		Decimal	18,2
18	Contamination		Decimal	18,2
19	SubWeightMoisture		Decimal	18,2
20	SubWeightContamination		Decimal	18,2
21	NetWeight		Decimal	18,2
22	NetAmount		Decimal	18,2
23	MortgageOfficer		Char	100
24	MillOwner		Char	100
25	RepresentFarmer		Char	100
26	RepresentOfficer		Char	100

Table 4.6 is the table for detail of rice mortgage.

Table 4.7 RiceMortgageReceipt

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	MortgageReceiptNo	Primary Key	Char	50
2	MortgageNo		Char	50
3	FarmerCertNo	Index (No Duplicates)	Char	50
4	MortgageReceiptDate		Date/Time	
5	MortgageDate		Date/Time	
6	MaturityDate		Date/Time	
7	MillNo		Char	50
8	MillName		Char	150
9	MillAddr		Char	255
10	CardID	Index (No Duplicates)	Char	13

Table 4.7 (Cont.) RiceMortgageReceipt

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
11	FarmerName		Char	100
12	FarmerSurname		Char	100
13	FarmerAddr		Char	255
14	AccountNo	Index (No Duplicates)	Char	20
15	Branch		Char	100
16	RicePrice		Decimal	18,2
17	RiceWeight		Decimal	18,2
18	Moisture		Decimal	18,2
19	Contamination		Decimal	18,2
20	SubWeightMoisture		Decimal	18,2
21	SubWeightContamination		Decimal	18,2
22	NetWeight		Decimal	18,2
23	NetAmount		Decimal	18,2
24	MortgageOfficer		Char	100
25	MillOwner		Char	100
26	RepresentFarmer		Char	100
27	RepresentOfficer		Char	100

Table 4.7 is the table for draw money.

Table 4.8 PaddyMillingOrder

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	MillingOrderNo	Primary Key	Char	50
2	MillingTime		Integer	
3	MillingOrderDate		Date/Time	
4	MillingDate		Date/Time	
5	MillingOrderRiceType		Char	50
6	MillingOrderWeight		Decimal	18,2
7	ExpectRice		Decimal	18,2
8	ReduceAverageRate		Decimal	18,2

Table 4.8 (Cont.) PaddyMillingOrder

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
9	MillingAverageRate		Decimal	18,2
10	MillNo		Char	50
11	MillName		Char	150
12	MillAddr		Char	255
13	MillOwner		Char	100
14	MillingOrderPerson		Char	100

Table 4.8 is the table for paddy milling order.

Table 4.9 PaddyMilling

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	PaddyMillingNo	Primary Key	Char	50
2	MillingOrderNo		Char	50
3	MillingDate		Date/Time	
4	RiceTypeMilling		Char	50
5	PaddyWeight		Decimal	18,2
6	RiceWeight		Decimal	18,2
7	ReduceRate		Decimal	18,2
8	MillingRate		Decimal	18,2
9	MillNo		Decimal	18,2
10	MillName		Char	150
11	MillAddr		Char	255
12	MillOwner		Char	100

Table 4.9 is the table for detail of paddy milling.

Table 4.10 RiceTransferringOrder

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	RiceTransferOrderNo	Primary Key	Char	50
2	RiceType		Char	50
3	WarehouseNo		Char	50
4	WarehouseName		Char	150
5	WarehouseAddr		Char	255
6	Distance		Decimal	10,2
7	TransferringOrderDate		Date/Time	
8	TransferringDate		Date/Time	
9	TransferringOrderWeight		Decimal	18,2
10	SackID		Char	50
11	QuantitySack		Decimal	18,2
12	MillNo		Char	50
13	MillName		Char	150
14	MillAddr		Char	255
15	TransferringOrderPerson		Char	100
16	HeadDeposit		Char	100

Table 4.10 is the table for rice transferring order.

Table 4.11 RiceTransferring

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	RiceTransferNo	Primary Key	Char	50
2	RiceTransferOrderNo	Index (No Duplicates)	Char	50
3	RiceType		Char	50
4	WarehouseNo		Char	50
5	WarehouseName		Char	150
6	WarehouseAddr		Char	255
7	Distance		Decimal	10,2

Table 4.11 (Cont.) RiceTransferring

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
8	TransferringDate		Date/Time	
9	TransferringOrderWeight		Decimal	18,2
10	SourceWeight		Decimal	18,2
11	DestinationWeight		Decimal	18,2
12	SackID		Char	50
13	QuantitySack		Decimal	18,2
14	MillNo		Char	50
15	MillName		Char	150
16	MillAddr		Char	255
17	TransferringPerson		Char	100

Table 4.11 is the table for detail of rice transferring.

