CHAPTER 5 RESOLUTION OF PROBLEMS RELATED TO LOW PRODUCTIVITY

This chapter takes each problem resolution and investigates solutions through the Research Stations and Extension Services. It is pointed out that 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 further investigations in a future study.

5.1 CROPS FOR DIVERSIFICATION

There is a drift of young men away fromthe kampungs for economic reasons. In order to achieve an acceptable economic return the value of the crops must be raised.

Two ways can achieve this:

- Crop improvement by raising quality and quantity of yield of existing crops
- Different crops with a higher value of yield per hectare

There is a drift of young men away from the kampungs for economic reasons. a consumption area which will have different dietary requirements to that of the farmers, the land values are higher, access to market is quicker and easier for perishable food. Therefore there is a geographic influence on crop requirements.

There are therefore two pressures at work on small farmers near to the towns, one is the increasing value of land and the other is the need for money to use in the town's amenities.

It is necessary that the farmer can utilize his soil to grow crops that are required in the market. The link here with the research station to indicate crops suitable, to the soil and also to the farmers purpose, is obvious.

A regular phenomenon of farming is that top soil is never homogeneous at planting depth and that there can be many small local variations, usually associated with drainage effects. It is therefore necessary that the research station responsible for the particular location is able to advise on crops and other matters relevant to the crops, particularly infestation at the local level.

It is necessary for the farmer to know how to manage his new crops. There are two problems here:

- New varieties of the old crop but which require new techniques
- New crops about which he has no experience

This indicates the second requirement, education and training – technological transfer between the extension officer and the farmer. In this connection, necessary provisions of infrastructure should be considered, such as drainage, irrigation, farm roads, and transportation.

There is no better example than success.

The part played by the research stations in introducing high yield and disease resistant stock is most praise-worthy and indicates what can be done to provide the farmer with the best that is available for Malaysian conditions. But the conditions in the field are not necessarily those of the research trial fields. There must be a direct advisory link between the station and the kampungs to give basic recommendations on soils and other conditions relevant to the crop.

It has been experienced in Europe where farming has a long family tradition over many generations for farmers to resent young scientists coming to their farms giving advice on how the traditional farmer must change his ideas and methods for new conditions. It is essential that this type of resentment does not occur. Incidentally in Europe there is no longer resentment, the advice is now sought by the farmer. Either the replacement of the older generation by a better educated generation or the fact that success breeds confidence and hence more success is the reason for the change. In a more cohesive unit as the kampung it may be harder for a young farmer to follow new ways against the advice of his elders.

The combination of research and extension service must be closely co-ordinated to ensure the success of the first few projects. In this context a model farm rather than an experimental farm should be established, where the crop diversification is obvious and the rewards obvious where the farmer obtains technological support.

Earlier in this section the term technology transfer was used.

The technology is not just in how to farm better in the sense that the extension worker passes on his knowledge and experience. Technology transfer means more than this, it includes irrigation (canal and sprinkler), and chemical applications (fertilizer and insecticide), mechanical applications to plowing and harvesting. These are areas where even the extension worker may also be unfamiliar. It is therefore necessary that there is back up through the research station to provide expertise or provide access to expertise to advise the extension worker.

The geographic location of the farmer has already been mentioned as a factor in crop types, in that perishable food should be grown near the market, and that the crops that are not so sensitive to time from harvesting and the travel conditions should be grown away from the towns. Whilst not all farms on the coastal strip are within the close proximity of market centres, they are on the low fertility bris soils. However the slope and hill farmers are all a similar travel distance from the markets. There are then two identifiable types of farm products associated with geographic location.

These are summarized below. Recommendations should be made after the results of the ongoing T and V operations together with research are analysed.

Bris soils

- production of perishable crops such as water melon, tomato, cabbage, carrot, cucumber, spinach and bean
- production of tobbaco, groundnut, cassava and others
- production of perennial crops such as coconut, cashewnut and mango

Inland Areas

- perennial crops such as orange, duku, mango, rambutan, durian, banana in undulating topographic areas
- field crops such as maize, sugar cane, soybean and cassava in selected areas

5.2 APPROPRIATE LAND USE PLANNING

The land use map of the area dates from KETENGAH (Fig. 4.2). In this context a review must be undertaken to see if it is still relevant under present conditions. Many agricultural policies have been promulgated since the map was gazetted, which have allowed the ground classifications to change in various areas.

It an orderly development programme is to occur the land must be released to follow a sound ecological pattern. That will prevent loss of forested or commercial timber areas, prevent erosion and other distressing events of human expansion.

In recent years agricultural science has advanced particularly in the use of foliage cover for shrubs and low fruit and vegetable crops. Old rubber trees provide a good example where without removing the old trees, hence causing erosion and loss of the topsoil and the accumulated humus. The undergrowth can be cleared and suitable fruit-trees and vegetables are planted under the rubber foliage.

However it indicates that the land use of areas can change. In order to assist in an orderly change it is necessary to have recommendations from the research stations on the soil conditions and recommended use for the land.

Whilst the land use map would be the responsibility of the appropriate government department the research station associated with the peculiar soil conditions must provide recommendation on the potential development opportunities.

In this matter no involvement by the extension services can be identified. Development possibility of irrigation system, ground water use and swamps should also be studied in relation to the review of land use planning.

5.3 UTILIZATION OF FARM BY-PRODUCTS

The high rainfall is the primary cause of the leaching out of minerals and fertilizing agencies in the soils, and the lack of humus and the thinness of the top soils. This applies to both the bris soil and the inland soil. In the bris soil, with their fine grained sand . the minerals are leached out down into the soil. In the hills the minerals are removed by the high run-off.

The decomposition of organic matter into humus, which is spread to improve top soil and to bond into the soil, is necessary to upgrade soil quality.

In the question of soil improvement resulting from organic by-products the research stations and the field extension service can provide the necessary research and advice to small farmers.

The wasted portions of fruit and vegetable that cannot be used commercially also represent another source of potential humus. In this context only waste from a commercial operation can be considered to provide sufficient quantities to ensure a viable commercial source of humus, and the following potential sources have been identified.

- Oil palm cake. In the northen part of the state, the use of oil palm sludge cake for animal feedstock is said to have started. Although the numbers of animal heads in the area are relatively small, animal manure can be used and turned into humus in the soils. Use of it in the fields in other ways should be studied.
- Sawdust and scrap wood from saw mills
- Market Waste

5.4 AGRICULTURAL DIVERSIFICATION

A good example of the practical results of crop diversification is to be found in an oil palm estate in the FELDA estate of Johor. The estate employees who had a high proportion of Chinese and Indian in their numbers, were permitted to undertake vegetable production outside estate duties. This started with the Chinese and the Indians. When the results, economic results, became ovbious the production of vegetables became common amongst Malaysian groups and other tree crop estate areas.

This is used to show the example of crop diversification in an area of oil palms.

This subject matter should not be confused with subsection of this chapter which deals with main crops. This subject concerns cash cropping to provide income between main harvests. It is recognized that much of the inland area there is no space for expanding a traditional market garden. However there are the contour rows of the trees of the main crop. It is possible to encourage growth of vegetable crops, where the high humus requirements of the vegetables will enhance soil improvement for the main crop resulting in a better yield.

Currently, the research stations in Jerangau and Kemaman conduct experiments in various combinations of mixed cropping. The result of the experiment is to be

extended in the surrounding area shortly. Extension Office in Jerangau advices farmers on raising salak under rubber trees. The State Veterinary Department has promoted the rearing of livestock in villages and estates.

This type of activity promotion is obviously linked with the research station to investigate in conjunction with soil improvement the best combinations of main crop and cash crop. The field extension service can provide the technical support necessary to advise the farmer in the new technologies involved.

5.5 INCREASING THE NUMBERS OF FARMERS GROUPS

The success of technology transfer from research to the small farmer in the ultimate situation must be dependant on the farmers receiving the expertise given by the field extension worker.

Until a situation has arisen that small farmers no longer need the transfer of new farming techniques, individual visits to one farm by the extension worker would not be rewarding.

It is therefore necessary that at each visit the extension worker should communicate with as many farmers in the area as possible.

