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Information System For Rural Development In Thailand

By

Kitisak Sinthuvanich
Case Title

INFORMATION SYSTEM FOR RURAL DEVELOPMENT IN THAILAND

by

Kitisak Sinthuvanich

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INFORMATION SYSTEM FOR RURAL DEVELOPMENT IN THAILAND

1. INTRODUCTION

From the past National Economic and Social Development Plan the economic growth in Thailand has increased at a satisfactorily rate about 6-7 percent per annum throughout the First to the Fourth Plan (1962-1981). However, the beneficial outcome of the plan did not reach the poorer population. A large number of rural population are still faced with basic problems which cause poverty and prevent them from raising their standard of living.

Through the Fifth Plan (1982-1986), Royal Thai Government has launched the Poverty Alleviation Program in order to tackle the poverty problem. The results of the plan was satisfactorily solve many problems. Its success however was not complete. There were still problems in the management of rural development plan. Coordination among government agencies and the people organization did not materialize either in the form of target area selection, preparation, implementation, and monitoring and evaluation. This led to an important components, which was the availability of data, the incompleteness of information, the uncoordinate collection of data for planning purpose. Therefore, the Sixth Plan has put more emphasis on the strengthening of of information system for rural development as one measure to improve the management procedures of the rural development plan in order to achieve the best results for the rural population.
2. ORIGIN OF THE INFORMATION SYSTEM

Information system for rural development in Thailand was started at the beginning of the Fifth National Economic and Social Development Plan (1982). By that time, a new approach for rural development was also introduced and is known as Management of Rural Development under the National Rural Development Committee (NRDC). The NRDC set up the administrative structure by using "Planning" as a tool to coordinate the management functions. These functions include project activity planning, target programming, plan coordination, and project monitoring and evaluation. In addition, the rural development data center was established at the Information Processing Institute for Education and Development (IPIED), Thammasat University.

3. ADMINISTRATIVE SYSTEM OF RURAL DEVELOPMENT PROCESSES

The National Rural Development Committee (NRDC) with the Prime Minister as its chairman and board members including the country's main planning organization, the National Economic and Social Development Board (NESDB), study rural development problems presented at the national committee. The National Rural Development Cooperation Center (NRDCC) was established as a supporting organization of the NRDC under the supervision of NESDB for the purpose of implementing the program. In addition, several development committees were established in all provinces, districts, subdistricts, and villages.

(Figure 1 shows the structure of National Administration for the rural development program)
Figure 1:
Structure of National Administration for the Rural Development Program

Board of Ministries

National Rural Development Committee (NRDC)
chairman: Prime Minister
secretary: Secretary-general of NESDB

Provincial development committee

District ((Amphur)) Development Committee

Subdistrict ((Tambon)) Development Committee

Village ((Muban)) Development Committee

Budget Bureau
Off. Civil Comm.
National Rural Development Cooperation Center (NRDCC) in NESDB

Ministry, Bureau, Department, etc.

Information Processing Institute TU

Provincial Development Subcommittee

Rural Development Implementation Supportive commission in Subdistrict level

Note
(1) (( )) shows Thai name.
(2) NESDB = National Economic and Social Development Board
TU = Thammset University
(3) Source: Project Documentation (by IPIED, TU)
Rural Development processes are characterized into cyclical processes comprising various activities which initiate, implement, and return to terminate at the same point in a cycle, then, a new cycle starts. These cyclical processes are the planning, the plan coordination, and the monitoring and evaluation.

The planning process deals with the analysis of information concerning with the socio-economic conditions of rural area including projects profiles which will be allocated based on the outcome of the data analysis. All agencies both national and local committees interpret the information which will identify the distribution pattern and the degree of problem severity which will in turn implies the setting of target areas for development at their own level.

The plan coordination provides the means through which the projects objectives and aims of solving problems in target area are met. These covers both top down and bottom up operation from all agencies level.

NRDC and its supporting organization NRDCC start the top down processes by providing the national policy and proposing various types of development projects to be selected by local and provincial committees according to the necessity of each area. Then, the bottom up processes starts with the priority ranking of village needs and the selection of projects lists. The selection of those projects will be related to the problems in the local area as well as other projects. After the selection, the
projects will be ranked in priority and submitted upward to sub-district, district, and province for approval respectively. The Provincial committee then submitted their requirements to the annual budget ceiling. After that, the project operation plan will be sent out to all provinces for implementation.

At this point, all projects allocated will be functioned at village sites, and the project monitoring and evaluation report includes the consideration of various conditions such as the expected benefits from the projects in terms of the improvement in various conditions of target area, the use of new project to cover the weak points of the existing project, the project side effect and appropriateness in terms of budget availability, manpower, constraints as well as community support. In consideration of these conditions, the policy and concepts in rural development will be adjusted and fed back to the planning cycle.

4. OBJECTIVES

The objectives of establishing information system for rural development in Thailand is to provide accurate, timely and useful information to those who formulate the policy for the rural development program, and for the planning monitoring and evaluation of the program. The information system is integrated into overall management system and response to the policy direction which have been incorporated into the sixth Plan. There are four main objectives of rural development policy which need information system as a tool for implementation. There are as follows.
(1) Decentralize more responsibility to the province for development planning.

(2) Focus development resources primarily in the poorest villages.

(3) Emphasize coordination among government and private agencies to solve rural problems.

(4) Foster more self-help by support of people's organizations in community problem solving.

5. SCOPE AND COVERAGE OF THE INFORMATION SYSTEM

The information system for rural development was designed to conform with the administrative system of rural development under NRDC which can be divided into 3 main processes.

1. Planning Process for national rural development, specifying ministerial and provincial policies framework.

2. Plan Coordination Process for sub-district, district and provincial policies. For the screening and authorization of policies.

