

ANNEX ▽
AGRICULTURAL SUPPORTING SERVICES



ANNEX - V

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ANNEX - V

AGRICULTURAL SUPPORTING SERVICES

1. GENERAL

Study on the agricultural supporting services was made to clarify the present conditions of the agencies related to the Upper Pasak Medium Scale Irrigation Project Area as a base for assessing the future conditions attributable to the project. For this purpose, the data and information were collected concerning the agricultural research, extension, farmers' organizations, credit, inputs supply, etc. The data and information were obtained mainly from the Ministry of Agriculture and Agricultural Cooperatives (MOAC).

In addition, field survey mainly through interview to the village chiefs was carried out for eight typical villages in order to clarify the activities of the supporting agencies at field level.

2. PRESENT ORGANIZATIONS AND ACTIVITIES

2.1 Outline of Governmental Organizations

Government organizations are centered in Bangkok running from there to the regional, provincial, district, sub-district and village level.

The Upper Pasak Medium Scale Irrigation Project Area belongs to two districts; Lom Sak and Phetchabun out of nine districts in Phetchabun Province.

A number of governmental and non-governmental organizations play an important role in the functions of the agricultural support for improving rural life and increasing agricultural production through the intensification program, extension and research works, seed multiplication work, credit, etc.

Among a number of organizations, the Ministry of Agriculture and Cooperatives (MOAC) plays a leading part as a systematic governmental organization. MOAC consists of two major offices administering nine departments, ten divisions and eight state enterprises (Fig. V-1). The principal agencies in MOAC are as follows:

- Department of Agricultural Extension (DAE)
- Department of Agriculture (DOA)
- Royal Irrigation Department (RID)
- Cooperative Promotion Department (CPD)
- Cooperative Audit Department (CAD)
- Land Development Department (LDD)
- Agricultural Land Reform Office (ALRO)
- Central Office for Land Consolidation (COLC)
- Marketing Organization for Farmers (MOF)
- Bank for Agriculture and Agricultural Cooperatives (BAAC)

Besides the above agencies of MOAC, the Community Development Department (CDD) and Accelerated Rural Development Department (ARDD) of Ministry of Interior provide their services for improving the socio-economic conditions as well as uplifting the living standard in rural area, and Thai Tobacco Monopoly (TTM) provides inputs supply with credit and marketing services for their contract tobacco growers.

2.2 Agricultural Extension

2.2.1 Extension Work

The Department of Agricultural Extension (DAE) plays a leading role for improvement of rural life through technical and administrative services to farmers (for organization chart of DAE, vide Fig. V-2). However, the previous system of agricultural extension had been ineffectual due to the following reasons:

- (1) Number of Extension Agents (EAs) were not enough for supporting farmers and most of their works were burdened by administrative functions. The ratio of farmers to EA exceeds 2,000.
- (2) Subject Matter Specialists (SMSs) were concentrated at regional head offices and gave little technical support to EAs.
- (3) Number of materials and equipment for extension services and field demonstrations, and holding of farmer group meetings were insufficiently accommodated.

Realizing the inadequacies of the system, the Government formulated the National Agricultural Extension Project (NAEP) in 1976 under the financial aid of the World Bank, to strengthen the institution and to develop the Training and Visits (T & V) System.

NAEP was divided into two phases. Phase I; from 1977 to 1981, was to serve 2.8 million farm families in 33 provinces out of 72. Phase II; from 1979 to 1983, covers the remaining 39 provinces comprising 3.3 million farm families. Under NAEP, it was programed that the recruitment of additional staff would be promoted, and introduction or expansion of proper extension method with emphases on regular farm visit and continuous training for EAs would be implemented.

Phetchabun Province was included in the Phase I of NAEP. The program was actually commenced in October 1980, and the recruitment of EAs was initiated in June 1981 after finishing their three-week training course, and the number of EA has reached 19 persons in Phetchabun District and 17 persons in Lom Sak District, which correspond to 1:1,120 and 1:1,520 of EA-farmers ratio respectively (Table V-1). MOAC has a plan to increase the number of EA up to 25 persons in Phetchabun District and 21 persons in Lom Sak District by 1984.

Five SMSs have newly been assigned in the Phetchabun Provincial Extension Office under the NAEP program for their specific fields of vegetables, tree crops, oil crops, farmers' association and young farmers' group. SMSs take a leading part for the extension activities in the province. They hold crop yield contests, agricultural fair and show, and operate and control a number of demonstration plots and trial plots. They also supervise and assist the farmers' associations, young farmers' groups and farm wives' groups in their activities.

There are programs to hold yield contests on the three kinds of crops, i.e. paddy, maize and peanuts among the nine districts in Phetchabun Province. The contest plots for these three crops are already arranged in each district. Both the agricultural fair and show are held once a year under SMSs' leadership. The number of demonstration plots and trial plots in the two districts are 120 plots and 6 plots respectively, and their total areas are 638 rai and 6 rai respectively as shown in Table V-2.

2.2.2 Extension Methodology

The provincial and district extension offices are paying a special effort to the introduction of T & V system proposed by NAEP for the field extension activities. This system aims at the simple transmission and low-cost management practices concentrating on the main crops in a particular area. The technical advice covers the entire production cycle and also includes advice on obtaining institutional credit. Each EA will be responsible for about 10 villages, regularly visit about 100 selected "contact farmers" on the fixed day at the fixed place and time, and reach about 1,000 farm families through the "contact farmers". EAs will operate their duties on a two-week basis schedule: eight days will be devoted to visiting contact farmers in the village, one day to the fort-nightly training session and one day to special problems or activities. EAs will receive these training session and technical assistance mainly from SMSs.

This T & V system has actually been introduced to Phetchabun Province only one year ago and not fully effectuated to every village. There are big differences in its introduction among the villages, particularly in the respects of frequency of EA's visits, arrangement of contact farmers and establishment of demonstration plots as shown in Table V-3. At present, MOAC is paying a main effort to the successful introduction of T & V system, and accordingly it is expected that the extension activities in the area would be much improved in near future.

2.3 Agricultural Research

2.3.1 General

Agricultural research in Thailand is carried out by several ministries and many divisions, such as the Department of Agriculture (DOA), the Royal Irrigation Department (RID), and the Department of Livestock Development (DLD) in the Ministry of Agriculture and Cooperatives (MOAC), the National Research Council (NRC) in the Prime Minister's Office, the Thai Tobacco Monopoly (TTM) and the national universities. There are also several research teams from foreign countries, international organizations and foundations working with the Government agencies and universities. Within MOAC, each department conducts its own research program and runs its own field experiment stations scattered throughout the country.

The Department of Agriculture (DOA) in MOAC is responsible for 90 percent of Thailand's crop production research. Organization chart of DOA is as shown in Fig. V-3. DOA has a network of 85 research stations over the country and their main activities comprise routine demonstrations, testing and seed production.

Besides, the O & M Division in RID has six research stations on irrigation water use and has a particular responsibility for the research on consumptive use of water for crops, rotational irrigation system and experimental cropping of upland crops and vegetables.

2.3.2 Research Stations

There is no research station in Phetchabun Province, but several stations are operated around the province. The Phitsanulok Experimental Station in Phitsanulok Province is conducting the research for both paddy and upland crops. The Lopburi Experimental Station in Lopburi Province is responsible for research on paddy, and the Tako Experimental Station in Nakhon Sawan Province is conducting the research for various kinds of upland crops. The Chainat Research Station in Chainat Province is located at about 200 km south of Phetchabun City, which is a major center of research on dry season irrigated farming. The Samchook and Phitsanulok Water Use Experiment Station in Suphan Buri and Phitsanulok provinces are operated by RID to determine the proper irrigation water use. The data and information accumulated in these stations would fully be used the project implementation and operation. Particularly, the Phitsanulok Experimental Station is the nearest station from Phetchabun Province, and the Lopburi Experimental Station has a responsibility to give direct support for Phetchabun Province. General features of both stations are as summarized in Table V-4 and Table V-5. Both stations also have a responsibility for seed multiplication (for details, vide Section 2.6 hereof).