To achieve this situation the farmers should be grouped together in areas such that access to a central point for meetings is relatively easy. It is also to be preferred that the farmers should be of one type in one group. That is slope farmers with common agricultural requirements should not be mixed with farmers of a hill type farm, nor either with a bris soil farmer. It is accepted that this is an ideal situation, but in regions just opening up to development the refinements of grouping must be ignored in order to achieve communication.

It is necessary that the extension service result in better husbandry by the small farmer. He must receive technology transfer delivery of inputs and other services, and until his skills have advanced such the receiving of skills in groups is no longer necessary. He must be grouped with farmers of similar status and problems.

Family groups and farm families for February 1985 are shown by SDOA as follows:

Table 5.1 Number of Farm Families and Groups Covered by SDOA 1/ (1985)

	Farm families in the groupings			Groups			Families/Group		
	Inland	Coast	Total	Inland	Coast	Total	Inland	Coast	Total
Dungun	1232	1145	2377	34	50	84	36	23	28
Demaman	644	1616	2260	18	49	67	36	33	34
Total	1876	2761	4637	52	99	151	36	28	31

Source: 1/ Dungun and Kemaman Agricultural District Office

Note: 1) Families of 729 in Pasir Raja is not included.

In 1983 the number of family groups were 2421 in Dungun and 2889 in Kemaman. Those in Dungun have increased from 2421 to 3106 (2377 + 729), while in Kemaman they have decreased from 2889 to 2260. The decrease in Kemaman is said caused by the industrial development in the coastal strip. Some small farmers abandoned village farming and engaged/moved into urban economy.

Although exact data of population are not available for small villages in 1985, the coverage in 1983 is approximated as in the following manner.

- Population in traditional villages

  68,000[1)]

- Percentage share of those engaged in small scale farming

  68,000 x 70% = 48,000

- Number of families covered by the grouping

  2,421 + 2,889 = 5,310

- Number of people in the grouped families

  5,310 x 5 = 27,000

- Percent coverage

  27,000 ÷ 48,000 = 56%

Source: 1) Table 5.2 of the Main Report (Vol. I)

- Average farmers per group in the area are 31, while it is 59 in Peninsular Malaysia (Table 4.2). Since village farmers need to improve their income level, which is lower than the national average, intensive care is necessary in terms of families per group. The State should make efforts to sustain the family numbers per group at the present scale.
- In 1983, the family groups under the T and V system were about 56% of the traditional village farmers. In 1985, the coverage was maintained. However, villages are always influenced by industrialization which attracts labourers to emigrate into the urban economy, which results in the deterioration of the level of rural production.

Efforts should be concentrated to encourage farmers through the extension service system and grouping to continue their agricultural activities in these traditional villages. In this sense the percent share of farmers groups should be increased.

5.6 IMPROVED CREDIT FACILITIES

This is an extremely sensitive subject with overtones outside the objective of this study.

However it is considered that both research stations and the extension service may have opinions relevant to governmental and commercial actions and so should be part of the relevant decision making process.

How this is to be achieved is an administrative matter.

5.7 RECRUITMENT OF STAFF IN MARDI

The overall MARDI organization has not filled all the existing posts as shown in Table 5.2. These posts should be filled in at the earliest time, otherwise there will be a shortfall in research activities in the near future.

Table 3.5 shows the staffing of MARDI stations of the study area. It is said that this staffing level is not sufficient to cover the various activities which will increase in the study area. The required increase in staff is shown in Table 3.6. It is recommended staffing positions of MARDI should be increased to at least as shown in the table, as a matter of some urgency.

Table 5.2 Number of Staff, Filled and Vacant Appointments In MARDI of Peninsular Malaysia (1985) [1)]

Division	Research Officer			Senior Assistant Research Officer			Assistant Research Officer			Senior Research Assistant			Research Assistant		
	Seat	Occupied	Vacancy	Seat	Occupied	Vacancy	Seat	Occupied	Vacancy	Seat	Occupied	Vacancy	Seat	Occupied	Vacancy
Rice	62	61	1	9	8	1	41	39	2	14	14	-	146	130	16
Coco/Coconut	37	29	8	3	3	-	29	15	14	7	7	-	68	56	12
Tobacco	16	15	1	2	2	-	15	7	8	2	2	-	33	27	6
Other Crops	47	45	2	6	6	-	31	27	4	7	7	-	93	93	-
Fruits Research	38	37	1	5	5	-	34	28	6	10	10	-	70	62	8
Livestock	55	50	5	5	5	-	40	35	5	7	7	-	93	80	13
Central Laboratory Research	64	58	6	8	8	-	47	36	11	16	15	1	124	108	16
Techno-Econo and Social Study	34	27	7	3	3	-	13	6	7	2	2	-	33	21	12
Technical Service	13	11	2	1	1	-	13	8	5	2	2	-	17	13	4
Food Technology	76	67	9	8	7	1	71	58	13	8	8	-	87	70	17
Promotional Technology	28	26	2	-	-	-	-	-	-	1	1	-	-	-	-
Total	470	426	44	50	48	2	334	259	75	76	75	1	764	660	104

Source: MARDI, 1985

Notes: 1) Including the study leave

CHAPTER 6 RESOLUTION OF PROBLEMS RELATED TO INCOME DIFFERENTIALS

The population drift away from the land to industry is quite obvious and apparent. This is particularly so in the areas adjacent to the towns and industrial bases.

The inland areas do not show the same trend in statistical data of population census because of new immigration in settlements and KETENGAH towns. But there is a trend for the young men to leave the kampungs to take up casual labouring in the development projects in the State. Whether these men will return to the kampungs is conjecture, however if the precedent of other areas of Malaysia is used, it is doubtful and they will tend to become squatters in the fringes of the urban areas.

To prevent this happening in the State the kampungs must be strengthened by raising incomes to deter the drift for economic reasons.

The average wage of manual worker between urban and rural economy is one of the causes of population drift. In urban areas of the study area, industrial and development projects attract labourers by paying M$20 or more per day, while in the estates is M$15 – 20 for field employees, according to the information including MAPA/NUPW Agreement of March 1985. The income of field employees fluctuates because of cropping patterns and the climate.

The income of a small farmer in traditional farming is not known in detail, it is doubtful it can be gauged accurately. But it is considered to be about M$3 – 6 a day. In terms of per capita household income this is less than M$1/– a day. In order to get cash income necessary to support his family, he needs to work in an estate or nearby town.

To raise the economic standard of the kampungs, two obvious features exist – the farmer must grow more and sell more.

6.1 INCREASING PRODUCTIVITY

The independence and homegeneity of the kampung must be preserved in order Transfer through education and example of the research and field extension services.

The independence and homegenity of the kampung must be preserved in order that the values held by the small farmers are preserved and strengthened. The enhancement of their standard of living must be matched by material values and the strength of their traditional values.

The income derived from their input of labour must show a reasonable relationship, that encourages the young men to stay in the kampung and to open up marginal lands to production. This cannot be achieved by traditional cultivation practices. These pioneers need to be supported, advised and encouraged. The success of the harvest must be the reward they receive for the labour they committed to the soil.

6.2 IMPROVEMENTS IN MARKETING

The improvements in crops and increasing yields do not alone increase farmer's prosperity, he may have a better diet and improved nutrition but his material standards are not raised unless he can market his product for money.

Barter is not considered in this study, though on a State organized basis of produce in exchange for equipment or fertilizer may offer an opportunity for research studies. Barter on a commercial basis is open to exploitation by the unscrupulous.

The market divides into three divisions.

- Local
- National
- International

At the moment in terms of fruit and vegetables only the local market is served by the small farmers – where neither quality nor quantity are particularly relevant as the marketable crops all come on to the market at the same time and finish together.

To enlarge the market possibilities there must be an increase in the quality requirements. With an increase in market requirements goes an increase in the waste levels. These wasted crops must have an end product that will permit waste to be used.

When the markets exist it must be possible for the farmer to have access to that market by having good transport communications and marketing channels.

In the context of this study a review of marketing projects and possibilities is not possible, but the requirements of the research and field extension services can be thus recognized.