All three processes mentioned above relied on a series of their respective data set. For the planning process, "NRD 2 C" which is the baseline data is collected at the village level on a two-year time frame. All rural villages socio-economic information approximately 60,000 villages throughout the country was stored in data base on a large scale computer at IP1ED. This data was then aggregated and computed into several development indicators which point out specific problem issues in degree of problem severity. Moreover, a composite village indicator was concluded to classified rural village into three categories: progressive, moderate, and regressive.

Project data concerning with the proposed project at various level is categorized as information for plan coordination process. Starting at the top, NRD-6 is the national policy framework and proposed list of projects. The NRD-5 is the project operation plan for each target area. The NRD-4 is the appraisal results of development plan. The NRD-3, NRD-2, and NRD-1 are the account of projects proposed at province, district, and subdistrict respectively.

(Figure 2 illustrates the flow of data for rural information.)

(Figure 3 illustrates the flow of data for project information.)
Figure 2: Flow of Data for Rural Information

1. National Rural Development Committee (NRDC)
2. Community Development Department in Ministry of Interior (CDD)
3. National Rural Development Cooperation Center (NRDCC)
4. Information Processing Institute in Thammasat University

Screening

- Screening data of NRO.2C
- Screening data of NRO.2C
- Screening data of NRO.2C
- Screening data of NRO.2C

Designing survey forms

Data processing

- Designing survey forms
- Reproducing pass forms

Training for the trainee

- Training for the trainee
- Training field officials

Research and Evaluation Division (RED)

- Designing survey forms
- Reproducing pass forms

Community Development Region Office (CDRO)

Provincial

- Designing survey forms
- Reproducing pass forms

District

- Designing survey forms
- Reproducing pass forms

Subdistrict

- Designing survey forms
- Reproducing pass forms

Village

Note

1. NRO.2C: Questionnaire for Baseline Data in Rural Village
2. Source: IPED, Thammasat University
Figure 3: Flow of Data for Project Information

Note (1) NESDB = National Economic and Social Development Board

(2) NRD.2 : Project Development Account of District
NRD.3 : Project Development Account of Province
NRD.4 : Appraisal Results of Development Plan
NRD.5 : Project Operation Plan of Development
NRD.6 : Policy Framework and Approach of Development
NRD.7 : Change of Target Area of Development
0.314 : Activity Results of Development

(3) Source : IPED, Thammasat University
As for ongoing projects, the information D-314 is collected periodically from projects sites for the purpose of progress evaluation and control. In addition, NRD-1A project assessment information is randomly sampled from target sites throughout the country.

Since the management processes under the administrative system of rural development are performed by the various organizations at different levels, therefore the information system for rural development is an extremely large system and served the users at all levels namely, the National, Ministry/Department and Pro vincial level.

5.1 Information System at National Level

One function of a management information system is to make relevant summary and analytical information available to those officials who are responsible for establishing policy direction, and to those who are responsible for making major resource allocation decisions and managing the programs. In Thailand's National Rural Development Program (NRD) this broad policy-making responsibility rests with the National Rural Development Committee and its several subcommittees, and the staff agencies who serve them—principally NRDCC and the five ministries which operate NRD Program rural development projects. The management function rests primarily with the operating departments in those ministries.
In the NRD Program, there are four central issues which need to be addressed, and for which relevant analytical macro information is required:

1. What are the major rural development problems and needs, and how are they distributed across the country?

2. What programs and projects will be mobilized to address these problems and needs, and how will they be ranked in priority?

3. What will be the distribution of resources among these programs and projects, in order to reflect the priorities assigned above?

4. What will be the basis for distribution of available resources among geographical areas, assuming that the development need will always be greater than the funds available?

At the broad national policy level, the information required to address these macro-planning issues must be highly aggregated and synthesized. It must be portrayed in ways which enable policy-makers to quickly grasp "the big picture" in order to draw conclusions and make judgements which answer these policy questions with concrete direction.
In order to provide the information required in this process, NRDCC has developed a set of macro-planning models which use planning, monitoring, and evaluation information to facilitate correlations of rural development problems and needs with expected and actual program outputs, effects and funding levels. These models include information which will allow:

1. Definition of the magnitude and distribution of a particular development problem by using village baseline data "NRD 2 C".
2. Identification of projects which address the problem.
3. Projection of the degree to which the problem can be reduced by given levels of resources.
4. Manipulation of variables which determine how resources are distributed.
5. Projection of how long it will take, depending on funding levels, to achieve a target objective with regard to that problem.

With the use of the information provided by these models, NRD Program policy makers would be in a position to make more informed decisions about (a) the resources required to address identified problems (b) which programs they believe should be given priority for funding, and (c) how the available funding resources should be allocated. These are the most important policy decisions to be made in the NRD Program.
5.2 Information System at Ministry/Department Level

The National Rural Development (NRD) Program is an integrated rural development program which operates projects designed to meet rural development needs through five ministries: Interior, Agriculture and Cooperatives, Health, Industry, and Education. These five ministries and the departments within those ministries which plan and implement rural development projects need good information from the NRD information system for three purposes; namely planning, Monitoring and Evaluation.

5.2.1 Planning

The first step in department planning for rural development projects is to make an assessment of village problems and needs at the national level. This assessment would come from NRDCC analysis of macro level information that clearly defines village conditions and needs which could be addressed with rural development projects. Rural development projects should be formulated to deal with these needs, or existing projects modified based on the changing assessment of needs.

After the projects are designed (or revised) to meet rural needs, criteria must be developed for allocating project funds. At the ministry or department level, this allocation should be done by province, using overall funding policy guidelines established by the NRDC for the distribution of projects within regions.
Three types of information are required to perform this project planning function:

1. Relevant data drawn from the village baseline data (NRD 2 C). First, information from the NRD 2 C which is pertinent to the project managed by the department will be important in defining the level of need, and the location of that need. For example, the Department of Health, in planning its Environmental Sanitary Project to build Water sealed latrines, would want to receive information on the number and distribution of households without water. Second, demographic data from the village survey which allows planners to account for varying size of the target areas. Third, an indicator that measures overall "poorness" would also be used in resource (or project) allocation, in accordance with Sixth Plan policy which indicates that resources for rural development should be allocated to the most backward villages.