Although no research station exists in the Phetchabun Province at present, they have a plan to establish the station in 1983, which will be responsible for research on upland crops. It is expected that research

station to be established in the province will produce good results for improvement of farming practices and will be an important information supply center of the province.

2.3.3 Technical Information Supply

The Lopburi Experimental Station has a direct responsibility for supplying the research results to the Phetchabun Provincial Extension Office. The information supply from the station to the extension office is done through following three means:

- (1) research report published by DOA;
- (2) lecture given by the research staff at training session to be held in the province; and
- (3) direct advice from the research staff to extension staff who visits the station with specific technical problems.

All the research results examined in the research stations are sent to the headquarters of DOA and arranged together with the results from other stations as a research report of DOA, and then the headquarters of DOA distributes the report to the provincial extension offices over the country for the use of extension works.

For the supply of research results to the EAs, it is considered that direct personnel contact between research staff and EA is the most effective way, but this contact has not been made frequently so far. According to the information from the Lopburi Experimental Station, the staffs in the station are invited only once or twice a year to the training session held in Phetchabun Province and moreover few extension staffs from the province attend the session.

Realizing the present relationship between the research and extension personnels, the Government has formulated a guideline for the establishment of Provincial Technical Advisory Committee (PTAC). Following this guideline, a PTAC has been organized in Phetchabun Province also. The committee is chaired by SMS in the extension office and almost all the personnel from agricultural supporting agencies concerned join to the committee as members. A conspicuous activity has not been made so far.

2.4 Farmers' Organization

2.4.1 Agricultural Cooperatives

The first agricultural cooperative in Thailand was established in 1916. In the early stage, most of cooperatives established were village-level small credit societies which gave insufficient services to members. Under the Cooperative Societies Act in 1968, the structure was revised for creation of three-tier system. Small village societies were merged

into district level Agricultural Cooperatives. These district level cooperatives were to be members of Provincial Cooperative Federation, and the Provincial Cooperative itself became a member of the National Cooperative Federation.

The two departments of MOAC control the cooperatives: the Cooperative Promotion Department (CPD) supervises and regulates the operation of the Agricultural Cooperatives and contributes a part of the finance, and the Cooperative Audit Department (CAD) has a responsibility for auditing cooperatives.

The primary role of the Agricultural Cooperatives is the disbursement of credit. The main source of credit is from BAAC, while some cooperatives have loan from CPD and commercial banks.

There are seven Agricultural Cooperatives in the districts related to the project area, three in Phetchabun District and other three in Lom Sak District. The total members in the related districts are 5,940 or 13% of its farm families as shown in Table V-6. Most of members of the Agricultural Cooperatives in the two districts are middle-class farmers.

Among the six Agricultural Cooperatives in the two districts, the Phetchabun and the Lom Sak Agricultural Cooperatives are notable, and these two representative cooperatives are giving the members various supports such as supply of credit, distribution of agricultural inputs, market of members' products and organization of agricultural projects. However, all these supporting activities are not fully provided even by these two cooperatives, because they were established in 1975 and still in the initial stage.

Out of the total farm families, 21,360 in Phetchabun District and 25,860 in Lom Sak District, only 2,730 families (12.8%) and 3,210 families (12.4%) have become member of the cooperatives respectively.

The number of membership of the two cooperatives has not been increased in recent years, rather decreased as shown below table.

Items	1979	1980	1981	1982
Phetchabun Agri. Coop.				
- No. of Group	35	38	38	38
- Membership	2,179	2,366	2,381	2,346
Lom Sak Agri. Coop.				
- No. of Group	42	42	42	66
- Membership	3,007	2,084	2,860	2,782

Source: Phetchabun Agricultural Cooperatives and Lom Sak Agricultural Cooperatives

It is a prerequisite for a farmer to join the Cooperatives that he has to possess his own farm land and must be approved by a half of the members of his village-level group, and further he has to pass the inquiry of the Cooperatives Committee. A farmer who is a "good farmer" can be a member easily in general. Further, a farmer has to get two cooperatives shares of ¥50 each and pay ¥30 for membership fee in case of Phetchabun Agricultural Cooperatives and ¥25 in case of Lom Sak Agricultural Cooperatives.

Total loan amounts and number of clients of both Cooperatives from April 1977 to March 1982 are as shown in Table V-7, and loan disbursement and repayment records of the Phetchabun Agricultural Cooperatives are as shown in Table V-8. Average amounts of loan disbursement per client of the Phetchabun and Lom Sak Agricultural Cooperatives are about ¥8,680 and ¥8,530 respectively. Rapid increase of loan disbursement and number of clients in the Phetchabun Agricultural Cooperatives were made in 1978.

Farm inputs supply from the Cooperatives in the related two districts are not actively done. Even the said two Cooperatives supply only a few kinds of farm inputs. Table V-9 shows the stock and distribution records of farm inputs from the Phetchabun Agricultural Cooperatives in 1981.

Marketing services to the members are not so active also. The Phetchabun Agricultural Cooperatives handled only 1,390 tons of paddy, and the Lom Sak Agricultural Cooperatives handled 1,800 tons of paddy and 15 tons of maize in 1981. It is roughly estimated that only 14% of paddy production was handled by two Cooperatives out of total production of members' farm. Both the said two Cooperatives have storages for marketing of members' products; five storages in the Phetchabun Agricultural Cooperatives and four storages in the Lom Sak Agricultural Cooperatives, of which total capacities are 2,500 tons and 2,000 tons respectively.

2.4.2 Farmers' Association

DAE has responsibilities for supervising and regulating Farmers' Associations. The Associations are generally established on the sub-district bases. Major services from the Associations to members are (1) to distribute agricultural extension advice from DAE, (2) to distribute farm inputs and outputs with good prices through the Marketing Organization for Farmers (MOF), and (3) to receive credit on a group basis from BAAC.

In the districts related to the project area, there are 20 Farmers' Associations, comprising 3,100 members in Phetchabun District and 19 Associations, comprising 2,500 members in Lom Sak District respectively. On an average, 12% of farm families in the districts related to the project area belong to the Farmers Associations.

The activities of the Farmers' Associations in the two districts are very weak, though the agricultural extension offices are paying a special attention to those intensification. This weakness of the Associations is mainly derived from insufficient working funds and management staffs in

conducting their multipurpose operations mentioned above. The loans from BAAC to the Associations were stopped in 1975 because of their nominal repayment.

On the other hand, there are 16 Young Farmers' Groups and 18 Farm Wives' Groups in the related two districts under the support of DAE. DAE leads members of Young Farmers' Groups for introduction of modern farming practices through EAs. The home economist in each district office of DAE supports Farm Wives' Groups through guidance on improvement of living conditions. Overall membership under the control of DAE in the two districts are summarized below.

MEMBERSHIP OF FARMERS' ORGANIZATION UNDER DAE

	<u>Phetchabun</u>		<u>Lom Sak</u>		<u>Total</u>	
	<u>Group</u>	<u>Member</u>	<u>Group</u>	<u>Member</u>	<u>Group</u>	<u>Member</u>
Farmers' Association	20	3,100	19	2,500	39	5,600
Young Farmers' Group	4	115	12	346	16	461
Farm Wives' Group	8	197	10	234	18	431

Source: Phetchabun Provincial Agricultural Extension Office

2.4.3 Water Users' Association (WUA)

RID has a responsibility for the supervision of WUAs. The Water Users' Groups under WUA take a responsibility for control of terminal irrigation units. There is no association around the project area, though the Pasak Left Bank Project completed under MSIP program exists in the project area.

It is considered that the activities of WUA will be incorporated into the project implementation and operation and maintenance. Further details on WUA are described in ANNEX - IX.

2.5 Agricultural Credit

2.5.1 General

Institutional credit to farmers in Thailand is available through three types of credit institutions, i.e. Bank for Agriculture and Agricultural Cooperatives (BAAC), Commercial Banks, and Cooperative Organizations. Although informal credit still occupies a large portion of agricultural credit to farmers, institutional credit has increased steadily in recent years as the result of special effort given by the Government.

Agricultural credits in Thailand are generally secured by mortgages on land, personal guarantors and/or floating charges on crops or movable property. Both BAAC and commercial banks follow these practices. Agricultural Cooperatives and Farmers' Association lend to members against expected crop production as well as personal guarantors.

