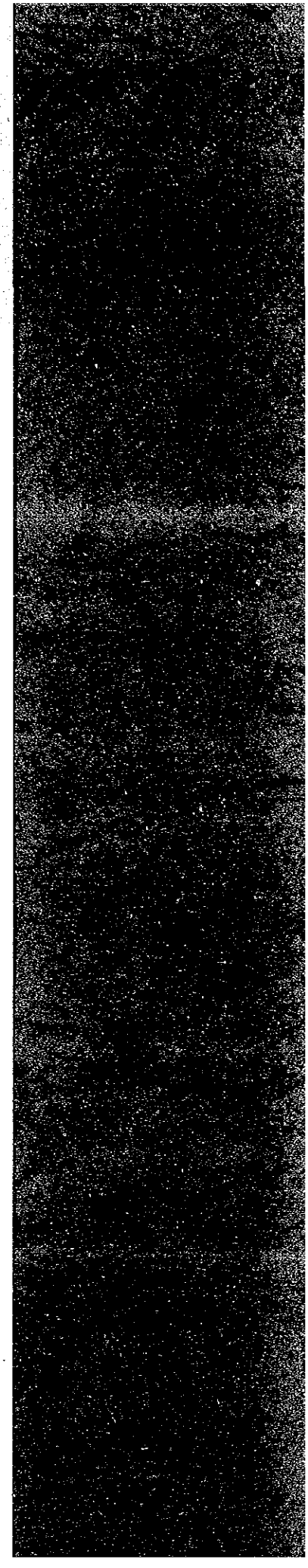
THE GOVERNMENT OF MALAYSIA

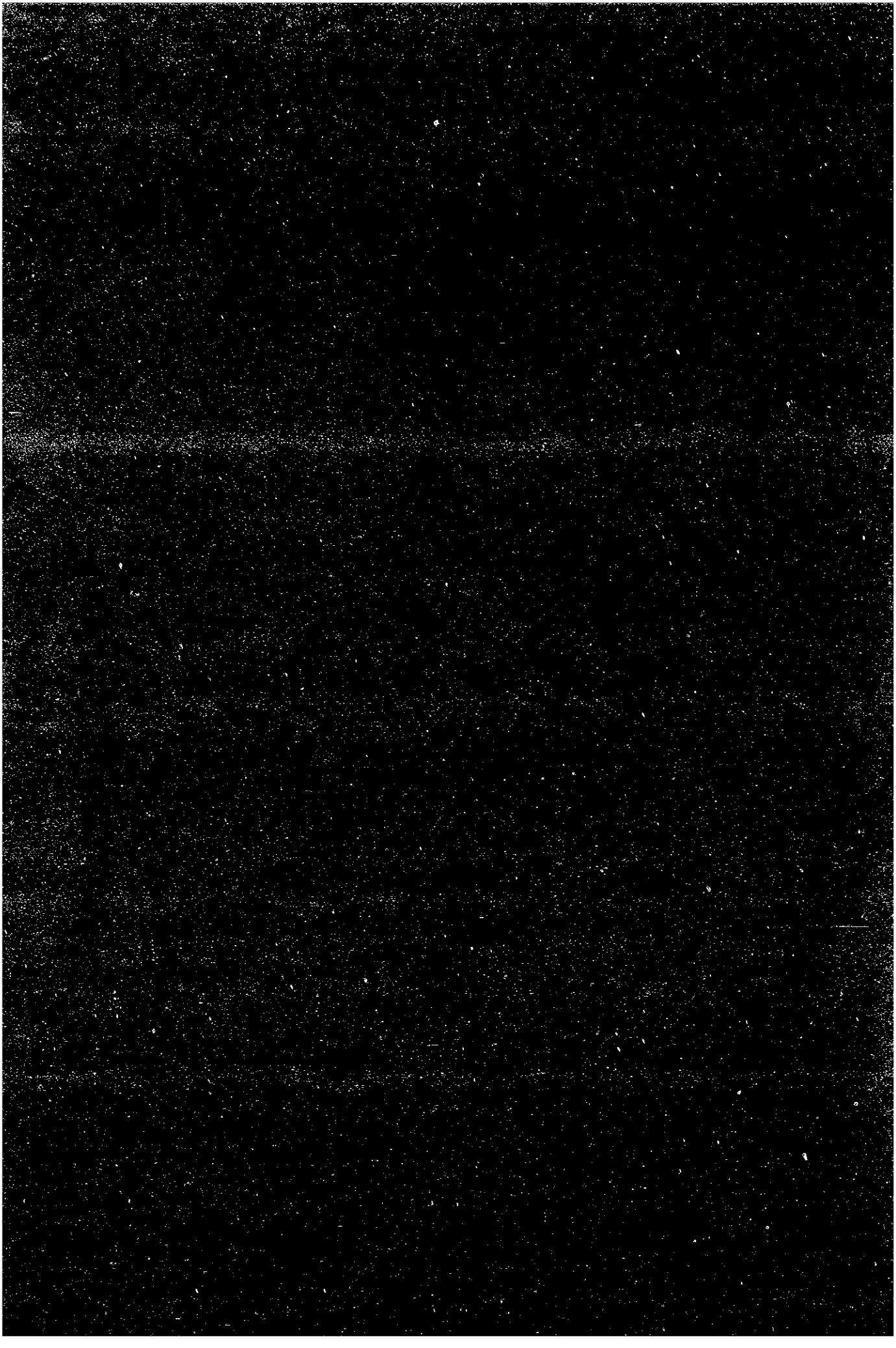
REGIONAL STUDY ON THE INTEGRATED DEVELOPMENT OF SOUTH TERENGGANU

VOLUME 3
STUDY ON AGRICULTURE RESEARCH AND DEVELOPMENT

AUGUST 1985

JAPAN INTERNATIONAL COOPERATION AGENCY





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GLOSSARY

DID	–	Drainage and Irrigation Department
DOA	–	Department of Agriculture
DOF	–	Department of Fisheries
DVS	–	Department of Veterinary Services
ELU	–	Extension Liaison Unit
FAMA	–	Federal Agricultural Marketing Authority
FAO	–	Food and Agriculture Organization
FELCRA	–	Federal Land Consolidation and Rehabilitation Authority
FELDA	–	Federal Land Development Authority
FRI	–	Fisheries Research Institute
FRI	–	Forest Research Institute
ICLC	–	Interagency Coordination and Liaison Committee
KETENGAH	–	Lembaga Kemajuan Terengganu Tengah
MARDI	–	Malaysian Agricultural Research and Development Institute
MPIB	–	Malaysian Pineapple Industry Board
NCSRD	–	National Council for Scientific Research and Development
NTB	–	National Tobacco Board
PORIM	–	Palm Oil Research Institute of Malaysia
RISDA	–	Rubber Industry Smallholders Development Authority
PRIM	–	Rubber Research Institute of Malaysia
SARDEC	–	State Agriculture Research Development and Extension Committee
SDOA	–	State Department of Agriculture
SICLC	–	State Interageycy Coordination and Liaison Committee
SIRIM	–	Standards and Industrial Research Institute of Malaysia
T and V	–	Training and Visit
VRI	–	Veterinary Research Institute

1. BACKGROUND

Agriculture sector including livestock, forestry and fishery plays an important role which shares 26.3% of GRP and sustains the employment of 18,200 people (38%) in the study area in 1983. However, there are problems to be solved in the development of agriculture in the area. They are described in two categories as follows:

1) Low Productivity
2) Income Differential between Agriculture and Other Sectors

These problems indicate a low return for the farmers. The low return and low income levels obtained from agriculture distract the labour force, promoting a drift away from the land. The shift of labour force to other sectors results in the reduction and abandonment of farming.

However, this rejection of agriculture cannot be accepted in the study area since agricultural production has been the largest subsector in the economy of the area. Rather it is necessary to establish strategies to increase and diversify crop products by emphasis in agricultural policies.

2. OBJECTIVES

Main causes of low productivities of the agriculture in the study area are classified as follows:

1) Low Soil Fertility
2) Less Developed Techniques
3) Severe Weather Condition
4) A Significant Proportion of Holdings Remaining Idle
5) Small Farm Size

Actions against low productivities are examined from the viewpoints of the functions of research stations and extension service. Problem solutions in terms of these systems are studied and categorized as follows:

1) Introduction of New Crops and Varieties
2) Appropriate Land Use Planning

3) Utilization of Agricultural By-products

4) Agricultural Diversification

5) Increasing the Number of Farmer Groups

In this context, the study will present proposed actions and recommendations in solving the problems of farming in traditional villages through the activities of research stations and extension service system.

3. RESEARCH STATIONS AND EXTENSION SERVICES OF THE STUDY AREA

There are several agricultural research organizations in Malaysia such as MARDI, PORIM, RRIM, FRI, VRI and others. Of these, MARDI stations are taken for consideration since they are closely related to the problem resolutions of small farmers of the area.

There are two research station (Jerangau and Kemaman) and one research unit (Rantau Abang Research Unit) in the study area. They are part of the MARDI system. Jerangau and Kemaman Agricultural Research Stations study cocoa, coconut and fruits under different natural condition in the inland area. Staff in these organizations total 28 including research assistants in 1985.

There are two district agricultural offices (Dungun and Kemaman) and four extension offices (Dungun, Jerangau, Cukai and Kemasik) in the study area. District Agricultural Officers supervise and provide technical support to the extension worker. The grass-roots extension service is made by each extension worker in accordance with the T and V system. There are 16 extension workers in these districts in 1985.