2. Technical data collected by the department which define the relative development potential of the province in relation to project criteria. For example, in planning a Land Titling Project to address the problem of landlessness, the department needs to know where public land is available. Without public land, there is no opportunity for a land titling project.
3. Policy directives and program structure. Information on Ministry/Department programs to operationalize RTG policy for rural development must be communicated to the province for their use in resource allocation. This would most likely be accomplished through the program structure and suggested guidelines for project allocation.

After manipulation of these data, departments and ministries can formulate policy priorities for the province to use in preparing their annual province plans (NRD 3). These policy priorities should include:

1. Budget Planning levels for each project for each province.
2. Criteria for use of technical and development potential information.
3. Policy criteria for allocation of projects within the province.

After submission of the provincial plan, divisions and departments can check provincial funding requests to be sure policy directives have been followed. The department then makes its final project funding allocation decisions, based on the process and criteria described above. The focus of the department activity in this process would be the use of criteria of need, degree of backwardness, and demographic factors to determine.
5.2.2 Monitoring

A department's objective in monitoring is to keep continuously informed of whether projects are progressing as scheduled; and if not, what the problems are, and what action is needed. To effectively monitor its projects, a department needs the following information:

1. Periodic reports on overall progress in implementing project in relation to a planned time schedule. This means progress by region and by province. Departments at the central level do not need detailed information aggregated lower than province.

2. Financial activity:
   a. Availability of budgeted funds
   b. Expenditure of budgeted funds

3. Physical progress or some means of regular reporting on use of planned inputs and production of outputs.

4. Identification of problems so that they can be addressed and alleviated.

Requests for monitoring information should flow from the department information system, that is, should be produced automatically from the final approved provincial plan. These project monitoring forms which based on the project implementation plan, should be sent on a trimester basis for completion at the provincial level. At the province, the completion of this report should be based on a report of project activity from each district.
Upon return of the report to the department, the results should be entered into the department information system and used to analyze project progress for planning in subsequent years.

In addition, a summary of these provincial monitoring reports will be prepared by the department and submitted to NRDCC. Overall summaries of NRD Program activity will then be prepared by NRDCC for submission to NRDC.

5.2.3 Evaluation

At the department level, the purpose of evaluation is to determine if the project objectives and purposes were met. If they were not, the evaluation should identify what went wrong; whether the project should be modified; and if similar projects should be implemented in the future. Thus, it provides feedback into the planning/budgeting component. To carry out evaluation, departments need the following information:

1. Relevant descriptor variables; in most cases, these would be the same as those used in the planning/budgeting component but compared over a time span.
2. Target and actual outputs (achievements).
3. Project locations.
4. Project budget expenditures by province.

The evaluation information will also be used to enhance the planning process in future years and to redesign projects to correct weakness or ineffectiveness. Specifically, the
evaluation information will address the pattern of success across the country in terms of the degree to which target objectives were realized. Individual study of sample local sites should also provide evaluation results which will be useful for subsequent planning and budgeting activities.

5.3 Information System at Provincial Level

During the operation of the information system over the past 5 years, the information processing has been done in batch jobs and printed report has been distributed to all central and local agencies. A large amount of data at local levels employ manual processing which is time consuming and inefficient. In addition, it creates a bottle neck in data entry system at IPIED.

To strengthen the structure of government agencies and increase the efficiency of rural development process, the Sixth Development Plan (1988-1992) gives the endorsement to decentralize the national information system to provinces and all related departments.

In October 1987, with the loan fund to strengthen the rural development from U.S. International Development Cooperation Agency (USAID), NRDCC was able to provide 102 micro computers for 72 provinces and 30 central agencies, NRDCC also supported IPIED to further study and develop an appropriate software for provincial and departmental rural development processes.
The information system at Provincial level is designed to serve 3 major tasks which conform to the administrative processes at Ministry and Department level, i.e.; planning, Plan coordination, Monitoring and Evaluation. The general characteristics of the system can be described as follows.

5.3.1 The Planning System

The main objective of this Planning System is to facilitate Provincial offices in utilizing the data from this system for resources allocation planning. The system consists of 4 sub-systems as the following:

(1) Village Data (NRD 2 C).

This sub-system accesses the NRD 2 C data file to display or print the information of villages survey 1986/1987. There are 5 economis, health, education and labor force.

(2) Village Development Indicator.

The indicator is a scoring system to measure the well being of each village for each development sector. There are five major sectors, infrastructure, economics, health, water resources, and education. The sectors are also broken down into another 34 respective development items.

(3) Supporting Data.

The intention of this sub-system is to allow Provincial Offices to have their own data items which they feel necessary to be stored. These data items can be input into computer by using special function to create data entry format. The stored information, then, can be retrieved for future utilization.
4 Identify Target Villages.

The function is to enable users to enter project conditions in order to list all villages that meet those criteria. This will facilitate all agencies to plan more accurately on target sites. The requirements are based on the data from all sources included in the system.

5.3.2 Plan Coordination System

This system is intended to put together all data related to plan coordination. The system will enable provincial administrator to examine project data and build target operation plan more effectively. Plan coordination system consists of 8 functions as the following:

(1) Enter District Development Plan.

This sub-system is a data entry format for District Development Plan. All district requested projects will be input into computer. The input screen is designed to look alike the project requested form for the simplicity of entering data. Printing utility is also included for on desk evaluation.

(2) Approved Provincial Development Plan.

This procedure will allow responsible officers to scrutinize all district requested projects prior to be approved as the provincial plan. The approval processes can be achieved by selecting by project or by target group. The processes must be performed manually to ensure correctness.
(3) Approved Operation Plan.

3.1 Manual Approval

The manual process function of approved operation plan aims to facilitate provincial authority to key in approved projects which were allocated by non computerized agencies.