The results of village survey on situations of loan use and loan sources are summarized as shown in Table V-10. The table shows that about 75% of farmers in the project area are loan-borrowers, and among these farmers about 60% of farmers get loans from BAAC, 14% from Agricultural Cooperatives, 13% from relatives or neighbours, but nobody gets loan from Farmers' Association.

2.5.2 Bank for Agriculture and Agricultural Cooperative (BAAC)

BAAC was established in 1966 and stands on top of the agricultural credit institutions of Thailand. BAAC has 58 provincial branch offices and 479 district field units and operates in all 72 provinces in Thailand. The head office is responsible for planning, control of functions and administration. The provincial office controls field operations such as lending and soliciting deposits. The district office assists borrowers under the control of provincial offices. It provides loans to Agricultural Cooperatives, Farmers' Associations, and individual farmers.

BAAC provides three types of loan, i.e. short-term (12-18 months), medium-term (3-5 years) and long-term (4-15 years) to individual farmers. Borrower is required to join an informal guarantee group (Farmers' Group of BAAC) and the group has to have more than five members. Each member is liable for his own loan and for other loans guaranteed by the group. The limit on short-term loan is 60% of the value of the expected marketable surplus products. The medium-term loan can be borrowed up to ฿30,000 without collateral, if the borrower is guaranteed by two members of the group. However, collateral is required in case of exceeding this amount and for all long-term loans.

The interest rate of BAAC is regulated by the Government and currently (Sep. 1982) stands at 14% per annum for all types of loan to individual farmers. The interest rate to Agricultural Cooperatives and Farmers' Associations is 11% per annum, and they onlend to their members at 14% per annum.

Loans from BAAC to Agricultural Cooperatives and Farmers' Associations are made available under credit line agreements renewed every five and three years respectively. BAAC stipulates the amount to be used for short-term and for medium-term investments respectively. The limit on the amount of loans is 12 times of the owned funds for Agricultural Cooperatives and 10 times for Farmers' Associations.

BAAC has a Provincial Office in the Phetchabun Province and a District Office in both Phetchabun and Lom Sak Districts. The Provincial Office controls field operations such as lending appraisal, approval within authorized limits, disbursement, supervision, collection and

soliciting deposits. Under the direct control of Provincial Office, the District Offices assist borrowers in preparing loan applications and contact them periodically to check their adherence to loan conditions, particularly on use of funds and repayment, as well as to support in organizing farmers into Farmers' Group of BAAC. There are 15 Credit Officers in Phetchabun District and seven in Lom Sak District, and they are supporting farmers through the field work mentioned above.

In Phetchabun District about 400 Farmers' Groups have been established, and their members are 6,600 persons in total or about 31% of the total farm families in the district. While, in Lom Sak District, there are about 230 groups, comprising 3,500 members or 14% of the districts farm families. On an average, 21% of farm families belong to the Farmers' Groups of BAAC in the districts related to the project area as shown in the following table.

MEMBER OF FARMERS' GROUP

District	Farm Families in District/ <u>1</u>	No. of Farmers' Group/ <u>2</u>	<u>Member</u> Number (%)
Phetchabun	21,360	400	6,600 (31)
Lom Sak	25,860	230	3,500 (14)
Total or Average*	47,220	630	10,100 (21)*

Source: 1: Phetchabun Provincial Office "Summary Report on Administration", Jan. 1982

2: BAAC, Phetchabun Provincial Office

According to the information from the Provincial Office of BAAC, borrowers in the province generally use short-term loan for their seasonal production inputs, medium-term for purchase of hand tractors and cattle and long-term for land consolidation and purchase of farm machinery such as four-wheel tractors and irrigation pumps.

Number of clients, loan amounts and amount per client for the related two districts in 1981 are as shown in Table V-11. On an average of the two districts, 96% of clients in the two districts have borrowed short-term loan, 2% have borrowed medium-term loan and remaining 2% have borrowed long-term loan. While, out of total amounts of loan in the two districts, 87% was lent for short-term loan, 5% for medium-term loan and 8% for long-term loan.

The loan records on disbursement and repayment from 1977 to 1982 are shown in Tables V-12 and V-13, and increase of clients and loan amounts during the said five years are summarized in the following table on the basis of Tables V-12 and V-13.

Province/District	Client Increase		Amount Increase	
	1977-1982 (%)	Per Annum (%)	1977-1982 (%)	Per Annum (%)
Phetchabun Province	21	5.0	41	9.0
Phetchabun District	66	13.4	-1	-
Lom Sak District	14	3.4	30	6.8

Source: BAAC

In Phetchabun District, clients have increased by 66% during the five years (10.7% per annum), but loan amount has decreased by 1%. This partial increase of clients has brought smaller loan amount per client than Lom Sak District as shown in Table V-11. While, in Lom Sak District, both number of clients and loan amounts have increased by 14% and 30% during the five years respectively. On an average, the repayment rate is estimated at 74% in the Phetchabun District and 69% in the Lom Sak District as shown in Tables V-12 and V-13. Good repayment has been made for short-term loan, but not for long-term.

2.5.3 Commercial Banks

In obedience to the guideline introduced by Bank of Thailand, commercial banks have been financing a predetermined portion of their total deposits to the agricultural sector. The present percentage is fixed at 11% since 1978. Rural branches of commercial banks are also required to lend 60% of local deposit. There exist several commercial banks in Phetchabun Province especially in Phetchabun City. The loans from commercial banks are generally lent to farmers who supply tobacco to the Thai Tobacco Monopoly (TTM) Stations, to joint-liability groups, and to the Cooperatives. Most of tobacco growers in the two districts receive their farm inputs with credit provided by commercial banks through TTM.

2.6 Seed Multiplication and Distribution

MOAC has channels of seed multiplication and distribution for farmers as shown in Fig. V-4. The Ministry is paying a special effort to seed multiplication and distribution especially for basic food crops such as paddy, maize, sorghum, soybeans, peanuts, and mungbeans. The Department of Agriculture (DOA) is responsible for production of foundation seed and breeder seed on its experimental station. Foundation seed produced on the experimental station is multiplied in the seed multiplication farm within the experimental station under DOA and in the seed center under DAE. Both the experimental station and the seed center multiply quality seed under the contract with farmers.

The two experimental stations near the project area; Lopburi Experimental Station and Phitsanulok Experimental Station, keep foundation seed of paddy, and further the Phitsanulok Experimental Station has a function of breeding of paddy also. Both stations multiply paddy seed on their own seed multiplication farms and contract farmers' farms. The Lopburi Experimental Station has 300 rai of own seed multiplication farm for paddy and 350 rai of contract farmers' farms, but seed production in 1981 was only 47 tons in total. The Phitsanulok Experimental Station has 450 rai of seed multiplication farm and 200 rai of contract farmers' farms for paddy, and produced 120 tons of seed in 1981. Outline of the two experimental stations are shown in Tables V-4 and V-5, and research activities taken in the two stations are described in Section 2.3 hereof.

Around the Phetchabun Province, there also exist some seed centers; Seed Center No. 1 in the Phitsanulok Province, Seed Center No. 5 in the Lopburi Province and Seed Center No. 4 in Chai Nat Province. The Seed Center No. 1 is the nearest center from the project area. This center produces seeds of various crops such as paddy, maize, mungbeans, peanuts and cotton. The total seed productions were 560 tons of paddy, 670 tons of maize and 76 tons of mungbeans in 1981 (Table V-14). These amounts of seeds were produced under the contract with farmers. During 5 years from 1976 to 1981, total amount of seed distributed from the center was increased for three times as shown in Table V-15. The Seed Center No. 5 produces mainly maize seed. This center is operated with the technical cooperation of JICA. The Seed Center No. 4 produces mainly paddy and mungbeans seed.

Produced seed in the experimental station is generally distributed to farmers through the extension offices of DAE. The Phetchabun Provincial Extension Office distributed 6.3 tons of paddy seed to Phetchabun District and 5.2 tons to Lom Sak District in 1982 under the paddy seed exchange program. This program aims at rapid expansion of paddy field with quality seed. The quality seed is given in exchange for the same amount of farmers' paddy. However, quantity of distributed quality seed is not enough; only 3% of estimated seed requirement of 390 tons in the two districts.