4. CONCLUSIONS

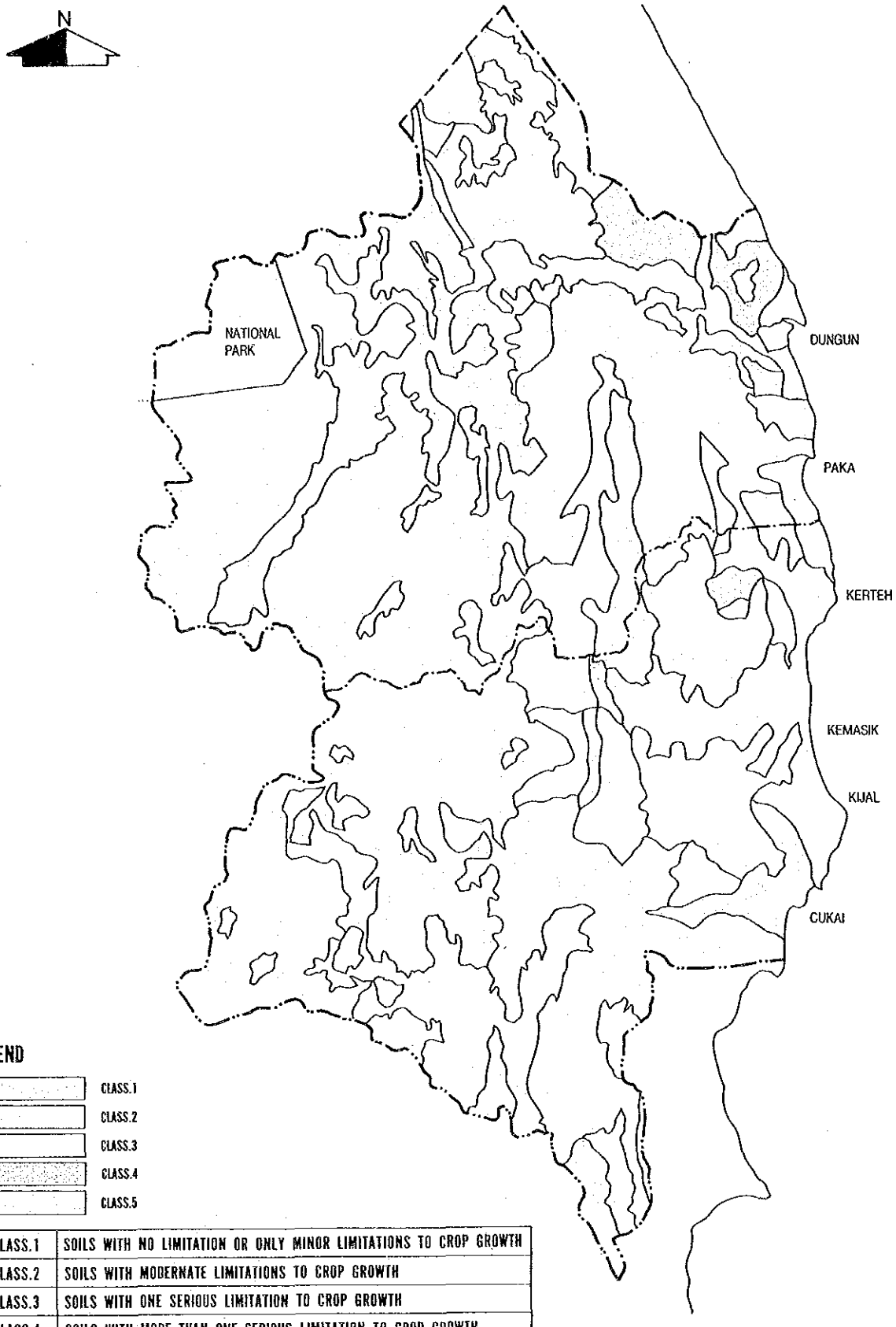
4.1 Research Stations

1) Inland Area

The existing two research stations of MARDI, one studying crop cultivation under slope conditions and the other hill farming, correctly represent the physical conditions of the area. Most of the inland area that can be developed for arable purposes has been taken or is under development for oil palm or rubber estates. The remaining area is either mostly class 5 group which is unsuitable for any agricultural use, or is flood prone. (Figs 1 and 2) In this respect there is no need for additional research stations in the inland area. The existing stations can cover and provide necessary technical information to the farmers in the area.

2) Coastal Area

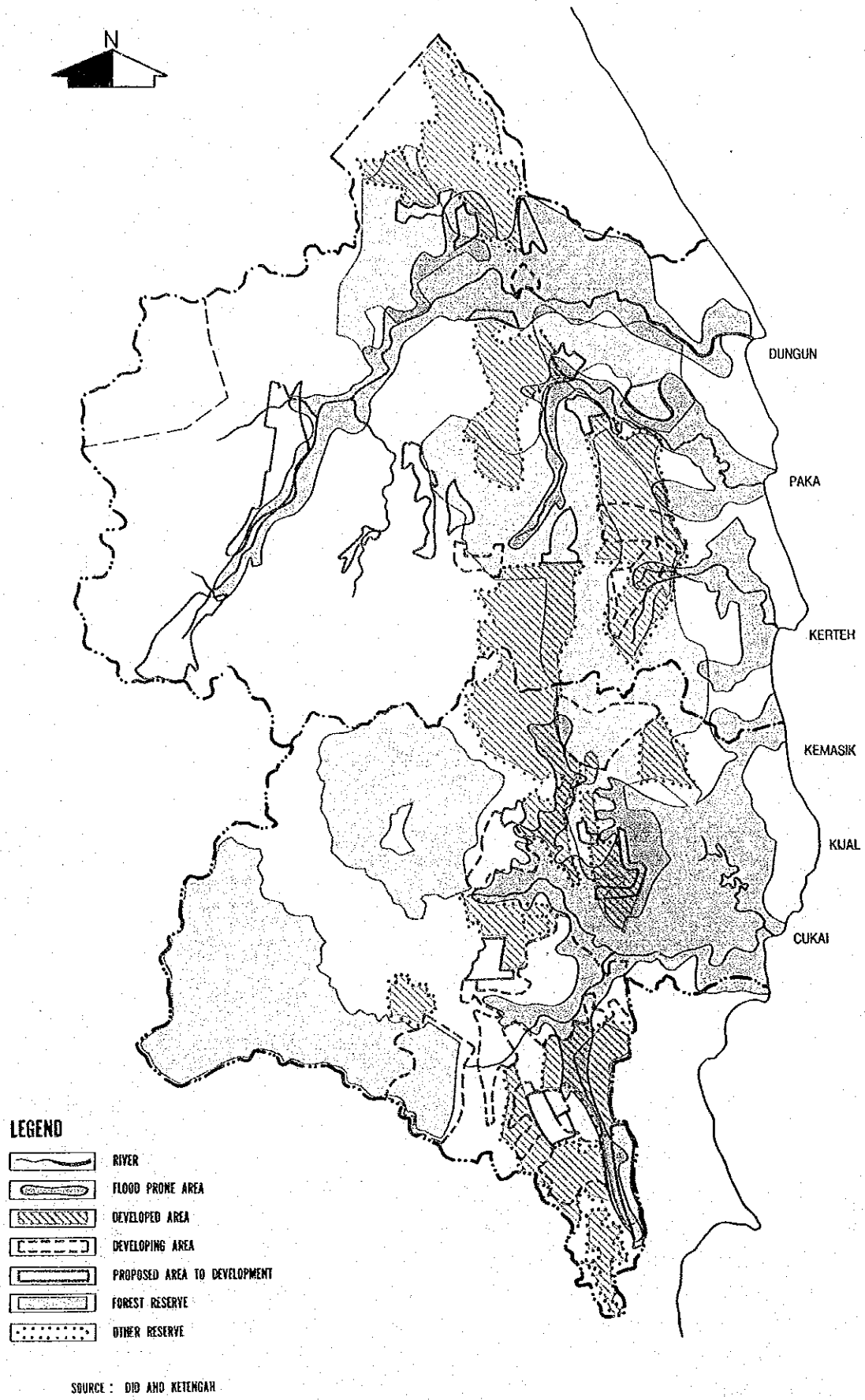
Rantau Abang Tobacco Research Unit investigates tobacco cultivation on the bris soil. The MARDI research station of Sungai Bagin is outside the study area, but is



CLASS.1	SOILS WITH NO LIMITATION OR ONLY MINOR LIMITATIONS TO CROP GROWTH
CLASS.2	SOILS WITH MODERNATE LIMITATIONS TO CROP GROWTH
CLASS.3	SOILS WITH ONE SERIOUS LIMITATION TO CROP GROWTH
CLASS.4	SOILS WITH MORE THAN ONE SERIOUS LIMITATION TO CROP GROWTH
CLASS.5	SOILS WITH AT LEAST ONE VERY SERIOUS LIMITATION TO CROP GROWTH

Source: S.D.O.A.

Fig. 1. SOIL CLASSIFICATION MAP



SOURCE : DID AND KETENGAH

Fig. 2. PRESENT DEVELOPMENT CONDITION AND FLOOD PRONE AREA

only 10 km away from the state boundary. The findings of the research station are applicable to the bris soil of the study area. Therefore, the research facilities appear to be adequate in the coastal area and there is no necessity to establish a new research station.

4.2 Extension Service

1) Farmers Grouping

The T and V system has been adopted and expanded to all Peninsular Malaysia including Terengganu State. (1979 – 1984) Furthermore, the DOA is implementing projects to strengthen the extension network by using World Bank Loans. In the study area, the T and V system has been introduced to provide a number of services included in a bi-weekly programme since the early 1980s.