Research and marketing are linked as the marketing function is to identify a market with a product. The research must be able to find a product that satisfies the market. An example in Thailand was that an entrepreneur identified a market in Singapore for pre-packed sliced Durian. His research produced a Durian that would be frozen, pre-packed, and have an acceptable quality when used.

In this context the research stations are able to assist by breeding crop varieties that satisfy the market.

The field extension worker's prime objective is technology transfer of farming skills. It is not possible that he is also a marketing expert. It is not considered practical that marketing is also his function. However it is considered his function to advise on harvest handling and packaging for market.

The process of "gathering – market designation – transportion – wholesales-retail sale" should be studied. How the demand and supply mechanism functions is also to be studied. These studies should be extended to investigate, not only at the producer sites but also in the urban markets and retail shops.

The subject of marketing is a specialised one and outside the requirements and hence the staffing of this study. It is properly a subject that requires a full and deep exploratory investigation to make recommendations and proposals.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

The scope of the study has directed attention at the research and the field extension services. The conclusion of Chapter 4 is that the basic service provided by both functions is adequate and that they appear to be functioning in accordance with procedural requirements.

Administratively the systems are functioning. But the principal objective of the service is to achieve a transfer of technology from research through the field extension service to the small farmer. It is necessary to have a few years experience to review the efficiency of this process.

However, the work loads which have not been apparent but will be imposed on the "research – extension service – farmers" system become larger and complicated as years pass on. Success and failure will come in turn in the development of farming in traditional villages. In the context of these points, a periodic review on the functions of the feedback mechanism as well as the whole linkage of the system is necessary.

7.1 RESEARCH STATIONS

a) The natural conditions for agricultural landuse in the area can be roughly divided into two types: the bris soil in the coastal area and the undulating land in inland. Therefore, the necessity of a new agricultural research station is examined for each area.

(i) Inland 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 estate. The remaining area is mostly the class 5 group which is unsuitable for any agricultural use, or is flood prone (Figs. 4.1 and 4.2). There are two research stations of MARDI: one studying slope conditions and the other hill farming and therefore represent the correct physical conditions of the area.

It is concluded that the existing two research stations of MARDI can cover the area. Therefore, there would be no need for additional research stations in the inland area.

(ii) Coastal Area

There is Rantau Abang Tobacco research unit in the area which investigates tobacco cultivation on the bris soil. Sungai Bagin research station, which investigates crop cultivation on the bris soil, is outside the study area, but is in the adjoining state.

The findings of these research stations are applicable to the bris soil of the study area.

It is concluded that the research facilities appear to be adequate in the coastal area. Therefore, there is no necessity to establish a new research station.

b) The research stations have a shortage of staff as is shown in Tables 3.5, 3.6 and 5.2. This is a significant shortfall which must affect the work of the research stations. This study has shown that there are further areas of activity in which the research stations must be involved. This will place further demands on the stations and unless the additional staff are deployed to meet these new requirements the burden placed on the existing staff will exceed their capacity to respond.

Particularly it is found that 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 (Table 3.5).
It is recommended that the staffing positions of MARDI stations in the study area are increased to at least the level given in Table 3.6.

c) A main characteristic of agriculture in the study area is then low productivity compared with Western Peninsular Malaysia. Tree crops are dominant in the study area. Land resource for arable purposes in new development 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 well consider the application of mixed crop cultivation by small farmers.

d) The soil fertility in the area is characterized by low organic content because of severe natural conditions. The application of organic material is very important to sustain soil fertility. In the study area, there are many unused agricultural by-products such as oil palm cake, sawdust and others. Furthermore, these have potential for livestock feeding.

In this context farm by-products are valuable natural resource for agriculture in the area. It is recommended that research stations should consider the multiple utilization of farm by-products for the small farmer.

e) Research and marketing are linked as the marketing function is to identify a market with a product. In this context the research stations can suggest breeding crop varieties and processing that will satisfy the market.

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

7.2 EXTENSION SERVICE

a) In the study area, the farmers grouping under the T and V system has been introduced and worked in accordance with a bi-weekly programme. However, it is still premature to assess the results concerning the T and V system because it is still new and it is too short a time to evaluate the impact upon the small farmers in the area.

It is recommended that the basic services of the T and V system be maintained in the extension services and a review on the effects should be conducted periodically.

b) Increasing grouped farmers under the T and V system is an effective way to communicate with as many farmers as possible and to perform technology transfer through the extension worker. The number of grouped farmers covered by SDOA in Dungun have increased, while in Kemaman they have decreased during the period of 1983 – 85 (Tables 4.2 and 5.1). Furthermore, there are some mukims in the inland area of the study area where no grouping exists. Approximately 56% of the farmers in traditional villages are covered by the grouping.

It is recommended that the grouping under the T and V system should be increased to cover the majority of small farmers.

c) The number of farm families per extension worker in the study area is 303 in Dungun and 361 in Kemaman, which are low ratios compared with that of the average in Peninsular Malaysia of 540 farm families (Table 4.2). The study area is already receiving priority in the extension service.

It is recommended that the ratio in the study area be maintained in order to operate the T and V system effectively.

d) There is no doubt that demonstration farms have proved the value of the research activity put into the crops being grown and certainly these exist as a success story to show the small farmers what can be achieved.

There are 569.9 ha of demonstration farms operated in the study area. Many kinds of crops are being cultivated, which is an effective way to encourage in diversifying and increasing farmer's production. However, the demonstration farms are mostly located in the coastal area and are not distributed equally in proportion to the types of farming and farm families (Fig. 4.3 and Table 4.3).

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

7.3 PROBLEM RESOLUTION OF PRODUCTIVITY

Improvements in productivity will result in an increase in income and consequently reduce the number of people below the poverty level. Emphasis on productivity improvement is consistent with national policies since the eradication of poverty is one of the main objectives of National Agricultural Policy.

The problem resolution for productivity emphasized the need for technological transfer to the small farmer and identified resolutions that have a relationship to research and field extension services.

The basic need is to permit the small farmer to improve quality and quantity of his crops and to diversify with cash crops. In this respect the research stations of the country have performed their tasks.

This is the preliminary phase. The transfer stage is that of communicating the concept of new plants and new techniques necessary to promote farm husbandry. The reward stage is the improved living standard and a halt to the drift of young men to the town.

This study has focused on the transfer stage. It has utilized the term "techlology transfer" to denote exactly the need of the farmer. However to many people technology transfer implies "Hi-Tech" and is thus irrelevant to a kampung dweller. A description commonly used is "Appropriate Technology" whereby the technology transferred is appropriate to the needs of the farmer and his situation.

In this context the objective is to enhance the skills of the farmer within his existing community and life style. It can be seen that this is an ongoing situation which passes on into the reward stage and then back again into transfer stage, as the farming community sustains more skills. It is a cycle of progressive repetition. But in each case the essential kampung life style is maintained as the technology passed on to the farmer is appropriate to his needs.

7.4 PROBLEM RESOLUTIONS OF INCOME DIFFERENTIALS

Problems in income differentials should be approached from various viewpoints:

a) Improvement in quality and quantity of product by supporting the betterment in farming technology.

b) Establish an efficient marketing system and introduce profitable marketable products.

c) Restructure the farming unit and management to realized the economy of scale.

Of these approaches, item a) is taken in this study to strengthen the communication system of "research-extension system-farmers" in improving the farming technology.

Item b) has been discussed in the previous sub-sections as the way to improve quality and quantity. However unless there is a market available to the larger quantity of improved crops nothing has been gained by the farmer.

Marketing is a highly specialised service that is outside the scope of either a Research Station or a field extension officer and must be examined by market research specialists. When the market has been identified then the research station

and extension worker are involved in assisting the farmer to satisfy the market requirements.

Item c) represents a political approach as it may involve philosophical and institutional elements which are outside the scope of this project.

8.1 ACTIONS

a) Research Stations

As recommended in the previous chapter, there is a need to fill in the vacant posts and increase the staff of the stations. It is found that there are no research officers specialized in fruit cropping. Existing research officers are rather specialized for tobacco and cocoa. However, fruit cultivation is quite common in small farmers land in the coast and inland. Most of the demonstration farms of SDOA have also perennial fruit trees.

It is recommended that fruit specialists should be included in the staff of the research stations of MARDI in the study area.