On the other hand, the seed center distributes quality seed to farmers through MOF, Agricultural Cooperatives and Farmers Associations. The Government intends to give a leading part in seed distribution to MOF, but most of the seed produced in the center are actually distributed to farmers through Agricultural Cooperatives and Farmers Associations not through MOF.

2.7 Other Agricultural Supporting Agents

2.7.1 Plant Protection Unit

The Plant Protection Unit (PPU) under the Plant Protection Division of DAE has a responsibility for the techniques of pest control and lending services of sprayer to farmers. There are 30 PPUs over the country.

PPU III in Phitsanulok has a direct responsibility for pest control of three provinces; Phetchabun, Phitsanulok and Phitchit. The major duties taken by PPU III are surveillance of pest control, collection and analysis of data, forecasting and warning on pest damages. In general, PPU III gets information on pest damages of crops from the extension offices and after that makes survey on them. In case serious damages occur, they carry out chemical application in a wide scale. In PPU III they have 10 big power sprayers, 50 small power sprayers and 100 hand sprayers.

PPU III also lends sprayer at the request of the farmers at free of charge. There are ten technicians in PPU III and they give advice to farmer on chemical application together with sprayer lending service. They have also a responsibility to give technical assistance to EAs in the extension offices. They attend training sessions rotationally and give lectures to EAs.

2.7.2 Thai Tobacco Monopoly (TTM)

TTM, state enterprise, is taking specific activities in the related two districts. There are two Sub-branch Offices under the Provincial Branch Office, each in Phetchabun and Lom Sak districts, and they provide an input distribution service for tobacco supplying farmers. Inputs are generally sold on credit terms, and repayment of credit is done from purchases of tobacco. TTM also provides technical services to their contract farmers, called "quota-holders". The Extension Officers in the Sub-district Offices of TTM have a responsibility for the service. They are attached at the ratio of 100 quota-holders to one Extension Officer. There are 35 Extension Officers in the related two districts, and they cover about 3,500 quota-holders in the province.

3. PROPOSAL FOR FUTURE IMPROVEMENT OF AGRICULTURAL SUPPORTING SERVICES

As described in the previous sections, various institutional and private agencies are playing important roles in the functions of supporting services for farmers on its specific field. However, in order to ensure the agricultural development plan programed in ANNEX - IV, further improvement of support services would be needed in future with project condition.

3.1 Establishment of Project Technical Advisory Committee

The agricultural extension activities in the two districts related to the project area have been improved under NAEP. Besides, the experimental stations around Phetchabun Province have enough research results, which will be useful for initiating the project. However, a communication channel of research information supply, which will improve farming practices, is not well-established between the experimental stations and the extension offices at present. Moreover, the Provincial Technical Advisory

Committee that is intended to facilitate a close personnel communication between the two agents has scarcely been held so far.

For the improvement of this less effective situation, it is proposed to institute Project Technical Advisory Committee under the overall representatives of the O&M Office, experimental station, seed center, provincial and district extension offices and WUAs. The Committee will be held periodically under the chairmanship of the Extension Officer in the Provincial Extension Office and will be responsible for establishing priorities and formulating programs of research related to project needs and also responsible for developing extension recommendations to be used in the field.

3.2 Establishment of Seed Multiplication Farm

In order to accomplish the projected target yields of paddy, mungbeans and tobacco, the requirements of these quality seeds will increase in the project area in the future with project condition. However, existing seed distribution system in the province will not meet the future requirements except the case of the tobacco seed. The distribution of tobacco seed is effectively handled by TTM and private agents, and it is considered that requirement of tobacco seed will be assured by them in future with project condition. The seed distribution systems of paddy and mungbeans are still under developing in the province, though the relevant institutional agencies are paying an effort to establishing the effective system of seed distribution. Most of the farmers there use low quality seeds which are obtained from neighbours and private seed growers.

For solution of these problems existing in the project area, it is proposed that seed multiplication farms will be established in the Province. The experimental station which is planned to be established in the Province will take a responsibility for the research on upland crops. In order to attain the projected yield after the project implementation, however, it is strongly proposed to give this station the responsibilities for seed multiplication and research activities on paddy also.

On the assumption that paddy and mungbeans seed will be renewed every three years, the annual requirements of these seeds for the project area at full development stage are estimated at about 100 tons of HYV of paddy, 45 tons of local variety of paddy and 25 tons of mungbeans in total, and the total area needed for the seed multiplication farms are about 105 rai, 50 rai, 100 rai for HYV paddy, local variety paddy and mungbeans respectively.

The quality seed to be produced in the farm will be distributed to the farmers through the proposed WUAs.

3.3 Establishment of Water Users' Association (WUA)

In order to operate and manage the irrigation facilities within the terminal irrigation units, it is proposed to organize farmers into the Water Users' Group (WUG) consisting of about 100 farm families, and further to federate several WUGs into the Water Users' Association (WUA) in each irrigation system of sub-project. The responsibilities of WUG and WUA are described in ANNEX - IX. RID will help establishment of both WUG and WUA, and guide and assist them in their early stage.

WUA will organize the committee of WUA to be composed of 25 representative of WUGs and create the conditions of committee to be a multi-purpose cooperative which will be given responsibilities like Agricultural Cooperatives. After establishment of the committee, the members of WUA will be given several services; supply of farm inputs with credit and marketing of farm products with better conditions of private sectors.

RECRUITMENT PLAN OF EXTENSION AGENTS
UNDER NAEP IN RELATED DISTRICTS

Condition	Phetchabun	Lom Sak	Total (Average)
<u>No. of Farm Families</u>	21,360	25,860	47,220
<u>1980: Before NAEP</u>			
No. of EAs	0	0	0
Ratio, EA to Farm Families	(-)	(-)	(-)
<u>1982: Present Condition</u>			
No. of EAs	19	17	36
Ratio, EA to Farm Families	(1 : 1,120)	(1 : 1,520)	(1 : 1,310)
<u>1984: Recruitment Plan</u>			
No. of EAs	25	21	46
Ratio, EA to Farm Families	(1 : 850)	(1 : 1,230)	(1 : 1,030)

Source: DAE, Phetchabun Provincial Office
Phetchabun Provincial Office "Summary report on
administration" Jan. 1982

LIST OF DEMONSTRATION AND TRIAL PLOTS
IN RELATED DISTRICTS

Crop	Phetchabun		Lom Sak	
	No. of Plot	Area (Rai)	No. of Plot	Area (Rai)
<u>Demonstration Plot</u>				
1. Paddy	8	16	9	18
2. Paddy in big plot	1	10	1	10
3. Paddy in small plot	n.a.	35	n.a.	70
4. Paddy with intensive direct sowing in dry season	1	30	-	-
5. Paddy with intensive direct sowing in wet season	1	30	-	-
6. Upland paddy	2	10	2	10
7. Maize	n.a.	12	n.a.	11
8. Maize (variety)	1	25	1	25
9. Maize (yield)	6	5	5	5
10. Sorghum	n.a.	2	-	-
11. Sorghum (yield)	2	10	-	-
12. Second crop in paddy field	-	-	-	-
13. Mungbean	12	24	-	-
14. Peanut	8	15	9	17
15. Peanut	n.a.	24	n.a.	16
16. Soybean	n.a.	37	n.a.	30
17. Vegetables	n.a.	1	n.a.	1
18. Cotton	12	24	-	-
19. Cotton (village level)	n.a.	2	n.a.	3
20. Cotton (sub-district level)	n.a.	5	n.a.	5
21. Coffee	5	50	5	50
22. Tree crops		7400-tree		7100-tree
23. Mushroom	15	n.a.	15	n.a.
<u>Total</u>	<u>73</u>	<u>367</u>	<u>47</u>	<u>271</u>
<u>Trial Plot</u>				
1. Paddy	-	-	1	1
2. Maize	-	-	1	1
3. Soybean	1	1	1	1
4. Tomato	n.a.	2	-	-
<u>Total</u>	<u>1</u>	<u>3</u>	<u>3</u>	<u>3</u>