However, it is still premature to draw any conclusions concerning the T and V system in the area, because it is still new and the coverage is still being extended. The coverage by the State's extension service of the study area in 1985 is shown as: –

Families	Groups	Families/Groups
4637	151	31

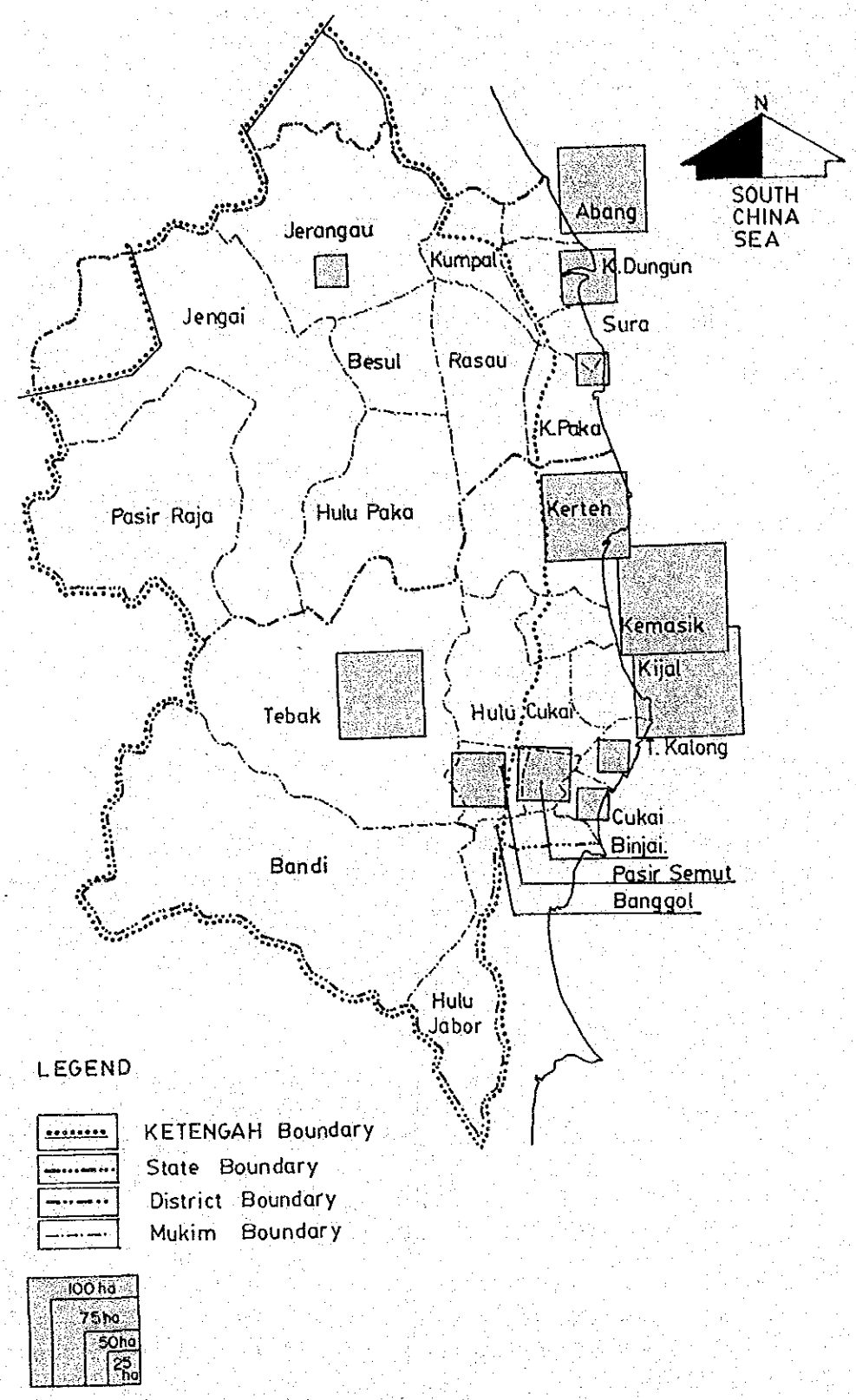
The coverage ratio is conjectured as about 56% and the State DOA is intending to increase the coverage ratio.

On the other hand, farm families per extension worker in the study area is 303 farm families in Dungun and 361 farm families in Kemaman. This is a low ratio compared with that of the national average of 540 farm families in Peninsular Malaysia. It can be said that the study area is being given priority in the provision of extension services.

2) Demonstration Farm Lots

There are 570 ha of demonstration farms operated by SDOA in the study area. (Fig. 3) Many kinds of tree crops and field crops are being cultivated. It is an effective way to suggest to farmers ways to increase produce and cropping varieties, and which would result in a larger income. However, the period of the experiment is too short to assess priority crops from those demonstration lots. Demonstrations should be continued and expanded in the study area.

The coastal area has 77% of the demonstration lots in ha whilst the inland area has 23%. On the other hand farm families covered by the extension service system are 51% in the coastal area and 49% in the inland area. The distribution is not balanced.



Source: Dungun and Kemaman Agricultural District Office

Fig. 3. EXISTING DEMONSTRATION FARM

5. RECOMMENDATIONS

5.1 Research Stations

a) It is found the current staff of the MARDI stations of the study area are not sufficient to cover various activities which are certain to increase further in the study area.

It is recommended that vacant staffing positions of the MARDI should be filled and new appointments increased.

b) Additional land resources for arable purposes in the study area is very limited. Remaining land with development potential for arable purposes may be the land under tree crops. Therefore, mixed cropping is important to diversify crops, increase production and maintain soil fertility.

It is recommended that the research stations should continue and intensify the development of mixed crop cultivation.

c) In the study area, there are many unused farm by-products such as oil palm cake, sawdust and others. The application of organic material is very important to sustain soil fertility. Furthermore, it would have potential to be used for livestock feed. In this context farm by-product is a valuable resource for agriculture in the area.

It is recommended that research stations should consider the multiple utilisation of agricultural by-products for small farmers.

d) Research and marketing are linked, as the marketing function is to identify a market with a product. In this context the research stations are a possible source of suggestions for breeding crop varieties and processing that will satisfy the market requirements.

It is recommended that the research stations should have close co-operation with any market organisations in studies for development of appropriate marketable products by small farmers.

5.2 Extension Service of the Department of Agriculture

a) There are approximately 570 ha in total of demonstration farms operating in the study area. Many kinds of crops are being cultivated. The demonstration farm is an effective way to encourage the diversification and increase in a farmer's production. However, the demonstration farms are mostly located in the coastal area and are not distributed equally in proportion to types of farming and farm families in the inland KETENGAH area.

It is recommended that the demonstration farms should be distributed more equitably in the inland area.

b) Farmers groups supported by the extension service system covers less than 60% of those in traditional villages. Farmers in the inland traditional villages have been not well organised as yet and the coverage should be increased by grouping these farmers.

CHAPTER 1 OBJECTIVES

This study, which is recognized for its importance in promoting improved living standards for small farmers, has a very rigid requirement in the scope of work.[1/]

The scope of work is summarized below in the following extract " . . . to examine from technical viewpoints a research and development station . . . . . with field extension service for small farmers . . . . . ".

The objective is described as " . . . . a system which supports a research and diversification programme and a farming extension service . . . . . for traditional farmers".

In this context of the requirements of this study all aspects of the report are investigated in terms of the research stations and the existing field extension services.

This is particularly relevant when discussion is made in Chapters 4 and 5 where there are factors occuring which are outside the immediate scope of the study. In these cases this study can only indicate that they be included in the feasibility study to follow.

The purpose of this study is to act as a sieve to identify problems, and to propose solutions to be studied further, to eliminate matters that do not require further investigation and to act as a pointer for detailed investigation.

The conclusions obtained from the study are best used to indicate how the study has achieved the objective by focusing on the research centres and the field extension services.

Source: 1/ The Inception Report of Phase III (February 1985)

2.1 EXISTING SITUATION 1/

GRP of agriculture sector including livestock, forestry and fishery amounts $133.7 million, which is 26.3% of the GRP in 1983 in the study area.

The number of employed people in the study area in 1983 is 48,230, and 44.2% of whom are engaged in agricultural activities.

This indicates that the agricultural sector is the principal industry in the study area, and the percentage composition is higher than the rest of Malaysia which averages 22.4% and 39.7% respectively.

Agricultural production in this region comprises 62.4% crops, 4.6% livestock, 20.6% forestry and 12.4% fishery by value.

A characteristic of agricultural production in the study area is the cultivation of perennial crops, among which oil palm is the most popular product sharing 90% of the total crop production in the GRP of the area in 1983.

Oil palm, rubber and cocoa are mostly cultivated in the estate field. Farmers in small villages cultivate coconut, fruit and rubber. They also produce vegetable, tobbaco, water melon, rice and others. Crop production in terms of GRP by farmers in traditional villages are small, about 5% in 1983 in the study area.

2.2 PROBLEM IDENTIFICATION

Main problems concerning agriculture in the study area are:

a) Low Productivity

Agricultural production in the study area can be compared with other areas by land productivity as shown below.

Source: 1/ Study Team

Table 2.1 Crop Yield

Unit: kg/ha

Crop	Oil Palm[1/]	Rubber[3/]	Rice[4/]
Malaysia	17.6	1,432	3,225[5/]
Terengganu	12.7	775	1,975
Dungun	10.6[2/]	482	1,591
Kemaman		1,276	1,870

Source: 1/ Oil Palm, Coconut, Tea and Cocoa Statistics 1981
2/ Ketengah's Quaterly Report (1983–December)
3/ Rubber Statistics Handbook Malaysia, 1981
4/ Annual Report 1981, Dept. of Agriculture, Terengganu
5/ F A O year Book, 1983

The above figures indicate a lower productivity per ha in the study area when compared to the averages of the country and the Terengganu State. Although productivity data in other cropping lands are not available for comparison, the general tendency is considered the same as the above indicators. Low productivity is a problematic feature of agriculture in the study area.

Main causes are:

- Low Soil Fertility
- Less Developed Techniques
- Severe Weather Conditions
- A Significant Proportion of Holdings Remaining Idle
- Small Farm Size

b) Income Differential Between Agriculture and Other Sectors.

This difference results in:

- Abandonment of Crop Cultivation
- Decreasing Number of Farm Families
- Decreasing Willingness to Farm

These problems indicate that the low return for the labour put into the farm results in a drift away from the land. This increases the present lack of food self-sufficiency in the area which, with increasing industrialization, can only further deteriorate.