Table 4.12 RiceReleasingOrder

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	RiceReleaseOrderNo	Primary Key	Char	50
2	RiceType		Char	50
3	WarehouseNo		Char	50
4	WarehouseName		Char	50
5	WarehouseAddr		Char	255
6	RecipientName		Char	100
7	QuantityReleasingOrder		Decimal	18,2
8	ReleasingOderDate		Date/Time	
9	ReleasingDate		Date/Time	
10	Releasing Committee		Char	150

Table 4.12 is the table for rice releasing order.

Table 4.13 QuantityRiceReleasing

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	RiceReleaseNo	Primary Key	Char	50
2	RiceReleaseOrderNo		Char	50
3	RiceType		Char	50
4	WarehouseNo		Char	50
5	WarehouseName		Char	50
6	WarehouseAddr		Char	255
7	RecipientName		Char	100
8	RecipientAddr		Char	255
9	BeforeReleasing		Decimal	18,2
10	AfterReleasing		Decimal	18,2
11	QuantityReleasing		Decimal	18,2
12	ReleasingDate		Date/Time	50

Table 4.13 is the table for detail of rice releasing.

Table 4.14 TitleDeed (from database of the Department of Lands)

NO .	FIELD NAME	INDEXED	TYPE	WIDTH
1	TitleDeedNo	Primary Key	Char	100
3	RaWang		Char	50
3	TitleDeedOwner		Char	150
4	TitleDeedArea		Decimal	10,2
5	Officer		Char	150

Table 4.14 is the table of title deed from the Department of Lands.

CHAPTER V
CONCLUSIONS

5.1 Summary of the system development

For the development of Relational Database Management System of Rice Pledging Governance, this is the prototype system development which can be further developed into actual usage in organizations. By the way, data storing of each organization in rice mortgage scheme (the Department of Agriculture Extension, Public Warehouse Organization, Marketing Organization for Farmers, Bank for Agriculture and Agricultural Co-operatives, Mills, Warehouses, and Rice Consideration Subcommittee) is the centralized database that it is controlled and managed by the Department of Internal Trade. This database has benefits for checking data in rice mortgage scheme to be efficiency and quickness. And, data relation of each table helps to prevent some of corruption in rice mortgage scheme. In additional, we add some data column in tables for data storing is more comprehensive, and create forms (in Microsoft Access) for use to fill data into this database.

5.2 Problem in development

5.2.1 In studying about the corruption in rice mortgage scheme, has a little insights and it is quite difficult to find data sources. Mostly, data sources are news that they have a little detail of the corruption in rice mortgage.

5.2.2 In the design of relational database management system of rice pledging governance for checking and prevention of the corruption, cannot check and prevent all cases of the corruption.

5.2.3 In the original and current systems, store not some of data that they help to prevent the corruption in rice mortgage. The examples are average rate of mill paddy, estimate of rice after milling, etc.

5.3 Solutions to resolve problem

5.3.1 Find news that they are both articles and videos to analyze processes and cases of the corruption in rice mortgage scheme.

5.3.2 Analyze and choose cases of the corruption in rice mortgage scheme that they are prevented by methods of information technology and existing data.

5.3.3 Add column in database to help for checking and prevention of the corruption in rice mortgage scheme.

5.4 Suggestion from development

5.4.1 Since, the system is developed to be the prototype system. This system is only the further development so it is effective in prevention of the corruption in rice mortgage scheme not as good as it should.

5.4.2 Microsoft Access 2007 is the basic program of database. It has more limitations such as size of database is limit at less than 2 GB. So, the system will develop into actual usage that it should be to use the advance program of database such as Microsoft SQL Server, Oracle, etc. These programs can support large databases and have high security to access data.

5.4.3 For system development into actual usage, may create an application or web service to use it more easily and secure.

5.4.4 For system development, the permission of officers for access data in database should be limited by granting roles as responsibility. Such as, the officer who is responsibility for checking data should not have the permission to modify or delete data in database, or the officer of Public Warehouse Organization should not have the permission to modify or delete the Department of Agriculture Extension’s data, etc.

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