Whilst trees of oil palm and rubber are planted in the undulating inland area, small areas of suitable cropping land are left in the study area. Mixed cropping is an important subject to increase produce. Examples of the mixture to be studied are shown below:

- Oil palm and livestock, salak, cocoa
- Rubber and livestock, salak, cocoa
- Coconut and livestock

Research should be intensified to find better combinations in the study area.

In order to supply organic fertilizer to the soils of the cultivated land and to produce animal feedstock, research should be conducted to find suitable by-products from forest and agriculture. Examples are shown below:

- Oil palm cake
- Sawdust and scrap wood
- Excessive catches of fish and low priced fish

b) Extension Service

It is found that less than two-thirds of village farmers are grouped into the extension service system. The grouping should be expanded to cover a larger proportion of village farmers, particularly those in remote villages.

In connection with the extension service, the transportation feeder system and communications should be improved. Improvement of infrastructure in these remote areas should be coordinated by JT,JKR, KETENGAH, and District Office.

Farm families per extension worker should be reviewed and adjusted to make the service more intensive and effective.

As an example, in Jengai there are 17 groups under one extension worker shown in Fig. 3.2. The 17 groups are considered to be too large under the less than convenient conditions of the area. The group size should be reduced to 10 or 12 by adjusting the areas of the extension workers or by increasing the numbers of extension workers. Therefore, SDOA should review the T and V time table of all extension workers in terms of his travelling distance and time, groups, families, demonstration lots, etc.

There is a prospect to have an enlarged vegetable consumption market in the coastal strip because of urban development and industrialization. New kind of vegetables will be consumed. Farmers in small villages adjacent to these areas can have advantages of production because of proximity. In order to meet this kind of demand, demonstration farm of vegetable cultivation in traditional villages should be encouraged. More demonstration farms should be located in the areas of Besut, Jengai, Pasir Raja, etc.

8.2 STUDIES

a) Reveiw of Land Development Plan

Many agricultural policies have been promulgated since the landuse plan was gazetted by KETENGAH in the early 1970s, which have allowed the ground classifications to change in various areas. If an orderly development programme is to occur the land must be released to follow a sound ecological pattern. That will prevent erosion and other distressing events caused by human expansion.

It is recommended that a review on landuse planning in the study area should be undertaken in order to have an appropriate plan under present conditions. The study should cover the following subjects:

- Review of the overall landuse plan including the plans of new development and ongoing programmes
- Environmental changes caused by various developments
- Establishment of a new landuse plan showing the development potential and measures to protect environmental deterioration

b) Study on Marketing System

It is recommended that a Market Research Study be undertaken to determine potential produce markets for the small farmer and the requirements of that market in terms of crop, quantity, quality and packaging. In connection with this study, a study of transportation requirements between farm and market shall be included.

Subjects to be studies are classified as follows:

- Origins of produce and seasonal pattern in local market
- Prices and cost component
- Marketing and transport system from traditional villages

APPENDIX

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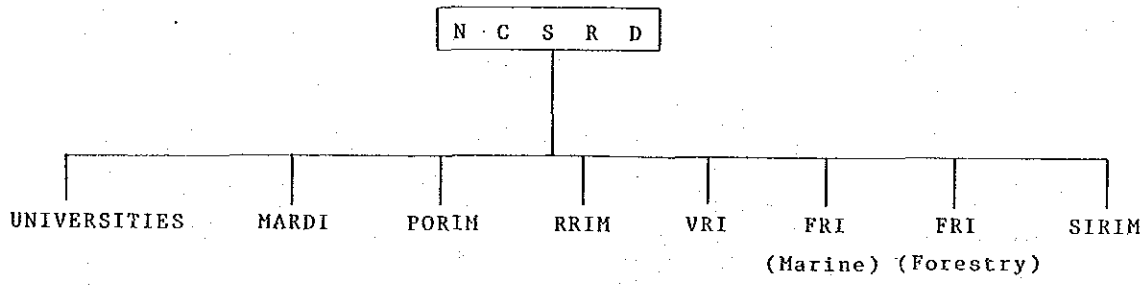
APPENDIX TABLE 1 THE SPECIFIC FUNCTIONS OF NCSRD

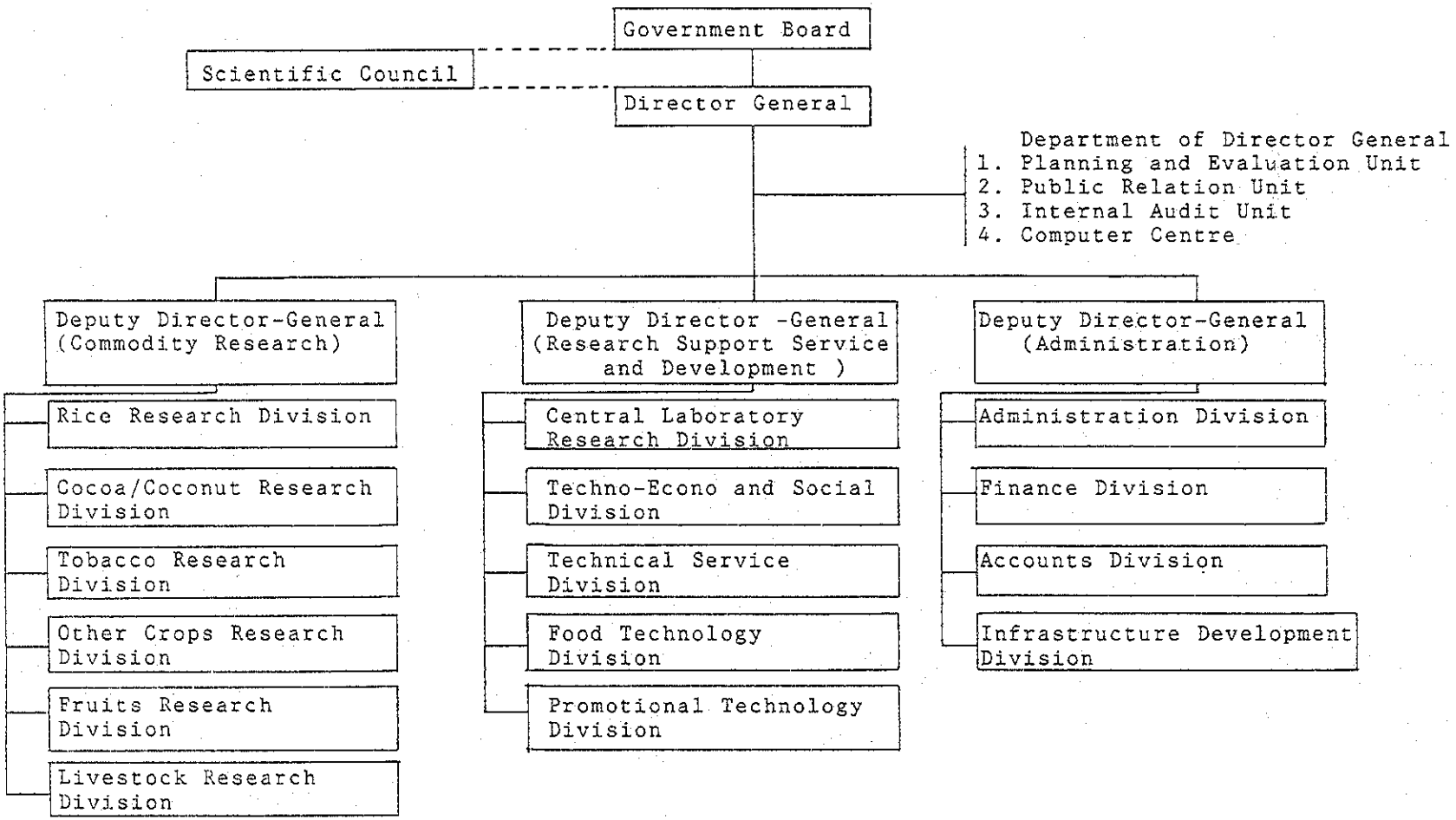
Items	Function
1)	To be responsible for the formulation of the science policy of the nation and undertake an innovative role in relation to science for the progress and modernization of society.
2)	To serve as the national scientific consultative and advisory body to the government.
3)	To identify R and D activities consonant with the national development objectives.
4)	To initiate, coordinate and moniter R and D activities of the nation and to ensure maximum utilization of resources.
5)	To develop the country's manpower potential for R and D activities.
6)	To collect information on R and D and to evaluate, print, publish and disseminate documents related to R and D.
7)	To promote appropriate legislation for R and D activities.
8)	To provide liaison with other countries in R and D.
9)	To undertake all other action of necessary measures which promote speedy and effective scientific research and development in the country.