3.2 Automatic Approval

Automatic Approval is handled by computer program which checks the NRD-5 diskette sent from central agencies. The program will search for matching projects identification of NRD-3, then the project status and related data will be changed to provincial operation plan.

(4) Enter Non-NRD Project

To help provincial offices to collect other non NRD-project data, for example project allocated by non profit organization, private sector, and provincial government. This will be a boon to management level in determining a suitable development plan for all target sites.

(5) Data Comparison Table.

The Comparison Table is aimed to let user select any data items of any village from both baseline data file and supporting data files.
(6) Identify Target Villages.

The function is to enable users to enter project conditions in order to list all villages that meet those criteria. This will facilitate all agencies to plan more accurately on target sites. The requirements are based on the data from all sources included in the system.

(7) Identify Village/Project Relationship.

For the purpose of plan-coordination in reducing target redundancy, this function will list all project sites by entering project id. Vice versa, by entering a village name, all projects that were allocated or requested by that village will be listed.

(8) Print Development Plan/Operation Plan.

This printer function is specially designed to meet the requirements of plan printing operation. The plan printing requires several options more than normal printing routine, for example, requirements to print any specific page, all pages, a project, a group of project activity, etc.

(9) Summary Development Plan/Operation Plan.

The purpose of this function is to summarize a number of projects, and budget requested by or allotted by all agencies. Moreover, sectorial summarization is also included. This routine aims to allow high ranking managers to have macro information about the projects.
5.3.3 Monitoring and Evaluation

Monitoring and evaluation processes are tools which help planning process to achieve successfully. Monitoring and Evaluation system consists of 5 major functions as follows.

1) Project Monitoring
   (1) Print Monitoring Form
       This function prints monitoring form for each project. The form includes project status, budget allocated, budget disbursement condition, and obstruction report.
   (2) Enter Progress Report
       This function allows entering the data collected from item 3.1.1 into computer.
   (3) Project Progress Report
       To list progress report of a project at any site on its activities operation and budget status.
   (4) Project Obstruction Report
       To list obstruction report of projects at any site or all sites, the report includes problems in organization, coordination, security, budget, transportation etc.

2) Summary of Progression Report
   To list progress report of group of projects by agency or ministry at any site on its activities operation and budget status.
3) Summary of Obstruction Report

To list obstruction report of group of projects by agency of ministry at any site or all sites, the report includes problems in organization, coordination, security, budget, transportation etc.

4) Fiscal Year End Summary

This report is the project activities operation report classified by agency or ministry. The function lists project progression report of each quarter of fiscal budget.

5) Summary of Obstruction Report at Fiscal Year End.

To list obstruction report at group of projects by agency or ministry at any site of each quarter of fiscal budget

6. ORGANIZATION AND MANPOWER RESOURCES PLAN

In developing information system for rural development in Thailand, The National Rural Development Coordination Center (NRDCC) was assigned from The National Rural Development Committee (NRDC) to take responsible in planning and coordination on system development while the Information Processing Institute for Education and Development (IPIED) is responsible on data processing.
6.1 Functions and Responsibilities of NRDCC

The National Rural Development Coordination Center (NRDCC) was set up under the Prime Minister Office's Regulation on Rural Development Administration. Major tasks of NRDCC are to formulate Rural Development Program, Program and Project screening, Program Coordination, Program Monitoring and Evaluation.

In order to efficiently and effectively transfer the rural development policy into implementation, key responsibility comprise of 4 main groups of activities.

1. The development of rural development information system for both central and local level to be used as tool for policy, formulation, planning, monitoring and evaluation.


3. The preparation of budget commitment to fund rural development program as specified in 2. with close coordination with the Bureau of the Budget.

4. The monitoring and evaluation of rural development both at a project and a target area levels to be used as inputs in the annual rural development program adjustments process.
6.2 The Role of IPIED

The Information Processing Institute for Education and Development (IPIED) was established at Thammasat University in 1982 as an equal status to a Faculty. Its objective is to serve as a technical unit to NRDCC in developing information system for rural development. The Secretary General of the National Economic and Social Development Board (NESDB), as the member to the National Rural Development Committee (NRDC) is the chairman of the executive board, appointed by the NRDC and the Director of IPIED is the secretary of the board.

IPIED is consisted of four sections.

1. Administrative/secretarial Affairs:
   Duty: operating general administrative work.

2. Operations and Engineering
   Duty: maintaining and controlling of computer installed at concerned agencies for rural development program.

3. System Analysis and Development:
   Duty: designing data system for rural development.
   - develop software for management of rural information system.

4. Technical Services:
   Duty: planning and conducting training programs for the end-users.
6.3 Responsible Organization at Provincial and Department Level

In order to execute the decentralize information system plan with efficiency, the Government has set up the Provincial Information Center (PIC) to handle this task.

The information center administrative organization was under the structure of provincial rural development administration. This structure, set up by the National Rural Development committee since March 1987, was that each province established a Provincial Rural Development Coordinating Center. Five working groups were formed within this center with the Information Administrative Working Group being one of these groups. When computer systems were installed in the provinces, the Information Administrative Working Group was assigned to act as the Information Center Administrative Committee. This Committee formulated policies for the Provincial Information Center.

The Information Center Administrative Organization under the Provincial Rural Development Coordinating Center was the form which was accepted by either the administrators, systems users, or systems operators. The administrative organizational structure was able to also facilitate the coordination vital for the utilization of computer and information systems for rural development administration at the provincial level.
The administration of provincial information centers was under the responsibility of the heads of provincial offices, who as heads of information centers, were to provide efficient utilization of computer and information systems. In the case that provincial information centers would like to extend their provincial information services beyond the system, the organizational structure as stated earlier was still considered appropriate provided that there should be one full-time officer stationed at the information center, particularly a technical and program maintenance officer.

There was no specification about the organizational structure and practical rules on administration and utilization of information systems for rural development at the departmental level. Consequently, computer hardware and information systems were under the responsibility of agencies which performed the functions of planning and evaluation.