2.3 PROBLEM RESOLUTION

a) Increasing Effectiveness of Research and Extension Activities

- Increasing or Establishing Research Stations
- Increasing Basic Extension Services

b) Actions Against Low Productivity

- Introduction of New Crops and Varieties
- Appropriate Landuse Planning
- Utilization of Agricultural By-products
- Agricultural Diversification
- Increasing the Numbers of Farmer Groups
- Improved Credit Facilities
- Recruitment of Staff in MARDI

c) Actions Against Income Differentials

- Increasing Productivity
- Improvements in Marketing

In this context the study will concentrate on item a) by reviewing the counter-measures of b) and c) in terms of item a).

2.4 REFERENCE TO NATIONAL AGRICULTURAL POLICY

The National Agricultural Policy (NAP) has been formulated in 1980 to ensure a balanced and sustained rate of growth in the agricultural sector vis-a-vis the other sectors of the economy.

The agricultural sector is characterized by the presence of an efficient and well-organized estate sub-sector as well as non-organized small-farm sub-sector. Currently, the sector, particularly the small-farm sub-sector, is faced with several constraints, some of which are structural in nature. These include the existence of uneconomic-sized holdings, low-return crops, traditional methods of production, restrictive conditions with regard to cropping patterns and inadequate access to assistance and support services. The interplay of these constraints has resulted in the low level of productivity and thus income in the small-farm sub-sector as compared to the estate sub-sector. This low level of productivity and income has led to the high incidence of poverty among farmers.

The objective of the NAP is to "maximize income from agriculture through efficient utilization of the country's resources and the revitalization of the sector's contribution to the overall economic development of the country".
Strategies are formulated in the following directions:

- New land development

- In si-tu development
- The provision of support services
- The social and institutional development

The study scope of this "agriculture research and development" is consistent with the policy and strategies of the above NAP. The scope of this study was also discussed and agreed by rhe technical and steering committees of the Malaysian Government in early March 1985.

CHAPTER 3 PRESENT SITUATION OF AGRICULTURAL RESEARCH AND EXTENSION SERVICE

3.1 THE SYSTEM OF AGRICULTURAL RESEARCH 1/

Four categories of institution are involved in scientific agricultural and related research. These are the Universities, Government Bodies, Statutory Bodies and Commerce. The institutions and the Government ministries involved in research activities are:

a) Universities

- University of Malaya (Ministry of Education)
- University of Science (Ministry of Education)
- University of Pertanian (Ministry of Education)
- University of Kebangsaan (Ministry of Education)

b) Government Research Organizations

- Forest Research Institute (FRI) (Ministry of Primary Industries)
- Veterinary Research Institute (VRI) (Ministry of Agriculture)
- Fisheries Research Institute (FRI – Marine Fish) (Ministry of Agriculture)

c) Statutory (Semi-Government) Research Organizations

- Rubber Research Institute of Malaysia (RRIM) (Ministry of Agriculture)
- Malaysian Agriculture Research and Development Institute (MARDI) (Ministry of Agriculture)
- Standards and Industrial Research Institute of Malaysia (SIRIM) (Ministry of Science and Environment)
- Palm Oil Research Institute of Malaysia (PORIM) (Ministry of Primary Industries)

d) The Major Private Sector Research Organizations are:

- Dunlop Research Centre, Batang, Malaka
- Harison & Crossfield (M) Sdn. Berhad

Source: 1/ Improving Extension Strategies for Rural Development (University Pertanian Malaysia, 1984)

- Highlands Research Unit, Selangor
- ICI Agricultural Research Centre, Malaka
- Guthrie Sdn. Bhd.
- United Plantations, Telok Anson, Perak

Activities of these agricultural research agencies are coordinated and geared by the National Council for Scientific Research and Development (NCSRD) (Appendix Fig. 1). Detailed function of NCSRD is attached in the Appendix (Appendix Table 1).

3.2 THE SYSTEM OF EXTENSION SERVICE

The extension agencies are dispersed in a number of ministries and agencies as follows.

Table 3.1 System of Extension Service[1/]

Ministry	Organization Responsible for Extension	Commodity
Ministry of Agriculture	Department of Agriculture	All crops (except rubber, tobacco)
	Veterinary Department	All livestock
	Fisheries Department	Freshwater and marine fish
Ministry of Primary Industry	MPIB National Tobacco Board	Pineapple Tobacco
Ministry of Land	RISDA FELCRA FELDA	Rubber and oil palm for settler estate development

Source: 1/ Improving Extension Strategies for Rural Development

This study will examine the agricultural extension service which is described in paragraph 3.5b.

3.3 RESEARCH – EXTENSION RELATIONSHIP

Research findings are disseminated through different extension agencies. The relationship between the research organizations and agricultural agencies covers a wide range of crops as shown in Table 3.2. Of these relationships, this study concentrates on the activities of the MARDI research stations and the extension service system of the Agriculture Department of the State of Terengganu. The recommendations presented will strengthen these activities in order to increase food production by farmers in traditional villages in the study area.

Table 3.2 Research – Extension Relationship[1/]

Commodities	Research Agencies	Extension Agencies	Clientele System
All crops (except rubber and oil palm) Livestock	MARDI	DOA Vet. Dept. MPIB NTB FAMA	Rice Farmers Veg. Gardeners Fruit Growers etc. Livestock Rearers Tobacco Growers Pineapple Growers
Rubber	RRI	RISDA[1)] FELDA[1)] FELCRA	Rubber Smallholders Land Settlers Fringe & Alienation Scheme Farmers
Oil Palm	PORIM	FELDA FELCRA RISDA	Land Settlers Fringe & Alienation Scheme Farmers Oil Palm

Source: 1/ Improving Extension Strategies for Rural Development.

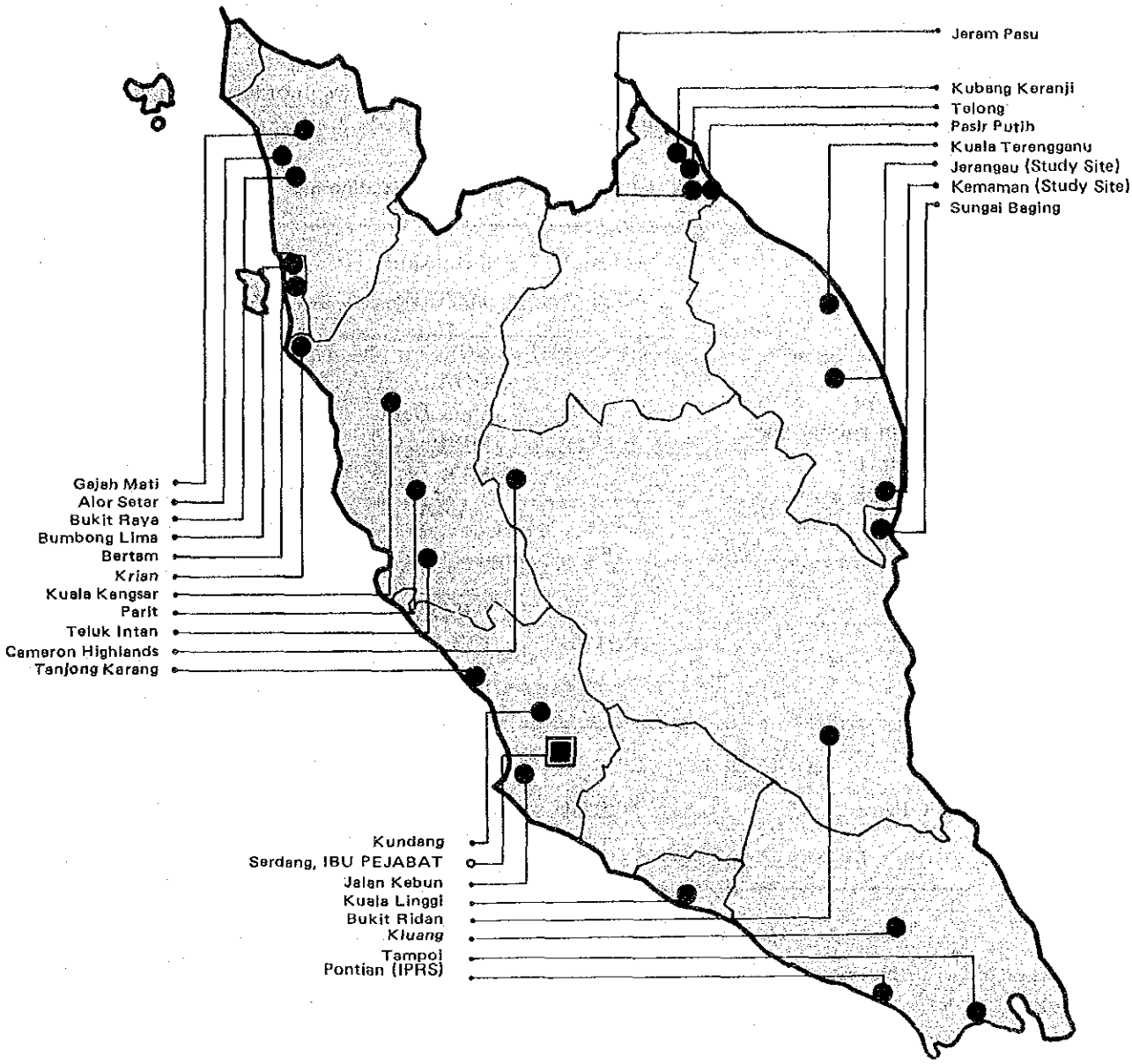
Notes: 1) RISDA and FELDA have working relationship with MARDI.

3.4 ORGANIZATION AND FUNCTION OF MALAYSIAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (MARDI)[1/]

MARDI consists of three departments, the commodity research, research support service and development, and administration department. Commodity research department is organized into six specialised divisions, Rice, Cocoa/Coconut, Tobacco, Other Crops, Fruits and Livestock. (Appendix Fig. 2)

Twenty seven Agricultural Research Stations are operated by MARDI in Peninsular Malaysia. The location of which and particular study items are shown in Fig. 3.1 and Table 3.3.