Source: Improving Extension Strategies for Rural Development



APPENDIX FIG. 1 THE MALAYSIAN AGRICULTURAL RESEARCH SYSTEM

Source: Improving Extension Strategies for Rural Development



APPENDIX FIG. 2 ORGANIZATION OF MARDI

Source: MARDI

APPENDIX TABLE 2 THE FUNCTION OF MARDI

Items	Function
1)	To conduct scientific, technical, economic and sociological research in Malaysia with respect to the production. Utilization and processing of all crops (except rubber and oil palm) and livestock.
2)	To serve as a centre for the collection and dissemination of information and advice on scientific, technical and economic matters concerning the agricultural industy including the publication of reports, periodicals and papers relating thereto.
3)	To serve as centre for specialist extention service in the agricultural industry.
4)	To advise on the training of workers for scientific and technical research and extension.
5)	To provide grants-in-aid for the purposes of pure and applied scientific, technical and economic research concerning the agricultural industry.
6)	To maintain liaison with other organization, both public and private, indigenous and foreign, which are engaged in scientific, technical, economic and sociological research concerning the agricultural industry.

Source: MARDI

APPENDIX 1 THE ACHIEVEMENTS OF MARDI

Rice

Through a tedious breeding programme that emphasized on developing and selecting strains which are high yielding, early maturing, resistant to blast and brown planthopper, tolerant to drough and acid sulphate conditions and having the desired cooking and eating qualities, several promising lines with the desired traits have been selected and evaluated in farmers' fields. The development of several improved varieties have been successful among which the varieties, Murni and Mahsuri were released in 1972. Sri Malaysia I, Sri Malaysia II and Pulut Malaysia I were identified and released in 1974. By November 1979, three more new varieties, i.e. Sekencang, Sekembang and Setanjung were released. Kadaria was released in Kelantan and Pulut Siding in Perlis during 1981. In 1984, MARDI, released 3 new varieties that are not only high yeilding but tolerant towards tungro vians disease. These varieties were named Manik, Muda and Seberang.

The Direct-Seeding cultivation method was further refined with regard to methods of broadcasting to obtain uniform seed, distribution uniformity, seed rates, fertilizer levels and weed control practices.

Cocoa/Coconut Research

A number of significant progress have been made in the development of vegetative methods of propagation for cocoa. Mature breeding of cocoa plants has become a standard rehabilitation practice. It is also proven that the chip budding method is more economical and practical as compared to conventional budding or by cuttings.

In 1983, MARDI officially released five high yielding cocoa clones. The released clones all of which satisfy the criteria of a good cocoa variety are the KKM 1, KKM 2, KKM 5, KKM 6 and KKM 7.

The clones have a sustained high yield of between 1.5 and 2.5 tonnes per hactare per year under intercrop with coconuts and between 2 and 3.5 tonnes per ha per year under monocrop planting. The plant matures early with good growth, vigour and uniformity.

MARDI has also made available an effective package technology for the industry. These include the technology that encompass propagation techniques, cultural practices, management, plant protection measures and processing and grading.

Tobacco Research

This programme is directed towards improving the quality and yield of the Malaysia flue-cured Virginia tobacco cultivated on the light-textured soils of the East Coast States (Bris, river-terrace alluvium and granite-wash alluvium). Essentially, the research activities focus on varietal evaluation, crop nutrition and fertility, crop protection, agronomic practices, water management, mechanization and post-harvest technology. To date, useful information on tobacco cultivation technology have been gathered. Nursery practices relating to time schedules, spacing and fertilizer applications have been standardised. Optimum fertilizer combinations for the twoseasonal crops on Bris have also been formulated. The varieties Coker 254, Speight G-70 and Speight G-28 give high yields on Bris soils.

Insecticides studies showed that Sumicidin 30, Dursban, Doltax, Lorsban, Elsan and Marshall could all be used. They provided control against shoot pest (Heliothis spp. and Prodenia litura) at Bachok, Jeram Pasu, Pasir Puteh and Pasir Mas. For black spot leaves caused by Alternaria sp. the effective insecticides were Rodoni and Dyrene.

Fruit Research

Fruit research concentrates on several locally important fruits namely, pineapple, cashew nut, banana, papaya, water-melon, nangka, durian, rambutan, mango, citrus (highlands), guava, soursop, carambola and to a lesser extent mangosteen and chikus. In line with the Government's policy, focus is given to generate new technology to stimulate further expansion of the fruit industry.

Specifically, attention is given to research programmes in developing varieties which will give high quality produce and maintain consistent production levels. The activities include survey on the status of fruit industry throughout the country; developing germplasm and genetic resources both through introduction from overseas as well as collections from local materials, and evaluating them for direct utilization as clones for commercial plantings and for use in further breeding programmes, intensify hybridization and systematic breeding programmes; developing optimum agronomic practices both to meet the nees of the 'dusun' system of farming as well as monoculture practices for crops which have potential for processing and export; identifying and evaluating suitable fruit types for the different environmental conditions in the country and to develop suitable crop protection practices against the major pests and diseases; and in developing technology for reducing juvenility period so as to obtain higher profits in fruit cultivation and to locate and register clones or varieties of fruits which have been observed to possess good eating quality.

Presently, the progress and achievements made have included a large collection of durians, mangoes and rambutan clones/varieties which have been observed to possess good eating quality.

For pineapples and to a lesser extent papaya and durians, systematic breeding efforts have yielded good success. In the case of pineapples, hybrid crossing between cultivars from Sarawak and Singapore Spanish have resulted in progeny with higher yielding and better quality fruits.

Hybrid crossing between the Solo Papaya and Subang 6 has produced a superior papaya in terms of size, eating quality and uniformity.

A number of potential banana accessions have been identified. These potential materials are being evaluated in MARDI research station at Pontian, Pasir Puteh, Jalan Kebun, Hilir Perak and Serdang.

Freshwater Fish (Unit 1983)

Breeding of various fish like Big Head Carp, Silver Carp, Grass Carp (Chinese Carp), Rhou (Indian Carp), by induction method using pituitary extract and exogenous hormones, is a breakthrough by MARDI.

Polyculture, a practice whereby fish (carp) and prawns are reared together and integrated farming with poultry, was found to be viable.

Minor Crops Research

Research activities on minor crops include vegetables, pepper, sugarcane, root crops, field crops, spices and beverages, ornamentals and miscellaneous crops (like stevia and thalin) and commodities that are export oriented (pepper and vegetables), import substitution potential (maize and sugarcane) and potential new crops of the future (stevia, thalin, kenaf).

Various varieties of groundnuts with good potential such as V 13, Matjam, Sungai Siput and 47 – 5 have been cultivated on farmers' fields.

Fifteen selected lines of soyabeans tested in Kelantan and Terengganu yielded between 1.7 – 2.9 tonnes per ha. Calland Palmetto and Bossier were recommended.

Tests on Thai Supersweet corn variety which was introduced two years ago confirmed its superior performance when compared to local sweet corn varieties.

Screening of tapioca clones imported from CIAT since 1981 produced 3 clones (MC01 600 – 9. MMcx 1 – 16 and MMcx – 9) giving high and good starch production.

For highland cultivar of cabbage (Store Head, V-R Mori, Highland 605 and IPB) performed reasonably well in the lowland yielding between 0.5 – 1.2 kg/head.

Promising varieties recommended for planting by farmers include chilli, bacterial wilt resistant, tomato, heat tolerant cabbage, chinese cabbage and cauliflower for the lowlands.

Animal Research

Research activities are aimed at: –

(a) Improving the supply and quality of feedstuffs.

(b) Genetic improvement through selection and breeding.