6.4 Manpower Required for System Development

At present, 40 officials are assigned to work in information system development, data sorting and data processing. From this number 15 persons attached to NRDCC, the rest are officials and employers at IPIED.

6.5 Financial and Technical Supported

In 1982, JICA, under Japanese Government, has given U.S. $1,880,000 for computer and necessary equipment which consists of
1. NEC 350 central processing unit of 6 MB, with virtual memory management.
2. Disk drive 7 units, 200 MB each
3. Tape drive 3 units, 2 drives each
4. Line printer 2 units
5. Cord reader 1 unit
6. Key to floppy data entry 30 stations.
7. Local/remote terminal 24 stations, intelligent, each with 384 kByte memory unit and 2 floppy disk drive

Between 1984 to 1988, USAID has supported the loan for amount of 4 million US. dollar for the following activities.

1. System design and software development for central and provincial level
2. Training of end users at all levels
3. Procurement of 102 micro-computers to install at central agencies and 72 provinces.
4. Other activities insupporting above mentioned activities.

Besides external donor Royal Thai Government has also provided regular budget about U.S. $ 180,000 to NRDCC and U.S. $ 280,000 to IPLED annually.
7. TECHNICAL STRATEGY

7.1 Basic Design Policy for Computerized Information System

The information processing system for the rural development is an extremely large system. To conform with the current manual rural development cycle, an understanding of information utilization for planning, plan-coordination, and monitoring and evaluation must be gained. The designed system must be user-friendly and easy to operate, since computer technology is still beyond most of rural officers' knowledge. In addition to prompt and accurate processing, the system should be economical as well as a standardized configuration to work in remote areas. Moreover, it must be constructed to work compatible with the information stored on the mainframe.

7.2 Data Base Development and Management

The main data base for rural development management is the NRD 2 C Data base. This data base provides a means for a relatively rapid survey of the standards of living in each village in order to classify the relative levels of development and to identify poverty areas. The levels of development are distinguished into three categories, namely 'progressive', 'moderate' and 'regressive'. Designation as 'progressive' areas or 'progressive' villages means that the situation in these particular areas is superior to the situation on the average, in the entire country; 'moderate' means an area or a village in which
the degree of problems is symptomatic of the average situation in the country; and 'regressive' means that specific problems are concentrated in that particular area to a degree above the country wide average.

Due to the fact that the NRD 2 C is a relatively rapid survey, its indicators are designed to render crude figures which include several factors. These factors, according to NRDC, reflect the level of development. They are classified into five basic problem groups which cover general factors and basic infrastructure, economic factors and social factors.

The NRD 2 C questionnaire is designed in keeping with the above objectives. The data are grouped into 34 indicators covering the five basic problem groups, namely:

(A) Problems of Basic Socio-Economic Structure

1. Settlement
2. Electricity
3. Transportation
4. Rice Mill or Private Business
5. Housing Drability
6. Woodlot and Fuel
7. Occupation and Employment
8. Animal Labour
9. Wages Rate
10. Land Ownership
(B) Problems related to production
11. Rice Production
12. Upland Crop Production
13. Other Occupation
14. Poultry Death Rate
15. Labour Migration
16. Farmers Organization
17. Agricultural Credit Sources
18. Off-season Farming

(C) Problems related to Public Health
19. Public Health Service in the Village
20. Public Health Services in the tambon
21. Households Hygiene
22. Health Condition
23. Medical Treatment and Nursing care Services
24. Infant Health
25. Children Health
26. Vaccination
27. Family Planning
28. Knowledge of medical usage

(D) Problems related to Water Supply
29. Drinking and domestic water
30. Water for agricultural purpose
(E) Problems in Relation to Knowledge

31. Villagers education level
32. Public education services
33. Religious, Cultural and Recreational Affairs
34. Education center in the village

In conducting the survey, the Sub-district Advisory Committees were responsible for collecting data, using structured questionnaires which were administered to groups of respondents as follows:

The first group consisting of village leaders. These persons are expected to be able to give reliable data on such broad issues as number of households, occupation, migration, birth rate etc.

The second group consists of 8-15 villagers who are well informed on what is going on in the village. These villagers are those deemed to be qualified to supply the information which concern all villagers, such as land holding size, yield, indebtedness etc.

The NRD 2 C questionnaire was designed by the National Rural Development Coordination Center (NRDCC), and the survey to collect this data for even 2 years was conducted by the Community Development Department, Ministry of the Interior with assistance...
given by the officials assigned to the sub-district level by the other three main ministries. In 1984, which is the first time that the survey was conducted for all villages in the rural areas of the country, about 54,801 villages. The Information Processing Institute for Education and Development at Thammasat University is the responsible agency to process this data using a mainframe computer.

7.3 System Development

The software development procedures are divided into four folds. The first phase covers the rural development system analysis, system requirements and other related procedures of three major rural development cycles namely the planning, the plan-coordination, and the monitoring and evaluation. While the second and third phase are dealing with programming and testing the provincial and department system and the fourth phase concentrates on the system installation and personnel training.

First development phase, the system analysis has been conducted by a team of rural development, and computer sciences specialists who have been the initiators of the national rural development information processing processes. The analysis team conduct several field visits in 4 sample provinces to observe and interview provincial officers for details of the manual operation.
Upon the recommendation from the analysis study, a stand alone 16-bit microcomputer utilizing MS-DOS as the operating system and Thai character generator has been suggested. The relational database management system for this process is selected because it is the most familiar to users for extracting information for other usages, and the Dbase III plus is used. However, the software itself is not purely Dbase III programs. It consists of several programming languages such as Pascal and C. These languages are used frequently to develop tool box library which can be retrieved to manipulate at various stages of the system, for example, menu driver, area selection, and data entry. Most of data file structures are simulated from central mainframe system in order to facilitate the flow of data by means of diskette carrier. In addition, the construction of interactive and user friendly system using pull down menu, window displaying techniques and spreadsheet imitation displaying format are implemented. Help messages are clearly printed on all screens. Data maintenance, error recovery, error protection, and security protection are also included in the system. Most importantly, all system functions must be able to display in Thai and must serve the three important functions of system cycle.