Source: 1/ MARDI



Source: MARDI

Fig. 3.1 LOCATIONS OF MARDI RESEARCH STATIONS (1985)

Table 3.3 MARIDI Research Stations and Items Covered (1985)

Name of Station	Research Item
Gajah Mati	Field Crop (Sugar Cane)
Alor Setar	Paddy
Bukit Raya	Paddy Processing
Bumbong Lima	Paddy
Bertam	Paddy
Krian	Paddy
Kuala Kangsar	Fruit
Parit	Paddy Seed Production
Teluk Intan	Cocoa
Cameron Highlands	Vegetable, Fruit, Horticulture, Tea
Tanjong Karang	Paddy
Kundang	Tin Tailing
Serdang, IBU PEJABAT	Fundamental Research
Jalan Kebun	Vegetable, Pineapple under Peat Soil
Kuala Linggi	Development Station, Acid Sulphate Soil
Bukit Ridan	Livestock, Fruit
Kluang	Spice, Beverages, Livestock
Tampoi	Food Processing
Pontian	Integrated Peat Research Station
Jeram Pasu	Fruit
Kubang Keranji	Paddy
Telong	Tobacco
Pasir Putih	Feed Processing
Kuala Terengganu	Miscellaneous Crop
Jerangau	Fruit, Cocoa
Kemaman	Fruit, Cocoa
Sungai Baging	Bris Soil (Fruit, Vegetable)

Source: MARDI, 1985

The primary functions of MARDI are the responsibility for scientific, technical economic and sociological research with respect to production, utilization and processing of all crops (except rubber and oil palm), and livestock. More detail functions and activities of MARDI are attached in the Appendix (Appendix Table 2, Appendix Fig. 2 and Appendix 1).

3.5 ORGANIZATION AND FUNCTION OF DEPARTMENT OF AGRICULTURE (DOA)[1/]

a) Federal Department of Agriculture

Organizational chart of the Ministry of Agriculture and DOA are shown in the Appendix (Appendix Figs 3 and 4). The DOA consists of one federal department and eleven state departments.

The Federal department is responsible for overall supervision, planning and for the recruitment of division one officers (professional and managerial group) and deploying such officers to serve in the state. Although administration is divided, close coordination is maintained between the federal and state department.

The FDOA has six branches.

- The Development and Training Branch
- The Agricultural Extension Branch
- The Crop Protection Branch
- The Crop Production Branch
- The Soils and Analytical Services Branch
- The Agricultural Education Branch

b) The Agricultural Extension Branch

Organization Chart of the Agricultural Extension Branch, which is mainly responsible for the extension service, is shown in the Appendix (Appendix Fig. 5). In support of the SDOA, the Federal Agricultural Extension Services Branch is organized into six specialized sections.

The main activities undertaken by the Agricultural Extension Branch by section are as follows:

(i) Development of Farm Families

- Assisting the State Directors of Agriculture in planning, programming and evaluating farm family development activities in the various states.
- Providing a technical consulting service for the farm family development personnel in the states.
- Organizing national and regional workshops on important topics such as nutrition, health, home gardening, etc.

Source: 1/ DOA

(ii) Farm Management Extension

- Preparing, publishing and maintaining a continuous review of a farm planning manual incorporating farm business, market and other relevant economic information which will facilitate and improve farm decision making.
- Preparing and publishing farm management technical papers for use by extension workers and farmers.
- Giving lectures in farm management to farmers and rural youths at the rural training centres in various states.

(iii) Communications

- Providing up-to-date information to both farmers and extension workers regarding new research findings, market developments, prices of agricultural commodities, etc.
- Organizing in-service training courses, workshops, seminars, etc. in agricultural communications.
- Preparing visual aids and other extension materials for the use of extension workers, etc.

(iv) Farmers and Youth Development

- Establishing contact with other farmer and youth organizations and studying their activities. Planning and coordinating the national extension rural youth programme.
- Developing a line of communication with the Ministry of Culture, Youth and Sports and finding out ways and means with which the Extension Branch can assist in their programmes of youth development.

(v) Projects

- Planning of new integrated area development projects and other special projects that arise from time to time, specifically pertaining to agricultural extension component, etc.

(vi) Development

- Supervising and coordinating the programmes of all rural training centres and farm mechanization centres throughout the country.
- Initiating and organizing training courses, study tours and village level extension programmes for farmers to improve their managerial and technical skills.

c) State Department of Agriculture (SDOA)

An organization chart of the State Department of Agriculture is shown in the Appendix (Appendix Fig. 6).

The organization of the SDOA are structured to reflect their role and responsibility to providing farm level extension activities. For easier administration and supervision, the SDOA is three-tiered: (i) headquaters (where specialized units are based), (ii) district and (iii) area or mukim (where all the grassroot extension agents are located).

The SDOA operates a comprehensive network of extension services which includes (i) providing technical advice to farmers through normal extension work; (ii) providing formalized training to farmers at the Rural Agricultural Training Centres (RAT s); (iii) administering crop subsidy programmes; and (iv) performing a wide range of regulatory work in relation to pest/diesease control, crop husbandry, soil survey and analysis, farm mechanization and farm management.

3.6 RESEARCH AND EXTENSION LINKAGE[1/]

The Extension Liaison Unit (ELU) is established in the DOA for an effective transfer of technology between MARDI and DOA. ELU is charged with the function of providing the mechanism for coordination at federal and state levels. This mechanism is structured to maintain a sustained flow of research findings to the grassroots, besides providing a means for feedback to research for their programme priorities and orientation.

The federal level committee is now called the Interagency Coordination and Liaison Committee (ICLC) to reflect the enlarged membership which includes the DVS, DOF and DID in addition to the original member of DOA, MARDI, FOA and FAMA.

The ICLC is the highest operational platform for the above agencies to coordinate their activities. The membership of ICLC is limited to the executive heads of each organization with the Director of ELU as the permanent secretary. The committee addresses itself to issues requiring the agreement of the executive heads particularly in terms of commitment of manpower and funds, as well as adopting common approaches in implementing ministry directives.

Specific technical matters are dealt at the sub-committee levels. At this point, there are sub-committees established for crop production, crop protection, soils, farm mechanization and agrobased industries (Appendix Fig. 7). These committes meet regularly and it is this constant interchange where actual technology transfer and feedback are effected.

At the state level, the coordination committee formerly called SARDEC (State Agricultural Research Development and Extension Committee) is now called SICLC which similarly reflects the enlarged membership as in the ICLC. Every state has a SICLC and its primary function is for implementation coordination at the grassroots. Simply said, SICLC would be the first sieve where problems resolvable at this level are settled. Problems or issues which need the attention and decision of the executive heads are channelled upwards and tabled at the ICLC meeting.

Source: 1/ Improving Extension Strategies for Rural Development

3.7 AGRICULTURAL RESEARCH AND EXTENSION IN THE STUDY AREA

a) Research

There are two research stations and one research unit in the Study Area, being shown in Table 3.4.

Jerangau and Kemaman Agricultural Research Station undertake similar research items but under different natural conditions. Their staffing numbers are shown in Tables 3.5 and 3.6.

Bris soil is dominant in the coastal strip of the study area but these is no research station in the study area in this soil. Sungai Baging Research Station, which is about 10 km from the study area, studies crop cultivation and diversification for bris soil.

Table 3.4 Research Activities In The Study Area (1985)

	Section	Priority Crops to be Researched	Contents of Research	Area ha
Jerangau Agricultural Research Station 1/	Cocoa/Coconut	Cocoa/Coconut	Clonal Trial, Pathology, Ecology of Rat, Nutritional Experiment, Planting System, Mixed Planting, Evaluation of Clonal, Planting in Farmers Land, Planting Density, etc.	400
	Fruits	Durian, Rambutan, Mangosteen, Banana, Mango, Duku, Citrus, Abaca, etc.	Collection of Genetic Material, Evaluation of Hybrid Variety, Entomology, Pathology, Fertilizer Trial, Planting Density, Mixed Planting, etc.	
Kemaman Agricultural Research Station 2/	Cocoa/Coconut	Cocoa/Coconut	– ditto –	1000
	Fruits	Durian, Langsat, Guava, Banana, Salak, Lichee, Citrus, etc.	– ditto –	
Rantau Abang Tobacco Research Unit 3/	Tobacco	Tobacco	Tobacco, Cultivation under Bris Soils, Sprinkler Irrigation, Breeding, Plant Protection, Fertilizer Trial, Liming Trial etc.	10

Source: 1/ Jerangau Agricultural Research Station
2/ Kemaman Agricultural Research Station
3/ Rantau Abang Tobacco Research Unit

Table 3.5 Present Agricultural Research Staff In The Study Area (1985)

Station or Unit	Section	Research Officer	Assistant Research Officer	Research Assistant
Jerangau[1/]	Cocoa and Coconut	1	1	4
	Fruits	0	1	3
Kemaman[2/]	Cocoa and Coconut	3	0	4
	Fruits	0	1	3
Rantau Abang[3/] Tobacco Research Unit	Tobacco	1	2	4
Total		5	5	18

Source: 1/ Jerangau Research Station
2/ Kemaman Research Station
3/ Rantau Abang Tobacco Research Unit

Table 3.6 Requested Additional Agricultural Research Staff In The Study Area (1985)

Station or Unit	Research Officer	Assistant Research Officer	Research Assistant
Jerangau[1/]	2	0	0
Kemaman[2/]	2	3	2
Rantau Abang[3/] Tobacco Unit	1	1	0
Total	5	4	2

Source: 1/ Jerangau Research Station
2/ Kemaman Research Station
3/ Rantau Abang Tobacco Research Unit

b) Extension

There are two district agricultural offices and four extension offices in the study area.

Extension staff in the study area is shown in Table 3.7 and the number of farm families, groups and kampungs in the study area per one extension worker is shown in Fig. 3.2.