Source: DAE, Phetchabun Provincial Office

EXTENSION ACTIVITIES IN TYPICAL VILLAGES

Name of Sub-Project Area/ Name of Village	Frequency of EA's Visit (times/month)	Contact Farmers (No.)	No., Area, and Crop Variety of Demo. Plot		
			(No.)	(Rai)	(Crop)
<u>Huai Khon Kaen Area</u>					
1. Ban Rong Khu No. 4	1	1	4	4	Paddy
2. Ban Tiew	2	0	0	0	-
<u>Pasak Left Bank Area</u>					
3. Ban Pak Huai Khon Kaen	5	0	0	0	-
4. Ban Pak Duk No. 8	1	5	0	0	-
<u>Huai Yai Area</u>					
5. Huai Yai	2	0	0	0	-
6. Kok Riang No. 1	2	3	1 1	5 5	Paddy Maize
7. Ban Kok	1	5	n.a.	n.a.	n.a.
<u>Khlong Chaliang Lab</u>					
8. Ban Chaliang Lab	3	1	1	1	Paddy

Source: Village survey in 1982

OUTLINE OF LOPBURI PADDY EXPERIMENTAL STATION

-
1. Area
 - a. Paddy experimental field : 50 rai
 - b. Paddy seed multiplication field: 300 rai

 2. General Research Program
 - a. Yield trial on 315 varieties
 - b. Fertilizer application test
 - c. Chemical control test
 - d. Test on cultivation practices

 3. Seed Multiplication Program
 - a. Quality paddy seed production : 47 tons
 - b. Number of contract farmers : 15 farmers
 - c. Total farm area of contract farmers: 350 rai

 4. Officers and Labours
 - a. Officer
 - 1) Technicians (univ. graduates) : 5 persons
 - 2) Assistants (vocational school or collage graduates) : 7 persons
 - b. Mechanic : 1 person
 - c. Parmanent labourers : 60 persons
-

Source: Lopburi paddy experimental station

OUTLINE OF PHITSANULOK EXPERIMENTAL STATION

-
1. Area
 - a. Experimental field : 175 rai
 - 1) for paddy : 100 rai
 - 2) for upland crops : 75 rai
 - b. Seed multiplication field : 450 rai
 - 1) for paddy : 375 rai
 - 2) for upland crops : 75 rai
 2. General Research Program
 - a. Breeding of paddy
 - 1) Observation and selection
 - 2) Yield trials
 - 3) Yield trials in farmers' field
 - b. Fertilizer application test for paddy and upland crops such as mungbeans, soybeans, peanuts, maize, sugarcane, etc.
 - c. Insect and disease control test by chemicals for paddy and upland crops
 - d. Test on cultivation practices for paddy and upland crops
 3. Seed Multiplication Program
 - a. Seed production
 - 1) Paddy : 120 tons
 - 2) mungbeans : n.a.
 - 3) Soybeans : n.a.
 - b. Number of contract farmers : 15 farmers
 - c. Total farm area of contract farmers: 200 rai
 4. Officers and Labours
 - a. Officer
 - 1) Rice division
 - technicians (univ. graduates) : 10 persons
 - assistants (vocational school or collage graduates) : 6 persons
 - administrative assistant : 1 person
 - 2) Upland crop division
 - technicians : 4 persons
 - assistants : 1 person
 - 3) Technical division
 - assistants : 1 person
 - b. Parmanent labourers : 46 persons
-

Source: Phitsanulok experimental station

MEMBERSHIP AND CAPITAL INVESTMENT OF
AGRICULTURAL COOPERATIVES IN RELATED DISTRICTS

District and Name of Agricultural Cooperatives	No. of Members	Capital Investment (฿1,000)
Phetchabun (Farm Families: 21,360)		
1) Phetchabun Agri. Coop.	2,381	30,028
2) Nanguo Agri. Coop.	97	88
3) Topai Agri. Coop.	253	875
Total	2,731 (12.8) /1	30,991
Lom Sak (Farm Families: 25,860)		
1) Lom Sak Agri. Coop.	2,782	24,535
2) Kao Ko Agri. Coop.	155	66
3) Ban Klang Agri. Coop.	275	35
Total	3,212 (12.4) /1	24,636
Grand Total (Farm Families: 47,220)	5,943 (12.6) /1	55,627

Source: Phetchabun administration office "Summary report on administration" Jan. 1982

Note : /1: Numbers in () show percentage to total farm families.

TOTAL LOAN AMOUNTS AND NUMBER OF CLIENTS OF PHETCHABUN AND LOM SAK AGRICULTURAL COOPERATIVES (April 1977 - March 1982)

Loan	Phetchabun Agricultural Cooperatives		Lom Sak Agricultural Cooperatives	
	No. of Client	Amount (฿) (฿1,000)	Average Amount/Client	No. of Client
Total	6,547	56,816	8,680	4,214
Short-term	6,495	56,566	8,710	3,845
Medium-term	52	250	4,810	369
				No. of Client
				Amount (฿)
				Average Amount/Client
				Amount (฿1,000)
				Amount/Client
				8,530
				7,520
				19,030

Source: Phetchabun and Lom Sak Agricultural Cooperatives

LOAN DISBURSEMENT AND REPAYMENT RECORD OF PHETCHABUN AGRICULTURAL COOPERATIVES

Loan	1977		1978		1979		1980		1981		1982	
	No. of Client	Amount (฿1,000)	No. of Client	Amount (฿1,000)	No. of Client	Amount (฿1,000)	No. of Client	Amount (฿1,000)	No. of Client	Amount (฿1,000)	No. of Client	Amount (฿1,000)
Total	178	1,923	706	5,504	974	8,267	912	8,925	821	9,058	593	7,339
Loan disbursement	n.a	2,335	n.a	2,831	n.a	4,790	n.a	6,910	n.a	8,812	n.a	8,755
Repayment	178	1,923	691	5,409	974	8,267	912	8,925	821	9,058	593	7,339
Short-term	n.a	2,310	n.a	2,790	n.a	4,759	n.a	6,887	n.a	8,740	n.a	8,736
Loan disbursement	-	-	15	95	-	-	-	-	-	-	-	-
Repayment	n.a	25	n.a	41	n.a	31	n.a	23	n.a	72	n.a	19

Source: Phetchabun and Lom Sak Agricultural Cooperatives

STOCK AND DISTRIBUTION RECORDS OF FARM INPUTS OF PHETCHABUN
AGRICULTURAL COOPERATIVES (April 1981 - March 1982)

Goods	A Stock Brought Forward	B Newly Obtained	C A + B	D Sold	E Carrying Forward
Engine	20	-	20	5	15
Sprayer	183	-	183	96	87
Grass Cutter	284	-	284	6	278
Spare Parts (set)	5	-	5	5	0
Engine Oil (can)	1	-	1	1	0
Maize Seed (kg)	60	15,990	16,050	13,440	2,610
Rice (kg) <u>1</u>		118,799	118,799	104,568	14,231

Source: Phetchabun Agricultural Cooperatives

Note : 1: Rice for food

NUMBER OF FARMERS HAVING LOAN AND LOAN SOURCES IN TYPICAL VILLAGES

Sub-Project Area Name of Village	Total Farm Families	Farmers Having Loan (%)/3	Loan Source					Miller	Dealer
			BAAC	Agricultural Cooperatives	Farmers Associ- ation	Commer- cial Bank	Relative Or Neighbour		
Huai Khon Kaen Area									
- Ban Tiew: /1 :/2	170	110 (65) (100)	85 (77)	5 (5)	- (-)	20 (18)	- (-)	- (-)	- (-)
Pasak Left Bank Area									
- Ban Pak Duk No.8: /1 :/2	136	120 (88) (100)	72 (60)	12 (10)	- (-)	- (-)	36 (30)	- (-)	- (-)
Huai Yai Area									
- Kok Rieng No.1 : /1 :/2	150	105 (70) (100)	42 (40)	42 (40)	- (-)	11 (10)	10 (10)	- (-)	- (-)
Khlong Chaliang Lab Area									
- Ban Chaliang Lab: /1 :/2	168	139 (83) (100)	88 (63)	7 (5)	- (-)	15 (11)	14 (10)	- (-)	15 (11)
Total or Average : /1 :/2	624	474 (76) (100)	287 (60)	66 (14)	- (-)	46 (10)	60 (13)	- (-)	15 (3)