Technically, programming to simulate rural development concepts is not the difficult part of the process, since most programmers are attached to IPIED which has sufficient background of rural development work. However, weekly review sessions were conducted in order to reconcile on issues such as system files, standard programming techniques, function and system interfaces, new tool box utilities, and etc. This system is required to be
completed within a short time period due to the limitation in managing the USAID loan fund. Therefore, most programming staff worked late at night and usually were at terminals even on weekend. It took approximately 4 months to complete the programming part which was considered quite short for this system scale.

Testing the system, again has to be performed in a limited time period. In order to assure that the system function properly, NRDCC put forth an installation plan by distributing the system to only 10 provinces out of 72. This will let IPIED have time to do corrective maintenance prior to installation throughout the country by September of this year.

7.4 System Installation

Installation of a computer system to facilitate work load at provinces is a new experience. NRDCC set up Provincial Information Center (PIC) to handle this task. The Provincial Rural Development Committee is responsible to set up their own policy objectives, scope of work, budget, and yearly planning. The Provincial Office which acts as the province's secretarial office is responsible for PIC management this includes normal maintenance, supply procurement, inventory control, service coordination, and budget preparation. Provincial Statistics office is responsible for technical advisory, data collection, tailor made data manipulation, and information services.
In addition, information requesting regulation, operation timetable, operating regulation are set as a guideline. However, Provincial Committee can adjust and improve the regulations to fulfill their actual operation, since this is the first installation ever. Therefore, a standardized format is still needed to be identified.

7.5 Provision of Users Manual

System technical documents were prepared briefly due to short development cycle. Data flow diagram, function flow diagram, HIPO diagram, and data file structure are used as macro design tool. For modules internal logic, it was left to programmers to exercise their abilities and write a pseudo code or comments as appropriate within the routines.

User's documents consist of three parts. First volume deals with the application of the system information toward three major rural development processes. Second volume is the user manual which was written in yellow pages like format with screen dump and operating procedures. The last volume covers the detail of file description for user to access the information from the system for other purposes. In addition, utilities tool box and that character generator functions and descriptions are also included in this issue for advanced users to develop their own application.
8. IMPLEMENTATION PLAN AND STRATEGY

NRDCC allocated approximately $500,000 of USAID loan fund to procure 102 sets of microcomputer, of which 72 sets were distributed to provinces while the other 30 were used at various departments in Bangkok.

The first lot of installment was done in February 1988 for 10 provinces and 21 departments. After the first installment, NRDCC in collaboration with the National Institute of Development Administration (NIDA) was conducted the system evaluation in order to find the weakness of implementation plan. Many recommendations from this evaluation have been used in adjusting the implementation plan for the second installment to cover the 62 provinces and 9 departments which started in September 1988.

In general, the evaluation revealed that "the development of computerized information system at provincial and departmental levels showed a proper attempt to apply information technology to rural development management. The system also employed distributed administrative structure which is now generally preferred to the centralized systems. From the technical point of view, the systems allowed moderate-to-high effective utilization. This is quite impressive for the initial stage of the information development cycle".
8.1 Period of Information Utilization

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<td>(b) Summary of NRD 2 C BMN</td>
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<td>(i) Reports of villages according to projects</td>
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</table>
Monitoring and Evaluation System

(a) Plan monitoring


8.2 Factors Affecting Successful Implementation of The Information System

The key factors that were associated with successful implementation of the information system can be summarized as follows.

1) The well designed system which mean:

- That the initial system be kept as simple as possible and that it only attempt to meet the basic needs of the provinces for rural development planning and monitoring. A system which too complex is not likely to be understood by provincial staff who are not familiar with the use of computers.
- That the system is based on data and information needs defined by the users of the system. This requires careful, systematic definition of those requirements with participation of provincial management level officials those who actually do the planning and participate in the real program decision making. This step is crucial to the process; provincial officials will use the system if they believe it meets their real needs for information, which they have help to define.

- That the system allowed the users to entry other set of data beyond the installed data bases and also manipulated them for decision making with NRD data.

2) The involvement of provincial officers in drafting instructions and manuals. In order to ensure that instructions and manuals for planning and monitoring with computerized information system are clear, precise, and understandable, the selected provincial staff were invited to participate both in the development and testing of instructions and/or manuals that are developed for rural development information system processes to be used in management cycle.
3) The provincial organization responsible in planning and monitoring were fully supported by the central which include direct funding and technical assistance at the beginning of implementation period.

4) The implementation of the information system was supported by the all levels of administrators.

8.3 Problems Encountered in Implementation

In reference to the problems specifically belonging to either the provincial or departmental levels, they can be summarized as follows:—

1) The operational procedures for computer application at provincial level may cause certain delays in the preparation of provincial development plans because the data preparation would be done by only one data preparation officer instead of scattering work to many officers.

Proposed solution

NRDCC has considered this problem and had prepared the operational guidelines by gradually feeding the planning information supplied by the districts. When the provincial development plan was taken into consideration for approval, the information already inputted would be edited whether each project was approved or not. By this means, it was expected that the planning processing would be completed in time.
2) There are personnel problems at provincial levels concerning full time operation, knowledge and capability in maintaining information systems and in developing application programs, as well as in job stability.

**Proposed solution**

NRDCC has supported the National Statistical Office at Provincial level to gain the additional manpower in supporting Provincial Information Center. The manpower which needed for each province are 1 programmer and 1 operator. Besides this, the IPIED will give advice on the information system and its utilization by telephone and in the near future a hot-line service. The Computer Sales representatives will also provide repair and maintenance services. With these measures it is expected that the personnel problems at provincial levels will be alleviated.