Table 3.7 Extension Staff In The Study Area (1985)[1/]

District Office	Extension Office	No. of Staff		
		Extension Worker	Regulatory	Home Economy
Dungun	Dungun	5	3	1
	Jerangau	3	1	1
Kamaman	Cukai	4	2	1
	Kemasik	4	2	1

Source: 1/ Dungun and Kemaman Agricultural District Office

District agricultural officers supervise and provide technical support to the extension worker. The grassroot extension service is made by each extension worker in accordance with the T and V System. The T and V System, which is being implemented in Malaysia through a World Bank Loan, is an effective way to disseminate research findings to farmers and to feedback farm problems from the farmers to research.

The main characteristic of the system is that the work of the extension service is organized in a systematic time-bound programme of training and visit, and farmers are grouped together with their own group leader and contact farmers.

The schedule of an extension worker under the T and V System is given in Table 3.8.

An extension worker is responsible for 8 ~ 12 groups of farms which consist of about 600 ~ 800 farm family members. It is found that the programme encounters disruption caused by rain, flood and other reasons, that extra visits or meetings in Table 3.8 can be used for other activities including reportings of questions and requests of farmers to the SDOA, and that it is too early to conclude an assessment of the system's performance since the T and V system only started in the early 1980s in the study area.

Table 3.8 Example of a Bi-Weekly Programme of an Extension Worker Under The T & V System[1/]

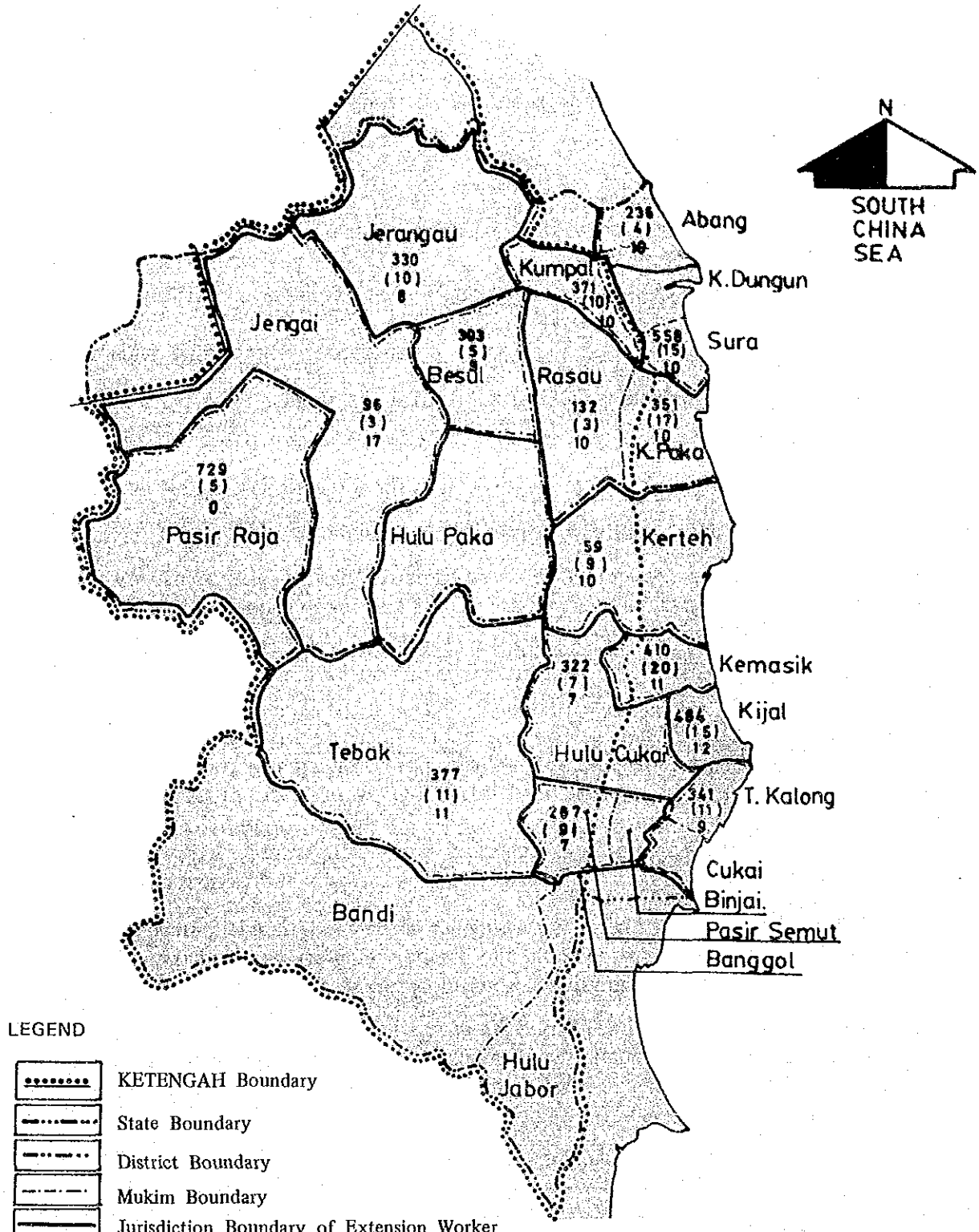
Week	Day	Activity	
First Week	1	Visit to Farmer Group	1
	2	"	2
	3	"	3
	4	"	4
	5	Training [1/]	
	6	Extra Visits or Meetings	
	7	Holiday	
Second Week	1	Visit to Farmer Group	5
	2	"	6
	3	"	7
	4	"	8
	5	Training [1/]	
	6	Extra Visits or Meetings	
	7	Holiday	

Source: 1/ Agricultural Extension (World Bank, 1977)

Note: 1) Training conducted by subject matter specialist or agricultural extension officer.

The feedback system of farmers questions appears to be established in terms of administrative organizations. At the moment no serious problems are found for the feedback of farmer's questions, however, it will require a few years to be able to evaluate the performance of the feedback system.

In addition the workload of the extension worker will increase in complexity, which can only be solved by an efficient and substantial operation of the feedback system to research stations.



Source: Dungun and Kemaman Agricultural District Office

Fig. 3.2 NUMBER OF FARM FAMILIES, KAMPUNGS AND GROUPS PER EXTENSION WORKER (1985)

CHAPTER 4 INCREASING EFFECTIVENESS OF RESEARCH AND EXTENSION SERVICES

This Chapter examines problem resolution item a) from Section 2.3.

4.1 NEW RESEARCH STATIONS

In order to establish a new agricultural research station certain requirements must be established:

- No research station in the area
- No research station under similar natural conditions in the country
- There is land available for agricultural development and a development plan exists to open up new areas.
- The area has a priority as a matter of policy, etc.

In this case, reasons 1), 2) and 3) should be considered. The natural conditions for agricultural landuse in the study area can be roughly divided into two which are the bris soil in the coastal area and the undulating land in the inland area. Therefore, the necessity of new agricultural research station is examined for each natural condition.

a) Inland Area

Undulating land is dominant in the study area except for the narrow coastal strip. The existing two research stations, one studying slope conditions and the other hill farming, represent the correct physical conditions of the area.

Most of the inland area that can be developed for arable purposes has been taken or is under development for oil palm or rubber estates. The remaining area is class 5 group which is unsuitable for any agricultural use, or is flood prone (Figs. 4.1 and 4.2).

This restricts heavily the land availability for paddy or field crops in the inland areas.

The two research centres are therefore being used to study the most suitable crops for small farmers under the two conditions. The MARDI operated centres at Jerangau and Kemaman study cocoa/coconut and fruit for the undulating areas, and general farming under the north-east monsoon conditions.

In this aspect there would appear to be no need for additional research stations. The content of the study programme however must be relevant to the needs of the small farmers particularly in obtaining produce in quantity and quality. The

opening up of new areas particularly in Pasir Raja and Jengai may indicate that new research activities are needed but do not justify new research stations.

b) Coastal Area

The bris soil characterizes the sandy and low fertility soils of the coastal strip. This strip, which supports the principal urban areas and industrial bases, should provide the necessary foods for self-sufficiency. To achieve this, improving crop cultivation and diversification are important for the farmers of the area.

Rantau Abang Tobacco Research unit is located within the study area and investigates tobacco cultivation on the bris soil.

The MARDI research station of Sungai Baging is outside the study area, and is in the adjoining state. However this has no negative effects as the research is not state oriented and is applicable to all East Coast bris soils.

The station investigates crop cultivation of cashewnuts, water melon, fruits and vegetables under bris soil conditions. The findings of the Research Station are applicable to the bris soil of the study area.

In the study area, SDOA implements a 438 ha of demonstration farms under bris soil conditions. Field crops such as vegetables and maize cover approximately 10% of the farmed area and perennial crops such as cashewnut, and fruits cover the remaining 90% of these demonstration farms (Fig. 4.3 and Table 4.1).