(c) An effective management and production system.

The following cross breds have demonstrated good performance.

Dairy cattle – LID x Friesian
Sahiwal x Friesian
LID x Jersey
Kedah Kelantan, LID x Jersey

Beef cattle – KK x Brahman
KK x Hereford
KK x Friesian

Goats (Milk) – Katjang x Saanen

Goat (Mutton) – Katjang x Anglo Nubian

Information on the nutritive value of a range of feed stuffs for various livestock, optimal and appropriate feeding systems and local alternatives to imported feed stuffs, are now available.

Tissue Culture

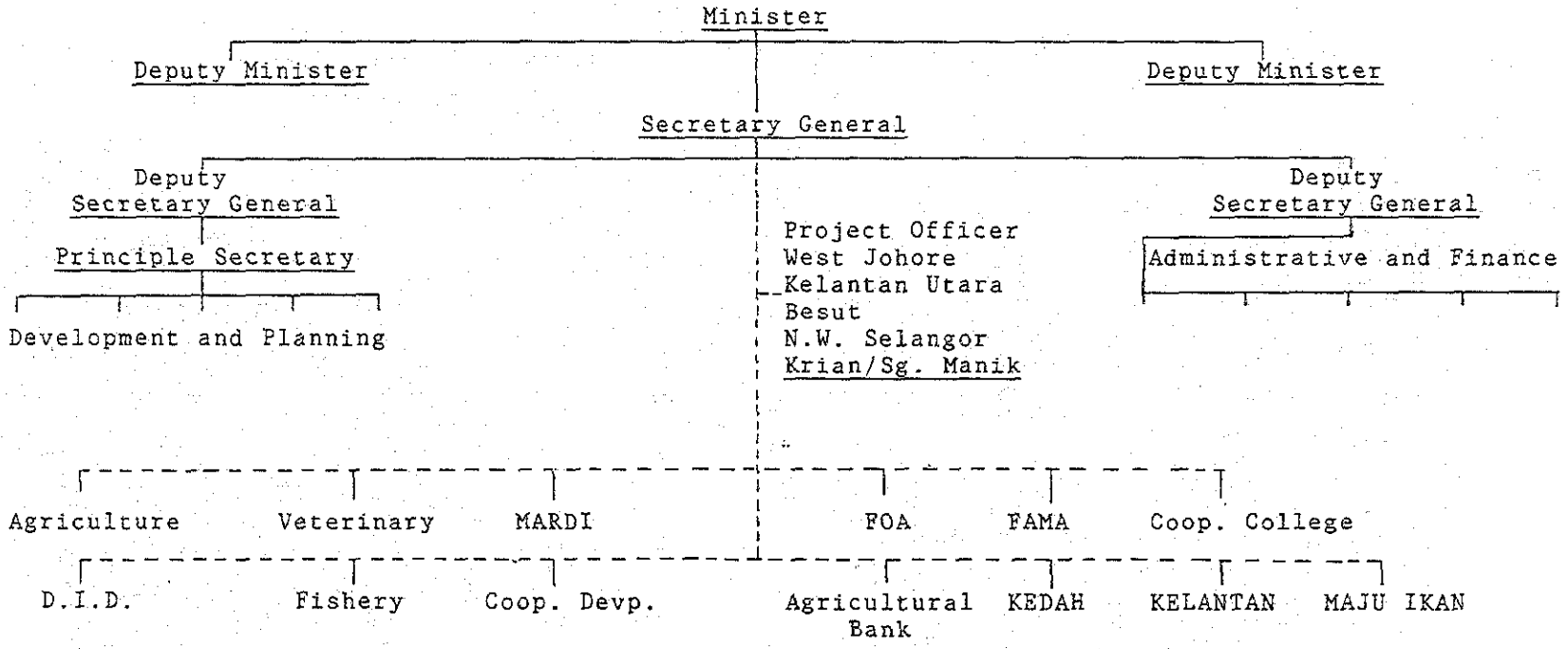
In this in-vitro propagation work on cocoa, a sterilization procedure suitable and capable of achieving a high percentage of uncontaminated inoculum has been established. A suitable rooting induction medium for papaya cultured in-vitro has already been worked out, and several plantlets have been successfully planted in the field.

Food Technology

In the development of post-harvest technology, MARDI through the Asean Handling Project paved the way towards improvement of the handling of fruits, vegetables, fish and rice from harvest to the market. Under the Small Industries Programme MARDI has 'adopted' twenty small food processing plants. The first objective of the adoption scheme is to improve the quality of the product besides assisting in production efficiency, plant layout and machinery used.

The Division also conducts research on the evaluation and quality control of traditional and novel fermented food products.

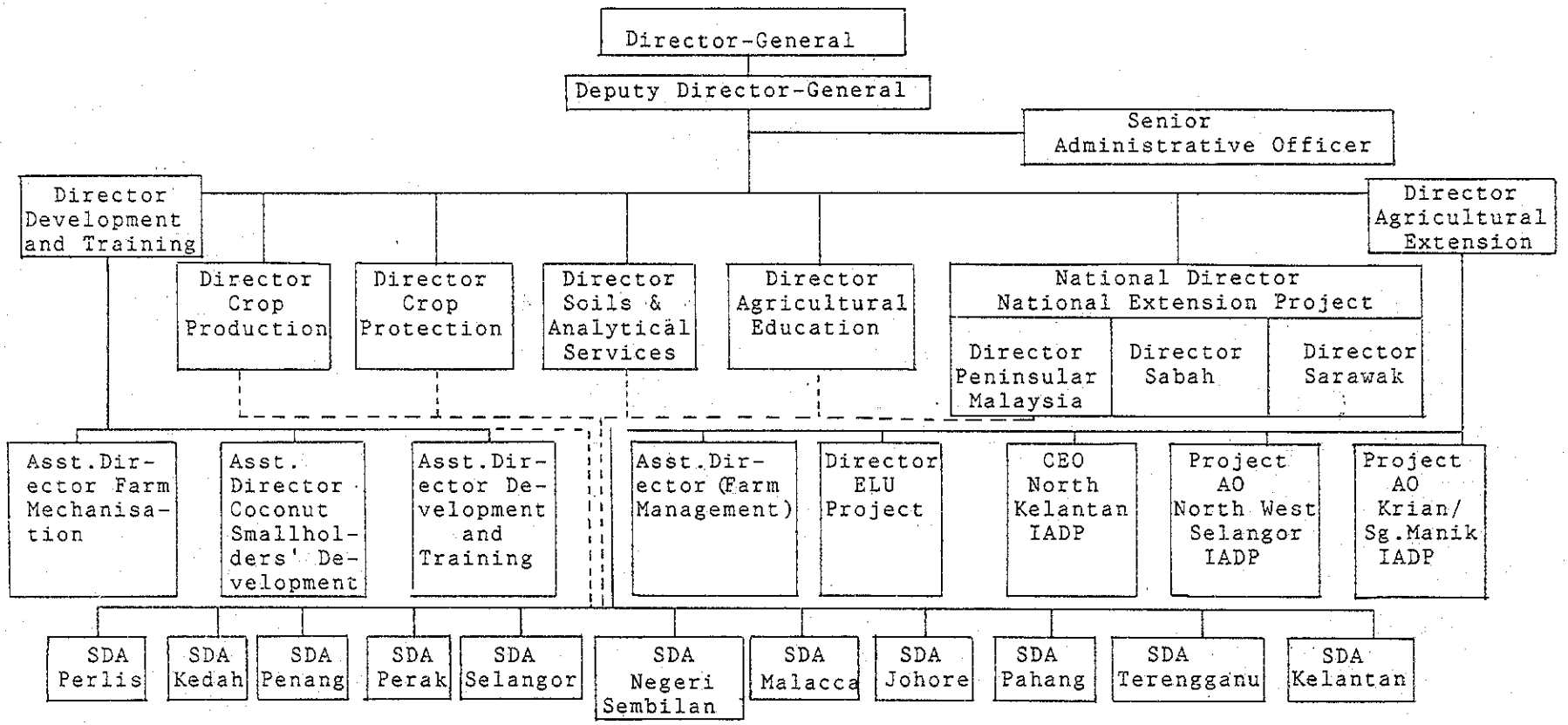
Source: MARDI



MARDI: Malaysian Agricultural Research Development Institute
FOA : Farmers Organization Authority
FAMA : Federal Agricultural Marketing Authority
DID : Drainage and Irrigation Department