3) There are certain departments which need much information apart from NRD information. The storing of such information as a part of the supporting information may face problems of inadequate computer space.

**Proposed solution**

The present information system for departments is only at the beginning stage, it covers only the standard functions most departments have to perform but not specifically suit their demands. It covers the NRD 2 C Database management, the interaction between provincial and
departmental level on the transfer of requests and approval, simple analysis of NRD 2 C Data base and its indexing system, and the aggregation of figures to fill in the project progress report form etc. It is therefore necessary to fulfill the need for information at department level by

- adding more decision support systems (DSS) to the existing system to enable them to better interact with both sides.
- adding new subsector databases or special technical data base as required by different kinds of function each of the departments has to perform.

4) The software programs were developed under Thai card which possessed specific distinctive characteristics, in particular the Thai language system. In this case, there would be a technical problem, with no solution, of incompatibility among other computer already possessed by the provinces or departments.

8.4 Training program

There are two courses of training program :

A. Training which was organized by the vendors. The objective is to train the information users and operating officers on preliminary knowledge on Microcomputer, Data Processing, Operating system lotus, Dbase and PASCAL program. The duration for training was 10 days.
B. Training which was organized by IPIED

The primary objective of the training is to train officers on the procedural and utilization of the Planning Information System. The processes cover three major tasks: Planning, Plan Coordination, and Monitoring and Evaluation.

(1) Target

a. Administrators: Consisting of department directors, and deputy governors.
b. Information Users: Officers who are responsible for provincial or departmental rural development processes.
c. Operating Officer: Consisting of operator, provincial statistician, and manager of computer center.

For target a, the training involves the benefit of the information system and national policy in managing the information system.

For target b, the training involves introduction to the utilization of information, benefit of data, application of information to support the three major operations: planning, plan coordination, and monitoring and evaluation.

For target c, the training involves operating procedures of the developed information system, technical characteristics, and raw data utilization techniques.
(2) Number of Trainees

Provincial level - for each province

- Target a. Governor or his representative 1
- Target b. Ministrial Representatives 5
- Target c. Provincial Statistician 1

Operating Officers 2

Total 9

(3) Training Steps

Day 1

Target a. Train administrators to comprehend national policy concerning the computer equipment and the information system.

Target b. and c. Train responsible officers to understand the software performance and benefit of the information systems.

Day 2

Target c. Train operating officers to be able to operate the software package concerning the Planning System and some parts of Plan Coordination System.

Day 3

Target c. Train operating officers to be able to operate the software package concerning the Plan Coordination System and the Monitoring and Evaluation System.
Day 4

Target to train operating officers to be able to operate the software package concerning the Maintenance System, the User Management System, and raw data utilization techniques.

9. EVALUATION OF COSTS AND BENEFITS

9.1 Cost Incurred (U.S. dollar)

1) Mainframe installment at IPIED
   - JICA grant $1,880,000
   - RTG budget $120,000
2) 102 Micro computer procurement $500,000
3) Software development $50,000
4) Staff training $92,000
5) Administration cost at NRDCC and IPIED $460,000 annually

9.2 Expected Benefits

The use of computerized information system for planning, plan coordinating, monitoring and evaluation had not been seriously started yet. The computer would be operate by provinces for the preparation of provincial development plans and provincial annual operational plans during the period of August to November. As for the monitoring and evaluation of development projects, they would be conducted at regular intervals of every four months. Agencies and offices at departmental levels would employ computer system for managing their development planning.
during May to June and for considering project approval during November to May of the following year. For this reason the benefits of using the computerized information system in rural development processes can not be quantify precisely. However the projection of the utilization of information system in general, at provincial and departmental level alike there was an opinion that information system are very profitable for rural development management and well help to reduce tremendous work load on preparing provincial plan. It was found that the number of printed letters in provincial plan differed approximately 20% from one year to another; the remaining 80% were repeated words.

10. IMPACT OF THE INFORMATION SYSTEM

The actual impact of the system toward rural development is not yet to be seen, since the system has been installed at the first 10 provinces for only 3 months, and the nation wide distribution is not scheduled until September, 1988. However, the expected benefit which NRDCC and the developer are eager to achieve are as follows:

a. Provincial officers at all levels will have both timely and immediate information to support decision making. This will reflect a better planning which can resolve problems to meet demands of local people.
b. Project requesting and allocation will be more systematic and standardized. In addition, it would reduce paperwork since all information will be stored on diskettes, with more efficiency to transfer. This should speed up the process of bottle neck data entry at central computer center.

c. Project planning will accomplish more accurate targets which will prevent the loss of government budget in allocation error.

d. Project ex-post analysis on project performance and project effect upon development will be well monitored at both national and provincial levels.

e. Provincial government will have a tool to manipulate information for their own research work and support other functions besides rural development processes.

11. CONCLUSION

During the course of the Fifth and Sixth National Plan, the National Rural Development Coordinating Center (NRDCC) has been established to undertake the secretarial functions of the National Rural Development Committee (NRDC) which comprises 6 key ministers, about 30 departments and 72 provinces.
The major functions of the NRDCC are to propose for NRDC consideration the short and long term plan for the National Rural Development Programme, the design of subprogrammes/projects to be included in the Programme, the estimation of total budget required, the formulation of implementation guidelines for involving agencies at all levels, the monitoring of the programme implementation and the evaluation of programme impact on social and economic condition of rural people. The above tasks require a very high level of liaisoning across agencies both horizontally and vertically.

NRDCC with full support from USAID has been successful in introducing vital management tools to undertake these tasks. A set of microcomputer was provided for each participating agency in both central and provincial level. The Rural Development Management Information System softwares for provincial, departmental and national level has been developed and training provided for users and officials at all level to operate their own system. A set of development indices for village level has been developed and used as standard development reference for involving agencies in allocating their resources to the most needed area, and in evaluating the impact of the programmes, projects they have undertaken for the rural people.
Though it proves that the adoption of MIS as management tools at all levels enormously helps to facilitate the coordinating works, the level of information utilization and sharing across agencies is not yet satisfactorily. There appears to be some duplication to the extent that an integration of all the efforts and resources allocated for this purpose would be sought for.