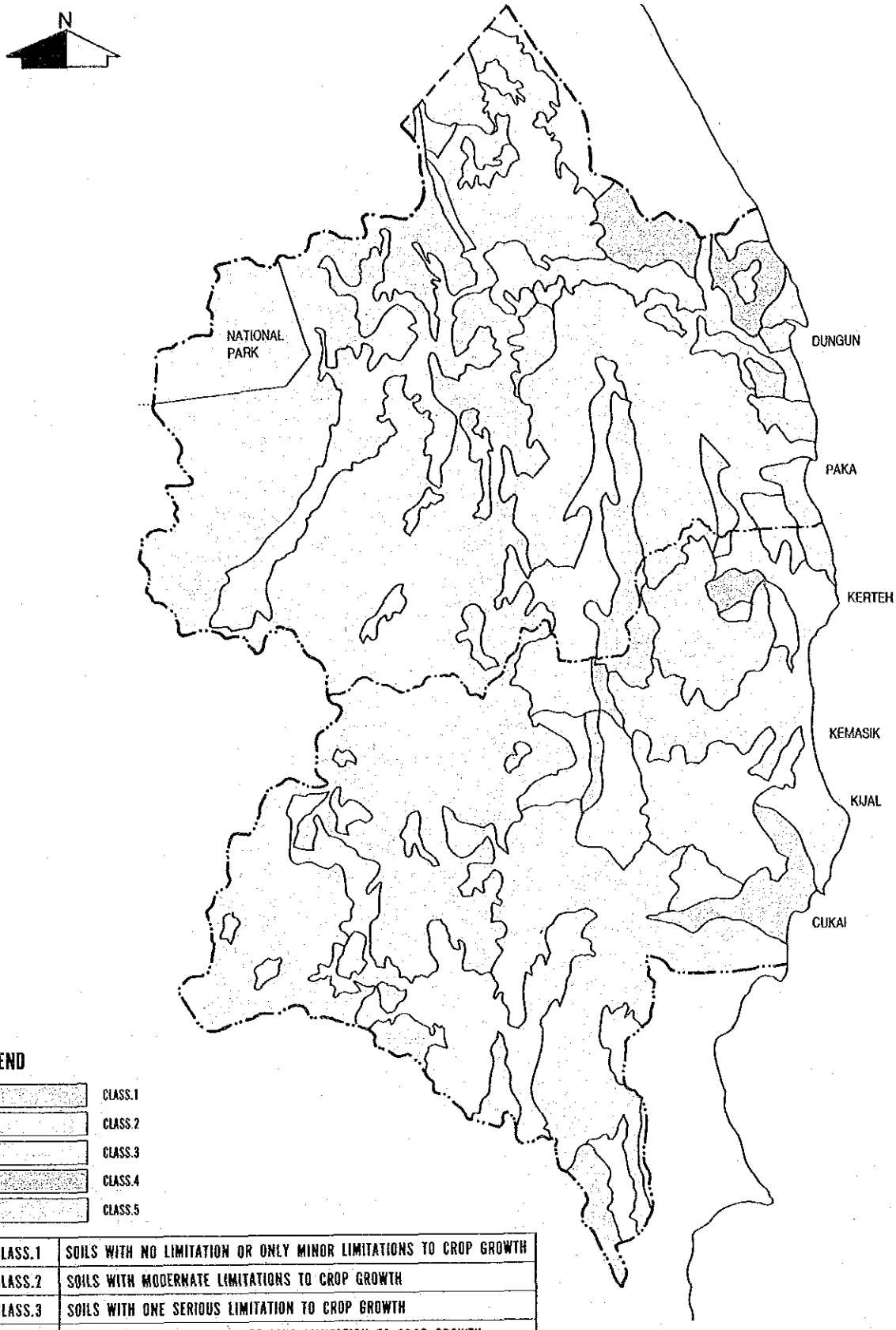
Whilst the majority of small farmers are located on the bris soil, the research facilities appear to be adequate and there is no necessity to establish a new Research Station.

4.2 BASIC EXTENSION SERVICE ACTIVITIES

Since the Training and Visit System was tested in the North Kelantan Project, the T and V system has been adapted and expanded to the all Malaysia by the DOA to implement effective agricultural extension services in 1979 – 1984. The T and V system of agricultural extension has helped to increase agricultural productivity impressively in many countries. Furthermore, the DOA is implementing projects to strengthen the extension network in Malaysia by a World Bank Loan (Appendix 3).

In the study area, the T and V system has been introduced and worked in accordance with a bi-weekly programme. However, it is still premature to come to a conclusion concerning the T and V system now, because it is still new and evaluation is considered premature. Also other projects or recommendations should not be proposed until the effectiveness of the system can be more clearly observed.

On the other hand, farm families per extension worker in the study area is 303 in Dungun and 361 in Kemaman, which is a low ratio compared with that of the national average in Malaysia of 540 farm families (Table 4.2). It can be said that the study area is already receiving priority in the extension services.



LEGEND

CLASS.1	SOILS WITH NO LIMITATION OR ONLY MINOR LIMITATIONS TO CROP GROWTH
CLASS.2	SOILS WITH MODERNATE LIMITATIONS TO CROP GROWTH
CLASS.3	SOILS WITH ONE SERIOUS LIMITATION TO CROP GROWTH
CLASS.4	SOILS WITH MORE THAN ONE SERIOUS LIMITATION TO CROP GROWTH
CLASS.5	SOILS WITH AT LEAST ONE VERY SERIOUS LIMITATION TO CROP GROWTH

Source: S.D.O.A.

Fig. 4.1 SOIL CLASSIFICATION MAP

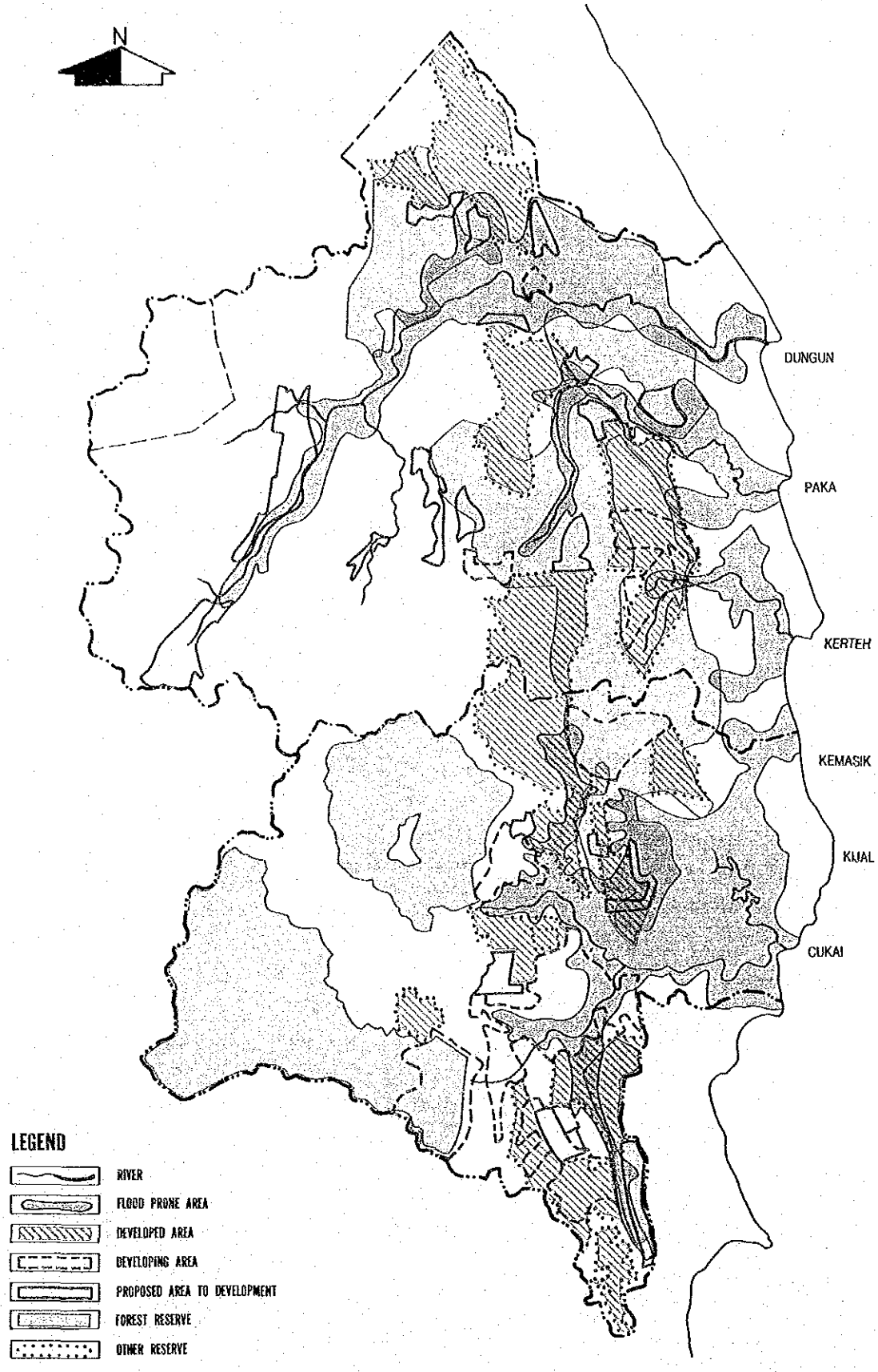
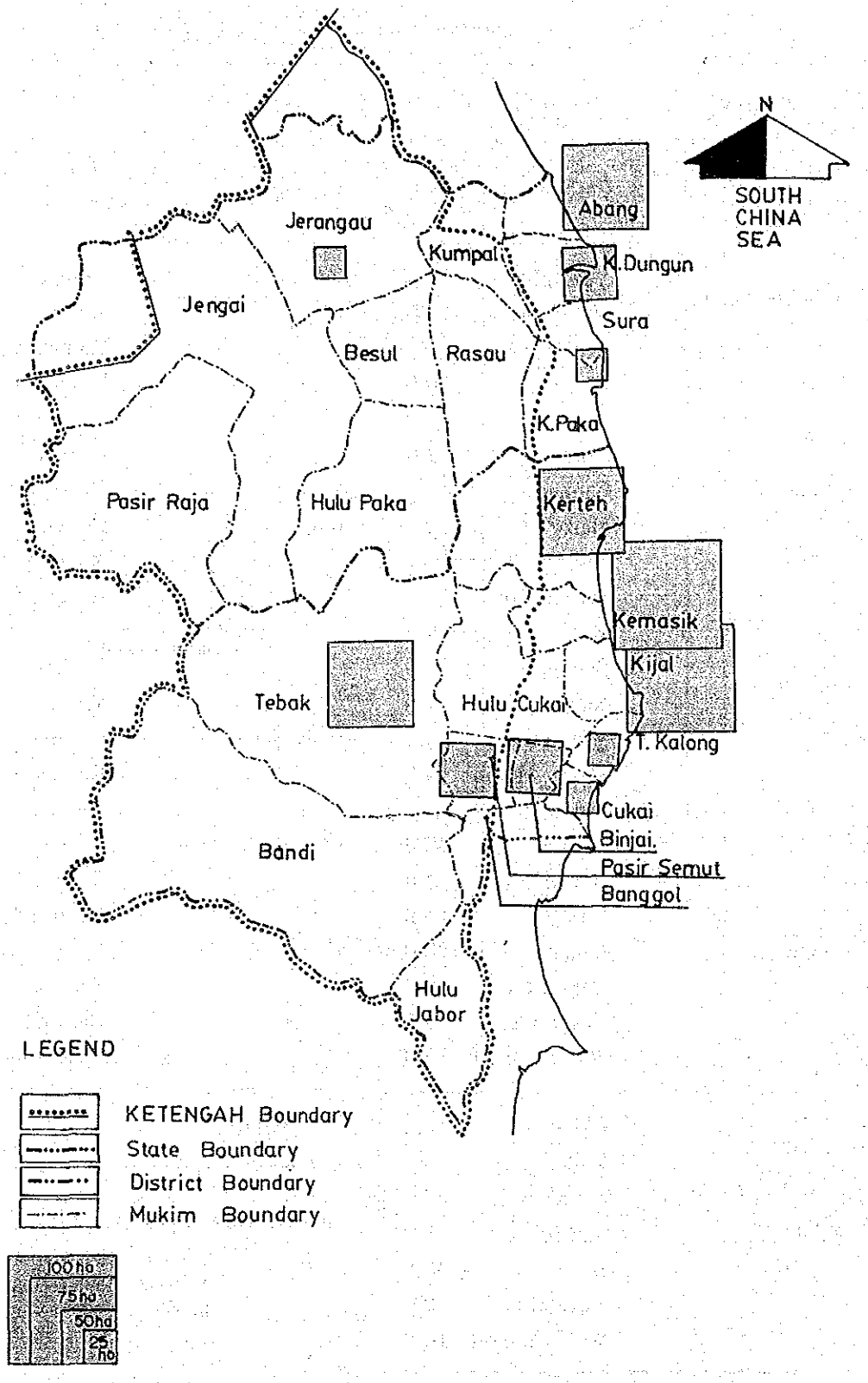