Source: Village survey, Oct. 1982

Note : /1: Number of farmers having loan

/2: Percentage of farmers having loan

/3: Percentage of total farm families in villages

NUMBER OF CLIENT AND LOAN AMOUNT FROM BAAC
FOR RELATED TWO DISTRICTS IN 1981

Loan	Client		Loan Amount		Amount per Client (฿)
	No.	(%)	Amount (฿1,000)	(%)	
<u>Phetchabun Province</u>					
Total	27,270	(100)	238,120	(100)	8,730
Short-term	26,400	(97)	223,960	(94)	8,480
Medium-term	470	(2)	6,250	(3)	13,300
Long-term	400	(1)	7,910	(3)	19,780
<u>Phetchabun District</u>					
Total	8,860	(100)	37,950	(100)	4,280
Short-term	8,530	(96)	31,790	(84)	3,730
Medium-term	150	(2)	2,410	(6)	16,070
Long-term	180	(2)	3,750	(10)	20,830
<u>Lom Sak District</u>					
Total	3,560	(100)	28,030	(100)	7,870
Short-term	3,380	(95)	25,790	(92)	7,630
Medium-term	110	(3)	1,130	(4)	10,270
Long-term	70	(2)	1,110	(4)	15,860
<u>Two Districts</u>					
Total	12,420	(100)	65,980	(100)	5,310
Short-term	11,910	(96)	57,580	(87)	4,830
Medium-term	260	(2)	3,540	(5)	13,620
Long-term	250	(2)	4,860	(8)	19,440

Source: BAAC, Phetchabun Provincial Office

BAAC LOAN DISBURSEMENT AND REPAYMENT RECORD FOR PHETCHABUN PROVINCE

Province/District Loan	1977		1978		1979		1980		1981		1982 (Apr.-Aug.)		Total/1 No. of Amount Client (\$1,000) Client (\$1,000)	Estimated/2 Average Repayment Rate (%)
	No. of Client	Amount (\$1,000)	No. of Client	Amount (\$1,000)	No. of Client	Amount (\$1,000)	No. of Client	Amount (\$1,000)	No. of Client	Amount (\$1,000)	No. of Client	Amount (\$1,000)		
<u>Phetchabun Province</u>														
<u>Total</u>														
<u>Loan</u>														
disbursement	22,470	169,970	17,900	201,610	26,490	230,490	20,590	164,010	27,270	238,120	7,700	67,200	114,720	1,003,200
Repayment	20,500	90,540	16,720	160,510	32,110	172,900	33,770	235,020	29,300	215,890	1,110	11,480	132,400	874,860
66														
<u>Short-term</u>														
<u>Loan</u>														
disbursement	18,710	122,890	13,710	143,160	22,370	170,920	17,710	120,610	26,400	223,960	7,070	57,560	98,900	781,540
Repayment	18,260	88,030	13,830	125,890	23,750	135,810	26,080	182,810	27,030	178,470	610	3,350	108,950	711,010
75														
<u>Medium-term</u>														
<u>Loan</u>														
disbursement	3,550	38,670	3,050	33,180	2,510	25,600	1,860	20,730	470	6,250	120	2,370	11,440	124,430
Repayment	2,220	2,020	2,630	29,750	6,240	26,120	6,120	32,200	1,520	15,530	260	1,350	18,730	105,620
50														
<u>Long-term</u>														
<u>Loan</u>														
disbursement	210	7,410	1,140	25,270	1,610	33,970	1,020	22,670	400	7,910	510	7,270	4,380	97,230
Repayment	20	490	260	4,870	2,120	10,970	1,570	20,010	750	21,890	240	6,780	4,720	56,230
21														

Source: BAAC, Phetchabun Provincial Office

Note : /1: Number of clients and amounts in 1982 are not included.

/2: Average repayment rates are estimated on the assumption that disbursed loans were repaid within 1.5 years for short-term, 4 years for medium-term and 8 years for long-term, and interests are deducted from the actual total repayment, and then following expressions are applied for the calculation:

$$R = \frac{TR \cdot i}{TId} (1 + i)^n$$

where, R: estimated repayment rate
 TR: total repayment
 TId: total loan disbursement
 i: interest rate
 n: repayment period

BAAC LOAN DISBURSEMENT AND REPAYMENT RECORD FOR RELATED DISTRICTS

Province/District Loan	1977		1978		1979		1980		1981		1982 (Apr.-Aug.)		Total/1 Amount (B1,000)	Estimated/2 Average Repayment Rate (%)
	No. of Client	Amount (B1,000)	No. of Client	Amount (B1,000)	No. of Client	Amount (B1,000)	No. of Client	Amount (B1,000)	No. of Client	Amount (B1,000)	No. of Client	Amount (B1,000)		
Petchabun District														
Total														
Loan disbursement	5,350	38,450	5,950	48,040	7,060	63,610	6,930	50,160	8,860	37,950	1,145	11,200	34,150	238,210
Repayment	5,880	27,770	4,200	36,590	8,760	46,830	5,300	75,750	8,220	55,430	300	1,710	32,360	242,370
Short-term														
Loan disbursement	4,370	28,610	4,770	33,570	5,800	45,090	5,790	33,230	8,530	31,790	910	7,520	29,260	172,290
Repayment	4,960	22,400	3,580	27,410	6,080	35,530	5,190	46,410	7,890	44,660	160	800	27,700	176,410
Medium-term														
Loan disbursement	890	7,910	850	7,910	760	8,120	710	8,230	150	2,410	40	1,030	3,360	34,580
Repayment	920	5,340	570	7,660	1,860	7,400	90	9,250	210	5,280	70	350	3,650	34,930
Long-term														
Loan disbursement	90	1,930	330	6,560	500	10,400	430	8,700	180	3,750	195	2,650	1,530	31,340
Repayment	-	30	50	1,520	820	3,900	20	20,090	120	5,490	70	560	1,010	31,030
Lom Sak District														
Total														
Loan disbursement	3,110	21,570	2,270	26,110	3,330	27,880	3,160	25,290	3,560	28,030	810	7,530	15,430	128,880
Repayment	2,580	15,560	2,330	20,660	4,050	23,710	2,630	28,900	3,670	27,690	280	1,820	15,260	116,520
Short-term														
Loan disbursement	2,480	14,980	1,650	17,200	2,840	21,640	2,740	20,050	3,380	25,790	720	6,380	13,090	99,660
Repayment	2,220	12,500	1,500	15,500	3,180	17,840	2,390	21,900	3,300	22,780	130	910	12,590	90,520
Medium-term														
Loan disbursement	610	6,320	530	6,430	360	3,800	230	2,790	110	1,130	20	260	1,890	20,470
Repayment	360	3,060	830	4,910	700	4,990	130	5,160	330	3,130	80	490	2,350	21,250
Long-term														
Loan disbursement	20	270	90	2,480	130	2,440	140	2,450	70	1,110	70	890	450	8,750
Repayment	-	-	-	250	170	880	110	1,840	40	1,780	70	420	320	4,750

Source: BAAC, Petchabun Provincial Office

Note : /1: Number of clients and amounts in 1982 are not included.