APPENDIX FIG. 3 ORGANIZATION CHART OF MINISTRY OF AGRICULTURE (AS OF 1984)

Source : DOA

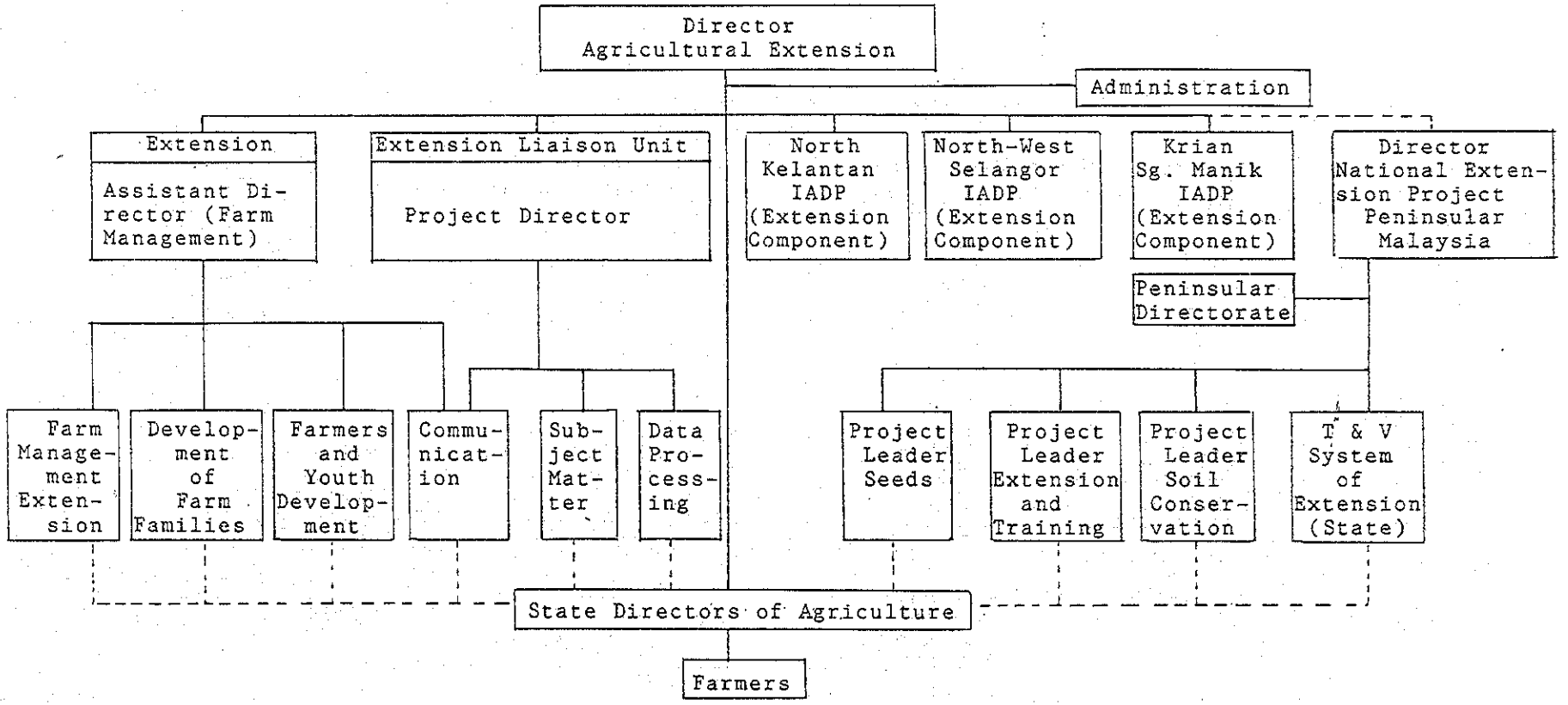


ELU - Extension Liaison Unit
NEP - National Extension Project
IADP- Integrated Area Development Project

SDA - State Director of Agriculture
CEO - Chief Extension Officer
AO - Agricultural Officer

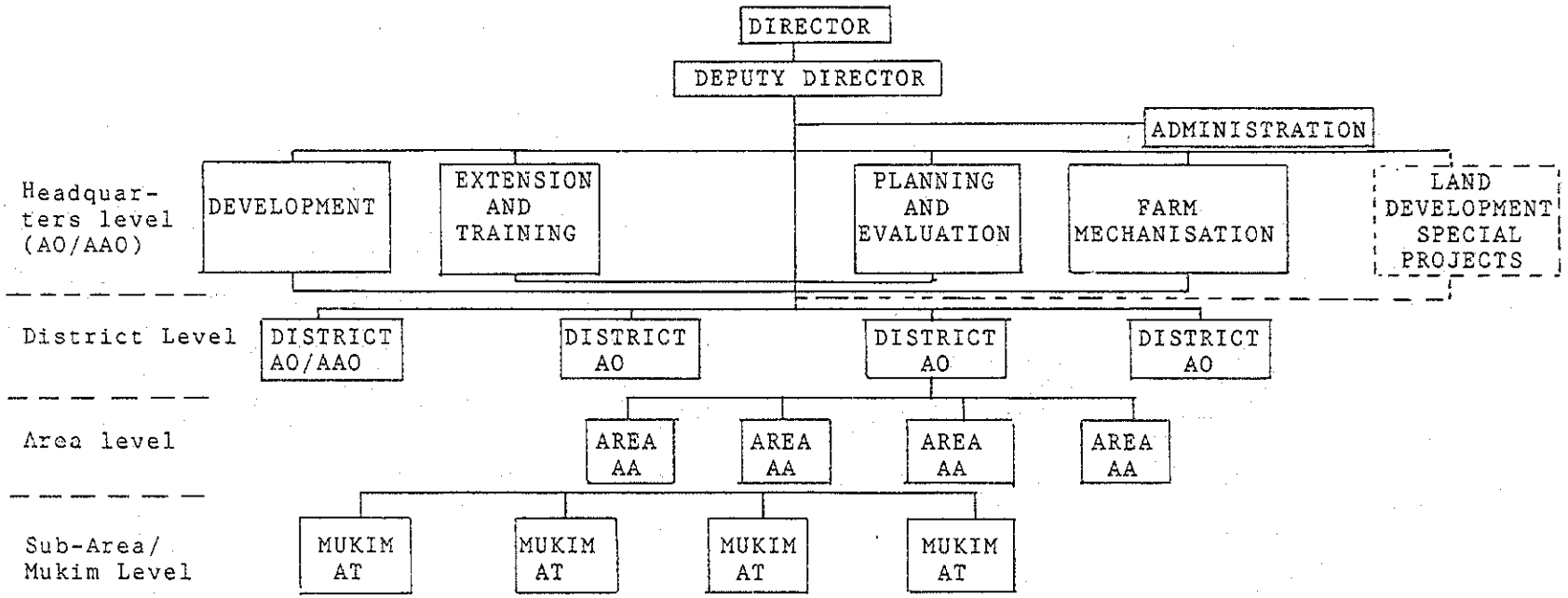
APPENDIX FIG. 4 ORGANIZATION OF THE DEPARTMENT OF AGRICULTURE PENINSULAR MALAYSIA (AS OF 1984)