Fig. 4.2 PRESENT DEVELOPMENT CONDITION AND FLOOD PRONE AREA



Source: Dungun and Kemaman Agricultural District Office

Fig. 4.3 EXISTING DEMONSTRATION FARM

Table 4.1 Existing Demonstration Farm Operated By SDOA (1985)

Mukim	Crop[1/]	Hectare
Abang, K. Dungun Sura, K. Paka	Cashew-nut	64.0
Sura, K. Paka	Vegetable	1.8
	Water Melon	15.0
K. Dungun	Paddy	50.0
Jerangau	Salak	14.0
	Cabbage	0.9
	Maize	0.4
Kerteh	Sericulture	0.8
	Mango	19.0
	Banana	4.0
	Rambutan	9.0
	Vegetable	10.0
	Water Melon	14.0
Kemasik	Chili	30.0
	Guava	1.0
	Cocoa	16.0
	Banana	20.0
	Rambutan	4.0
	Vegetable	8.0
	Water Melon	12.0
Kijal	Chenpedak	6.0
	Chili	8.0
	Cocoa	8.0
	Mango	8.0
	Banana	40.0
	Vegetable	8.0
	Water Melon	14.0
T. Kalong	Duku	5.0
	Vegetable	2.0
Cukai	Orange	1.0
	Mango	4.0
	Rambutan	10.0
	Vetetable	3.0
Binjai	Durian	12.0
	Maize	3.0
	Mango	3.0
	Rambutan	20.0
	Water Melon	4.0
Pasir Semut	Durian	20.0
	Maize	4.0
	Banana	8.0
	Rambutan	10.0
	Water Melon	2.0
Tebak	Durian	20.0
	Maize	10.0
	Mango	3.0
	Banana	12.0
	Rambutan	25.0
	Vegetable	3.0
Total:		569.9

Source: DOA, Terengganu, 1985.

Notes: 1/ Demonstration farms of coconut, mangosteen and langsat are not shown.

Table 4.2 Number of Extension Workers, Farmer's Groups, Farm Families and Farm Families Per Extension Worker (as of 1983)

State	District/Area	Extension Worker	No. of Farmer's Group Formed	No. of Farm Families Covered	No. of Farm Families Per Extension Worker
PERLIS		14	164	8,896	635
		14(9)	164	8,896	635
KEDAH	Pendang	8	69	4,323	540
	Baling	16	135	11,487	718
	Kubang Pasu	10	79	5,983	598
	Sik	13	110	6,444	496
	Langkawi	10	73	4,953	495
	Kuala Muda	15	121	11,878	792
	Padang Terap	4	-	-	
	Kota Setar	3	-	-	
	Yan	2	-	-	
	Kulim	3	-	-	
	B. Baharu	2	-	-	
		86(54)	587	45,068	524
PULAU PINANG	Seberang Prai Utara	12	120	9,000	750
	Seberang Prai Tengah	9	74	5,600	622
	Seberang Prai Selatan	7	70	5,231	747
	Barat Daya	6	41	3,010	502
	Timur Laut	1	4	350	350
		35(21)	309	23,191	663
PERAK	Larut-Matang/Selama	21	180	10,502	500
	Ulu Perak	11	113	5,476	498
	Kuala Kangsar	16	166	7,553	472
	Kinta	5	22	1,530	306
	Perak Tengah & Manjong	20	186	11,229	562
	Hilir Perak/Batang Padang	25	280	14,087	596
	Krian	26	306	14,153	544
		124	1,263	65,330	527
SELANGOR	Kuala Langat	10	147	7,030	703
	Kelang	6	57	2,326	388
	Ulu langat	3	35	1,488	496
	Gombak/Petaling	3	41	2,102	701
	Ulu Selangor	4	38	2,043	511
	Sepang	5	66	2,859	572
	Kuala Selangor	14	226	14,777	1056
	Sebak Bernam	21	369	16,986	809
		66(34)	979	50,248	761

CONT'D

State	District/Areas	No. of Extension Worker	No. of Farmer's Group Formed	No. of Farmer's Group Formed	No. of Farm Families Per Extension Worker
NEGERI SEMBILAN	Jelebu	4	29	2,040	510
	Kuala Pilah	14	97	7,906	565
	Seremban	7	50	3,911	559
	Tampin	4	28	1,875	469
	Jempol	3	20	1,336	445
	Rembau	7	53	3,930	561
	Port Dickson	4	25	1,495	374
		43(14)	302	22,493	523
MELAKA	Masjid Tanah	8	62	7,000	875
	Alor Gajah	8	61	10,000	1250
	Jasin	8	15	2,400	300
	Merlimau	8	8	1,200	150
	Melaka Tengah	9	16	2,500	278
		41(25)	162	23,100	563
JOHOR	Pontian	12	134	7,443	620
	Mersing	8	57	1,508	189
	Kota Tinggi	5	48	1,963	393
	Muar	26	268	16,376	630
	Batu Pahat	26	293	20,134	774
	Segamat	11	94	5,696	518
	Kluang	9	67	4,379	487
	Johor Bharu	7	64	2,948	421
		104(52)	1,025	58,149	559
PAHANG	Kuantan	10	64	3,683	368
	Pekan	9	52	2,985	332
	Rompin	5	41	2,086	417
	Maran	5	42	2,192	438
	Temerloh	17	118	6,073	357
	Jerantut	8	62	3,974	497
	Bentong	5	50	2,317	463
	Raub	8	60	3,749	469
	Kuala Lipis	10	74	3,818	382
	Cameron Highlands	1	-	-	
		78(45)	563	30,877	396
TRENGGANU	Kuala Trengganu	26	259	12,509	481
	Ulu Trengganu	9	91	5,450	606
	Besut	14	150	4,433	317
	Dungun	8	74	2,421	303
	Marang	6	50	2,443	407
	Kemaman	8	79	2,889	361
	Besut(Projek)	7	70	3,623	518
		78(44)	773	33,768	433
	GRAND TOTAL	669(350)	6,127	361,120	540

Source: DOA

According to the World Bank Programme, a ratio of one extension worker for about 800 farm families is generally adequate, and also 500 farm families is more effective under the T and V system. The ratio in the study area shows that it is sufficient to operate the T and V system effectively.

In respect to basic facilities the farm extension service is well provided and the basic service is active. It is getting to the farmer and functions both in the field and administratively. This places credit on both the State & Federal Departments of Agriculture.

4.3 DEMONSTRATION FARMS

There are 569.9 ha of demonstration farms operated by SDOA in the study area (Fig. 4.3 and Table 4.1). Many kinds of crops are being cultivated, which is an effective way to encourage a farmer's productivity. Also the results from the farm provide important information on crop diversification in the area.

This is a very effective physical demonstration to the farmer on how his productivity can be improved.

The study however suggests that there is an imbalance in the location of the farms to the locations of the farmers, for example:

The number of family farmers under the T and V system are divided into 2,605 in inland kampungs and 2,761 in coastal kampungs, while the hectarages of demonstrative lots are 132 ha in inland and 438 ha in coastal area.

Table 4.3 Relationship Between Farm Families And Demonstration Lots[1/] (1985)

		Inland Area	Coastal Area
Dungun District	Farm Families	1,961 (63%)	1,145 (37%)
	Demonstration Lots	15 ha (10%)	131 ha (90%)
Kemaman District	Farm Families	644 (28%)	1,616 (72%)
	Demonstration Lots	117 ha (28%)	307 ha (72%)
Total	Farm Families	2,605 (49%)	2,761 (51%)
	Demonstration Lots	132 ha (23%)	438 ha (77%)

Source: 1/ Dungun and Kemaman Agricultural District Office

This indicates that many needs of the farmers are not necessarily covered. A hill farmer has little interest in the results of crops on bris soil. He must have something he can directly relate to his actual farm conditions.

This observation requires a deeper investigation than can be determined in this study. There are changing conditions in the study area and the experimental farms must reflect change to promote farming efficiency under new conditions.

In this respect it is considered that this matter should be examined by the State Department of Agriculture to determine the correct relationship between the facilities existing and the present and future needs of small farmers.