To efficiently and effectively utilize the system, NRDCC planned to continue the following activities.

A. The improvement and enhancement of the NRDCC/MIS
   - the addition of DSS for macro planning
   - the establishment and implementation of NRDCC/MIS within NRDCC, NESDB

B. The improvement and enhancement of DMIS
   - the addition of decision supporting systems (DSS) to the existing systems
   - the inclusion of other sector databases and the establishment of network communication
   - the training of service staff and promotion programme of senior administrators to keep up with rapid change of IT
c. The improvement and enhancement of IMIS
- the addition of decision supporting system (DSS) to the existing systems
- the inclusion of other sector databases and the establishment of network communication
- the training of service staff and promotion programme of senior administrators to keep up with rapid change of IT.

To conduct the aforementioned activities, NRDCC will seek some technical assistance from abroad to support Royal Thai Government efforts. At the same time, it would be appropriate to establish linkages with overseas institutions or organizations and exchange IT experiences with other developing countries in order to be abreast of any development in this field.
REFERENCES


SPECIFICATIONS, DRAWING AND OTHER REQUIREMENTS.

SPECIFICATIONS AND DRAWINGS

MICROCOMPUTER

Computer ready-to-operate unit with
- one system unit
- one CRT display
- one printer

Each set shall be operable under non-air-conditioned environment with provincial power supply quality, which may be subject to brownouts and outages. The microcomputers shall be installed at different sites throughout Thailand. The quoted price is inclusive of basic installation expenses at the target sites. Basic training of operation personnel shall be conducted in Bangkok.

The Specification.

The following descriptions are MINIMUM requirement. Bidders may propose goods which have specification above the stated values. Over-specifications, if proposed, shall be accredited according to their relative value to NRDGC.

For each set:

Central Processing Unit: True 16 bit processing elements,
                       20 bit address bus.

Main Memory: 640 KB for read/write,
              Expansion capacity to more than 4 MB.
Data Storage:

(1) 2 Unit Non-Removable Hard Disk Drives capacity 20 MB, average seek time less than 35 ms

(2) 1 Unit High Density Floppy Drive (1.2 MB)

(3) 1 Unit standard 2-sided Floppy Drive (360 KB)

Display Adapter(s):

Support following feature:

- 80·25 English/Thai Characters per screen
- True 25-line display of Thai Texts
- Character cell in thai mode of 9·28 dots or larger
- Monochrome graphics (all points addressable) of 720·348 and 720·704 pixels
- Large Character display of English Characters under Thai/English mode
- Supports line graphic characters with Thai texts on screen

Peripheral Interfaces:

One parallel (Centronics) printer interface
Two serial (RS232c or RS423) interface.
Keyboard: Typewriter keys (Thai/English),
Calculator-key keypad,
Programmable function keys.

CRT Monitor: High resolution monochrome display,
14 inch diagonal, reduced glare surface

Printer: 24 wires printing head,
15 inch carrier,
Thai/English characters
136 characters per line (pica)
272 characters per line (compressed)
260 characters per second in draft mode and 85 characters per second in near-letter-quality mode.
parallel and serial interface,
6000 characters internal buffer,
Bidirectional Tractor-feeder attachment.

Voltage Stabilizer: 165-26-operating Input Voltage
220+/-5% output Voltage
500 VA output capacity
1 cycle response time
Battery back up at least 15 minutes at full load.
Operating System: DOS 3.10 (or later) with Thai

Features in system
Operable with dBase III, Lotus 1-2-3, Sidekick and PASCAL in Thai/English
Print Screen in Thai/English and all graphic modes.

Other Standard Accessories (per set):
- Mains cable for each device,
- Power distribution panel (5 outlets with one master On/Off switch)
- Interface cables between devices,
- Operating manual(s) for each devices,
- Operating System Package (Diskettes and Manuals),
  - 30 High-Density (1.2 MB) Blank diskettes,
  - 30 Double-sides Double Density (360 KB) blank diskettes,
- 10 Ink Ribbon cartridges
- 10 boxes 11" x 15" continuous stationery (200 sheets per box)
- 5 boxes 11" x 9" continuous stationery (2000 sheets per box)
APPENDIX B
LIST OF ACRONYMS

BMN : Basic Minimum Needs
D-314 : Activity Results of Development
DSS : Decision Support Systems
IPIED : The Information Processing Institute for Education and Development
IT : Information Technology
JICA : Japan International Cooperation Agency
MIS : Management Information System
NESDB : The National Economic and Social Development Board
NRD : National Rural Development
NRDC : The National Rural Development Committee
NRDCC : The National Rural Development Coordination Center
NRD 2 C : Questionnaire for Baseline Data in Rural Village
NRD-1 : Sub-District Development Plan
NRD-1A : Project Effect Evaluation
NRD-2 : Project Development Account of District
NRD-3 : Project Development Account of Province
NRD-4 : Appraisal Results of Development plan
NRD-5 : Project Operation Plan of Development
NRD-6 : Policy Framework and Approach of Development
NRD-7 : Change of Target Area of Development
NRDCC/MIS : National Rural Development Coordination Center/Management Information System
NIDA : The National Institute of Development Administration
PIC : The provincial Information Center
PMIS : Provincial Management Information System
RTG : Royal Thai Government
USAID : The United States Agency for International Development
APPENDIX C

RURAL DEVELOPMENT MANAGEMENT PROCESS

BY

COMPUTER SYSTEM

MICROCOMPUTER

At

Provinces

- Planning
- Plan-Coordination
- Monitoring

Provincial Data Entry

Transfer Data by Diskettes

Mainframe

NEC

PCIED

- Collect Data And Sort On Provinces And Departments

Microcomputer

At

Departments/Ministries

- Planning
- Plan-coordination
- Supporting Data