/2: Average repayment rates are estimated on the assumption that disbursed loans were repaid within 1.5 years for short-term, 4 years for medium-term and 8 years for long-term, and interests are deducted from the actual total repayment, and then following expression are applied for the calculation:

$$R = \frac{TR \div (1 + i)^n}{TLD}$$

where, R: estimated repayment rate i: interest rate
TR: total repayment n: repayment period
TLD: total loan disbursement

SEED PRODUCTION RECORD OF SEED CENTER NO. 1, PHITSANULOK IN 1981

Crop	Variety	No. of Contract Farmer	Area of Contract Farmer (Rai)	Production from Contract Farmer (ton)	Value of Production (฿1,000)	Unit Value (฿/ton)
Paddy	RD7 (in dry season)	22	502	113.6	454.4	4,000
	RD7 (in wet season)	40	665	307.2	1,198.2	3,900
	Kao Dok Mai 105	16	500	143.4	602.3	4,200
Maize	Suwan 1	89	2,400	699.0	2,341.5	3,350
	Mungbeans					
	Angtong (in dry season)	29	281	5.1	56.3	11,000
	Angtong (in wet season)	140	2,580	70.6	723.7	10,250
Peanuts	Thainan/1	41	150	-	-	-
	Total or Average	377	7,078	1,338.9	5,376.4	4,016

Source: Seed Center No. 1, Phitsunulok

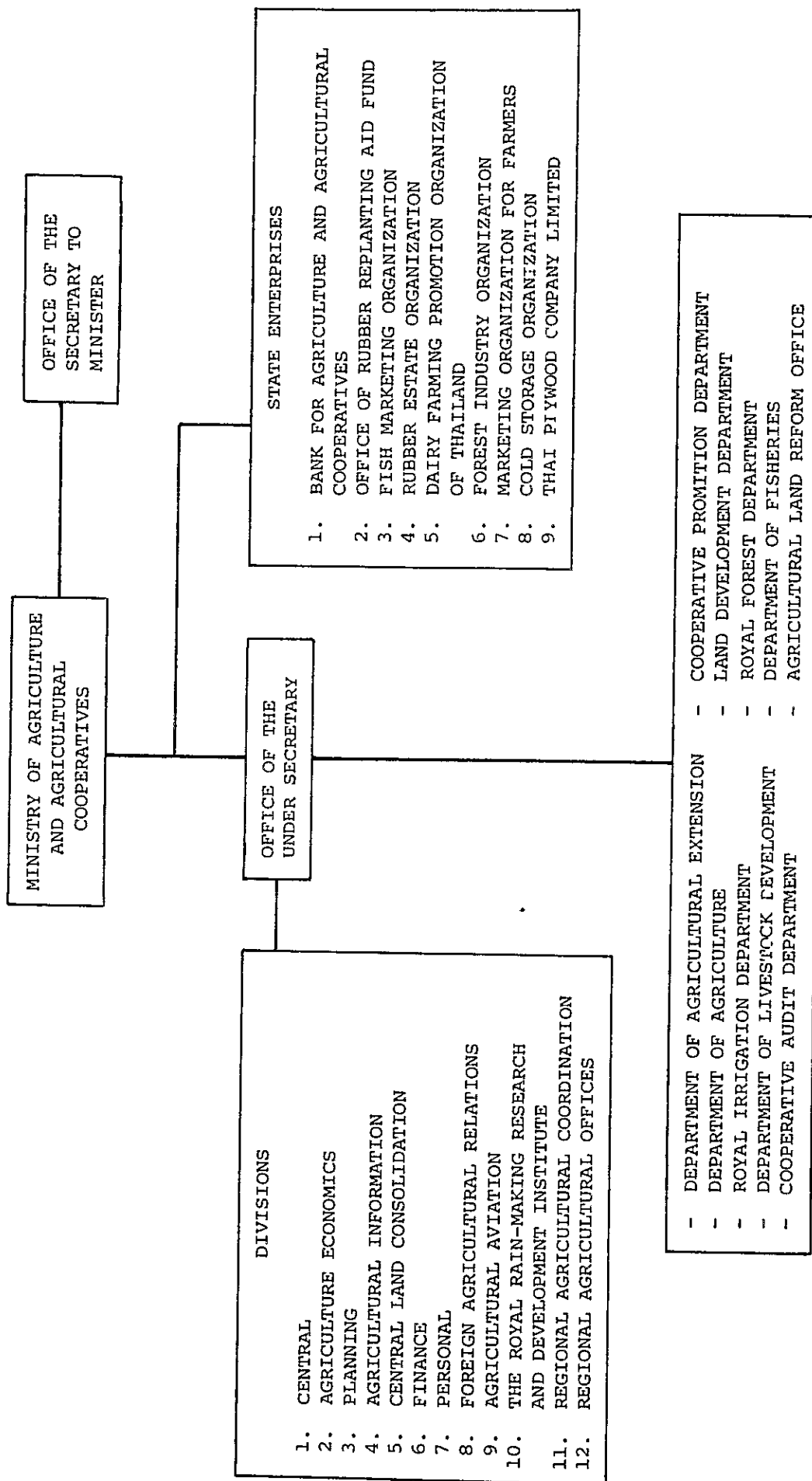
Note : /1: The center give up production because of no germination.

SEED DISTRIBUTION RECORD OF SEED CENTER NO. 1, PHITSANULOK

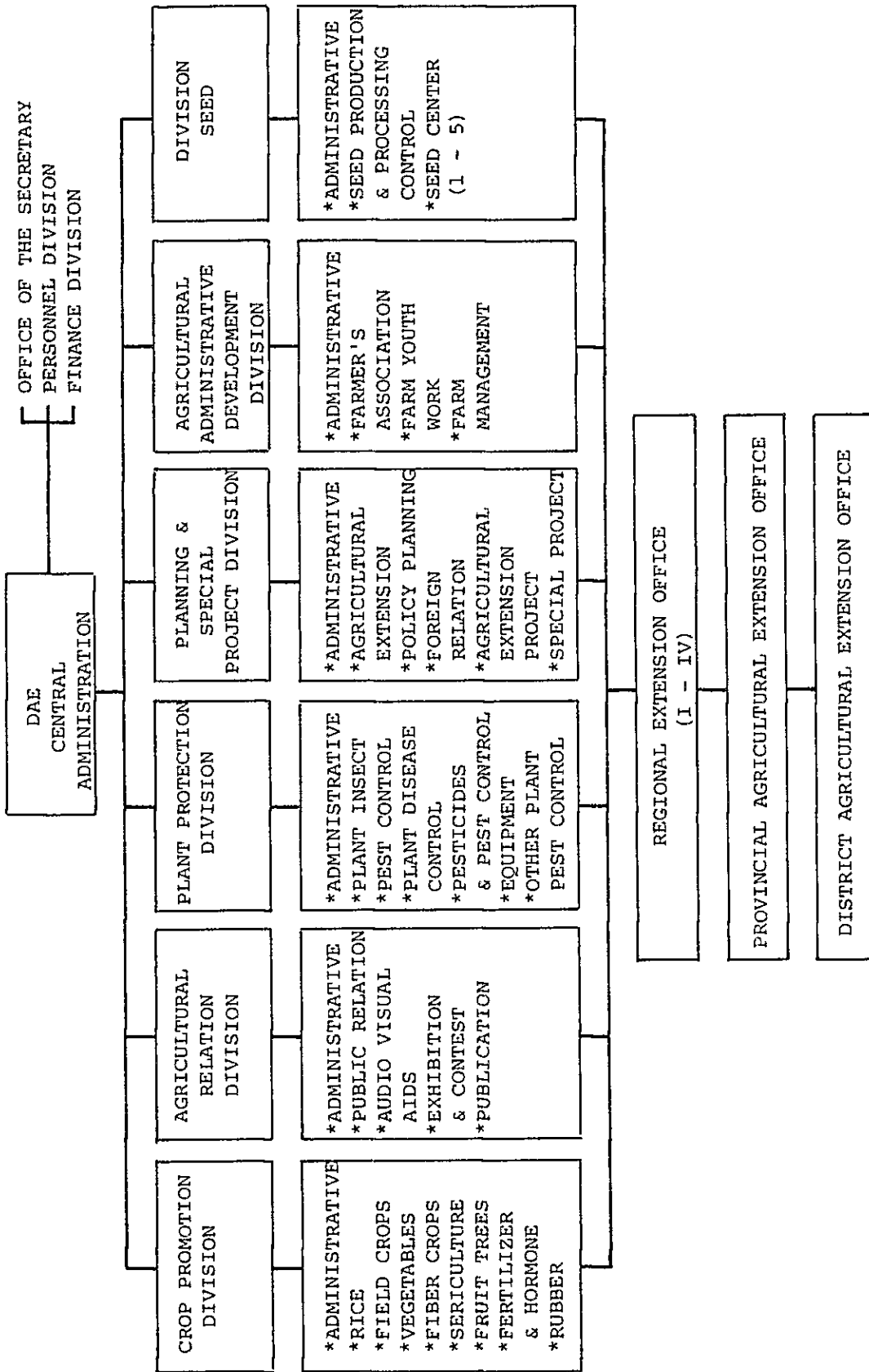
Crop	(Unit: ton)									
	1974	1975	1976	1977	1978	1979	1980	1981	1982/1	
Paddy	-	-	-	235	550	771	575	535	(362)	
Maize	-	158	175	207	240	126	346	619	(-)	
Mungbeans	-	-	5	16	22	46	114	72	(5)	
Soybeans	282	52	155	166	200	247	13	-	(-)	
Peanuts	-	-	32	2	4	33	-	-	(-)	
Cotton	-	2	71	84	-	338	250	14	(-)	
Total	282	212	438	710	1,016	1,561	1,298	1,240	(367)	

Source: Seed Center No. 1, Phitsanulok

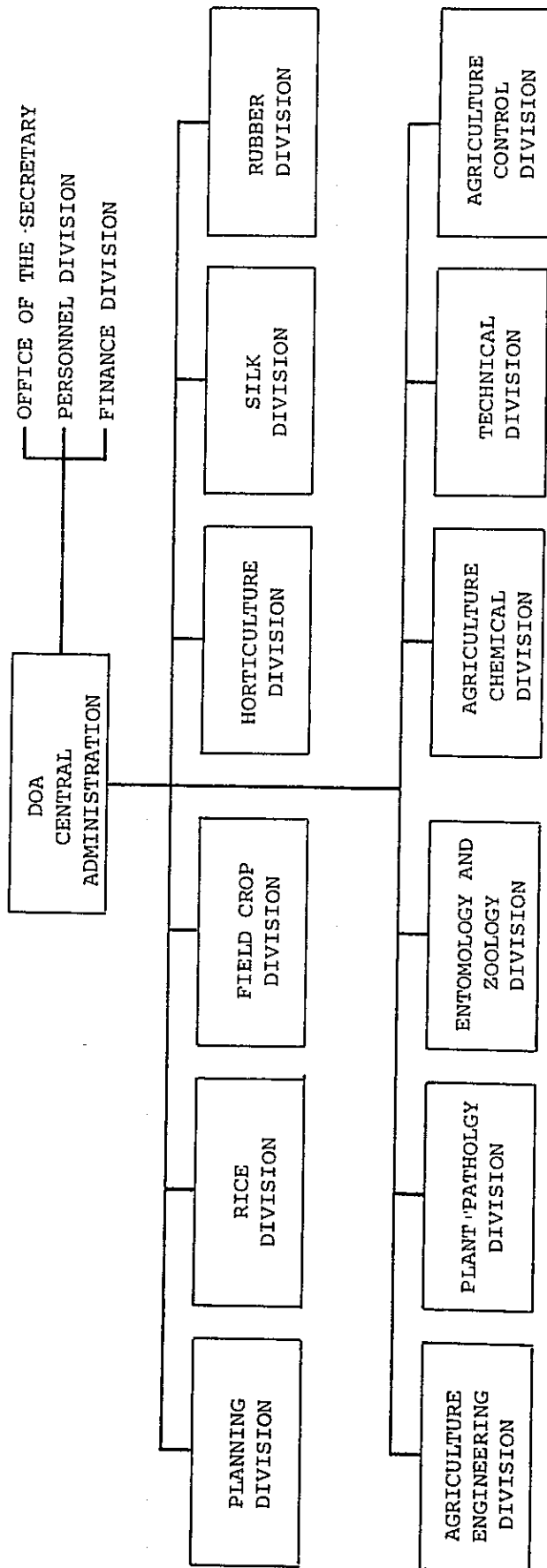
Note : /1: Production in dry season only



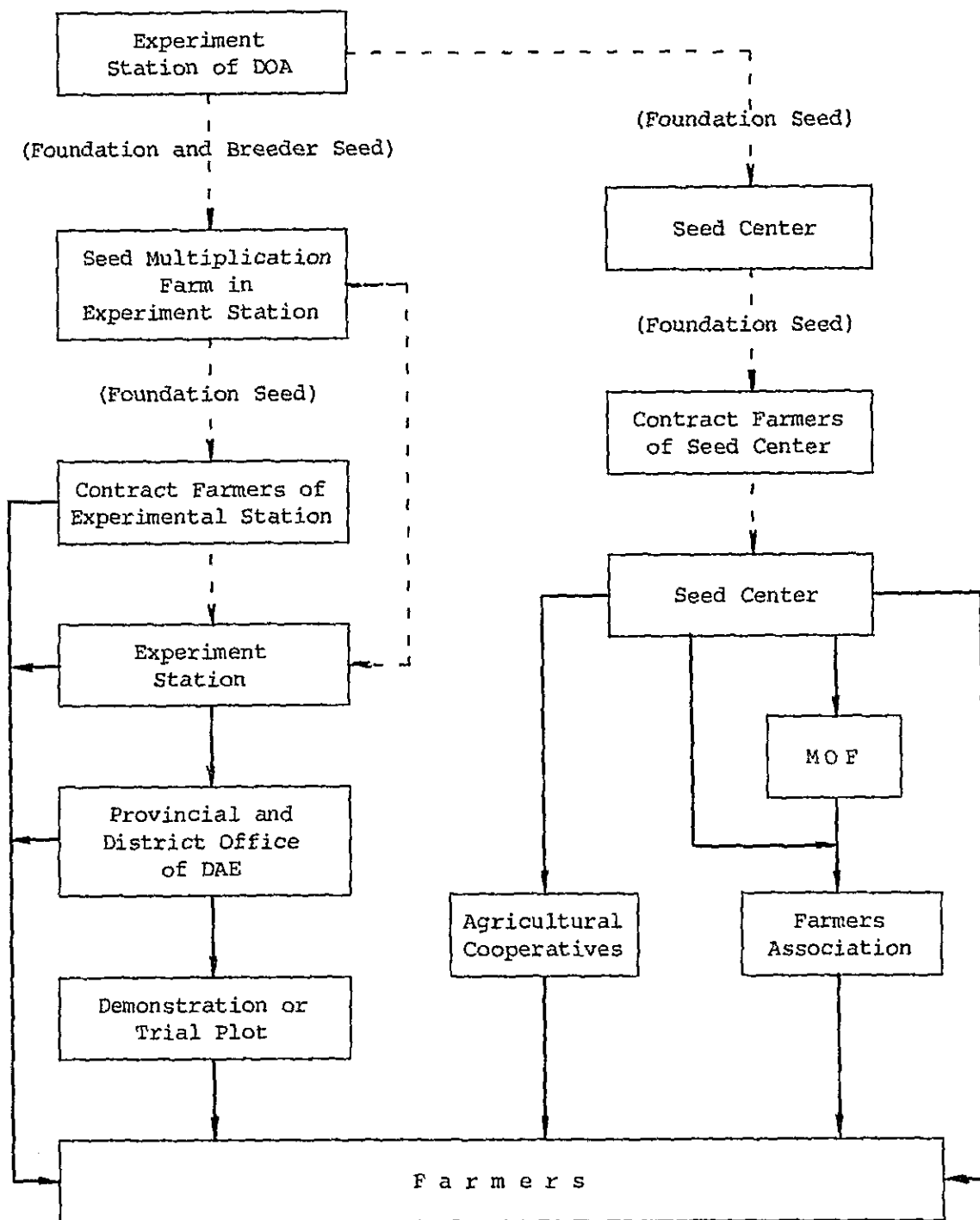
ORGANIZATION CHART OF
MINISTRY OF AGRICULTURE AND AGRICULTURAL COOPERATIVES



ORGANIZATION OF DEPARTMENT OF AGRICULTURAL EXTENSION



ORGANIZATION OF DEPARTMENT OF AGRICULTURE



- - - - Seed Multiplication Channel
 ———— Seed Distribution Channel

SEED MULTIPLICATION AND DISTRIBUTION CHANNEL

JICA