Source : DOA



T & V - Training & Visit
IADP - Integrated Area Development Project

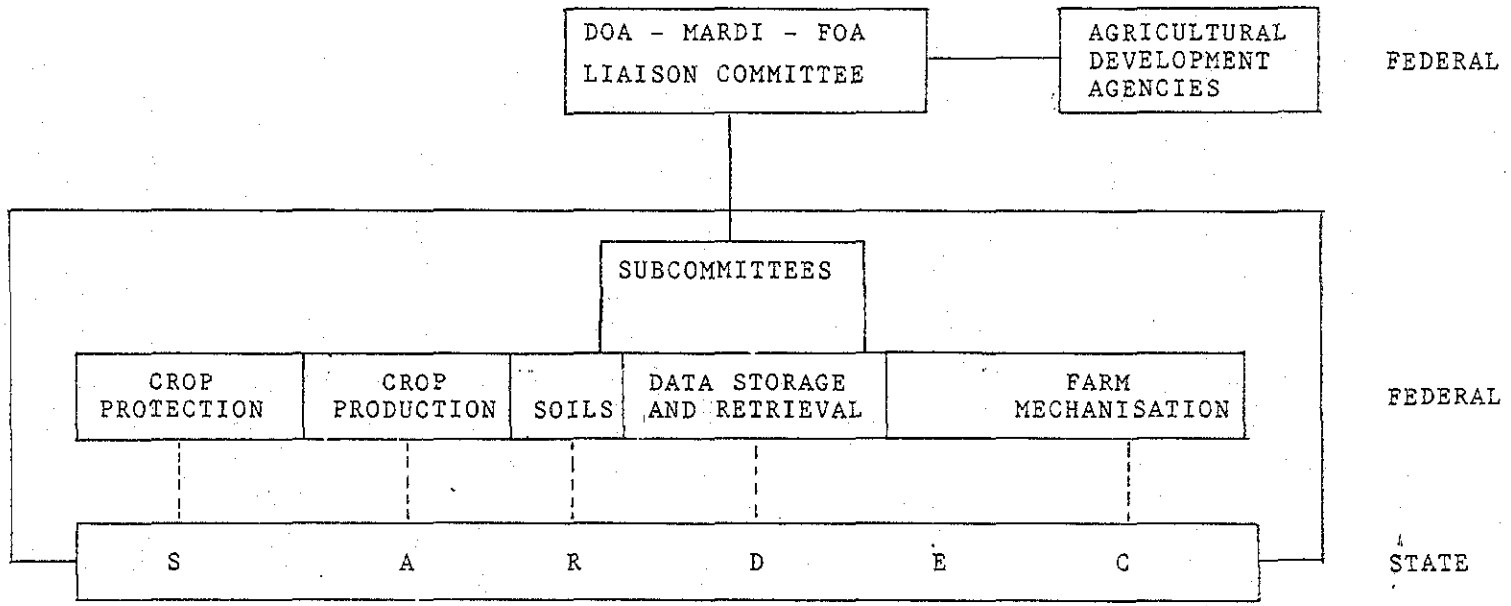
APPENDIX FIG. 5 ORGANIZATION CHART OF THE AGRICULTURAL EXTENSION SERVICES BRANCH (AS OF 1984)
SOURCE : DOA



AO - Agricultural Officer
AAO - Assistant Agricultural Officer
AA - Agricultural Assistant
AT - Agricultural Technician

APPENDIX FIG. 6 ORGANIZATION CHART OF THE STATE DEPARTMENT OF AGRICULTURE (AS OF 1984)

source : DOA



APPENDIX FIG. 7 RELATIONSHIP BETWEEN THE DIFFERENT LEVELS OF COMMITTEES

Source: Improving Extension Strategies for Rural Development

APPENDIX 2 CRITERIA OF SOIL CLASSIFICATION

Class 1. Soils with no limitation or only minor limitations to crop growth

The soils in Class I are suitable for the widest range of crops. They can be profitably cultivated under a moderate level of management. These soils occur on flat to rolling terrain (0° – 12°). They have good water-holding and nutrient-retaining capacities and are well suited to continuous cropping on a sustained yield basis.

The most versatile soils in this class are those found in flat areas where they can be utilized for a very wide range of dryland crops or irrigated for padi cultivation; these are deep, well structured soils.

Class 2. Soils with moderate limitations to crop growth

These soils are suitable for a narrower range of crops than Class I soils. Management practices may include erosion control measures, minor drainage and irrigation works, or improvements resulting in better tilth.

Class 3. Soils with one serious limitation to crop growth

As these soils possess one serious limitation besides possibly one or more moderate limitations, they are restricted to an even narrower range of crops. Necessary management practices may include erosion control measures, an intensive fertilizer programme and/or drainage and irrigation works involving moderate expense.

Class 4. Soils with more than one serious limitation to crop growth

In having more than one serious limitation these soils are suitable for a very narrow range of crops. Moreover, major conservation or amelioration measures are necessary before they can be cultivated on a long term basis.

Class 5. Soils with at least one very serious limitation to crop growth

The soils included within this class, in their present condition, are least suitable for crop growth. Where they are not built over for urban development or excavated for mining and quarrying purposes they are best allowed to continue under primary or regenerating forest.

Source: DOA

APPENDIX 3 ON-GOING EXTENSION PROJECTS BY DOA

1. Agricultural Research and Extension Project (Loan No. 1115-MA)

A small portion of the Research Loan was utilised for the establishment of the ELU with the primary function of bridging the gap between existing research findings and known technology on one hand, and farmer's adoption of known technology on the other. Therefore, once fully consolidated at the end of the project in 1983, the ELU Sub-Project would greatly enhance the effectiveness of the agricultural extension services besides establishing operational linkage between the DOA and MARDI on a more permanent and mutually beneficial basis. The ELU would promote and facilitate the effective transfer and dissemination of research findings and information to the farming and agency clientele which simultaneously serves as a channel for feedback of field problem to focus and align MARDI's programme of work within the context of malaysian agriculture.

2. National Extension Project (Loan No. 1493-MA)

The second phase, which is even more crucial, is strengthening the direct links between the federal DOA and the SDOA. Here again another World Bank Loan (US$19.0 million) was obtained to finance the NEP (Loan No. 1493-MA) with the expressed objective of strengthening the extension services of all states including Sarawak and Sabah. The NEP is therefore an indispensable follow-up and corollary of the heavy investments put into the research loan (Loan No. 1115-MA).

The NEP consists of three integral components – Agricultural extension, training and seed production and certification for all the states including Sarawak and Sabah. Therefore the project would endeavour to bind each SDOA into an effective institution to provide adequate extension services to small holders and to ensure that research results are translated into farm benefits. The project seeks to provide for substantial increase of manpower particularly at the grassroots level whereby the ratio of AT to farm families are increased from a previous ratio of 1:1510 to 1:810, with the adoption and implementation of the Training and Visit System (T & V).

Source: DOA

APPENDIX 4 EXPORT POTENTIAL OF AGRICULTURAL PRODUCTS FROM THE STUDY AREA, PARTICULARLY OF FRUIT

1. Background

At the Technical Committee meeting on February 27, 1985 to discuss the study plan of phase III, a question was raised if there is export potential of agricultural products particularly of fruits from the study area.

A series of studies are necessary to establish a development plan for fruit export. Studies should be concentrated on problems as listed below:

- Demand survey in fruit exported countries
- Marketing systems and transportation
- Suitable land availability to produce fruits for export
- Production
- Disease and pests disinfection
- Tax, subsidy and government supports

These matters cannot be explored within this kind of pre-feasibility level study. However, the following points are shown briefly to assist in understanding part of the problems.

2. Fruit Export from Malaysia

Appendix Table 3 shows the destination countries of fruits with tons and values in 1982. Major points to be noted are: –

1) Singapore is the major export destination for the most of the crops. However, no information is shown of the classification into re-export and consumption.

2) The second largest destination is Hong Kong. It is followed by other South East contries. Part of the fruits are exported to Europe and USA, but the volume is quite marginal when compared to those toward neibouring countries. Export to China, Japan and Korea are also quite small.

3. Fruits Import of Japan

Japanese consumption of imported fruits for the years of 1976 to 1983 are shown in Appendix Table 4. The following points are to be noticed.

1) The volumes imported during those years were at a constant level of 1.20 million tons. Reasons of constant volume are related to consumers preference, competition with local products and import quotas and tariffs.

2) Most of the imported fruits are produced in large scale plantations in exporting countries. The production and market system of these plantation can cope with Japanese requirements of quality, quantity, scheduled shipment, and pest and disease disinfection.

3) In the recent years request to open the Japanese market to foreign fruit crops has been increasing. However, it is difficult to forecast at what rate the import will increase.

4. Plant Quarantine in Japan

Japanese Government has a regulation in plant quarantine. The purpose of import plant quarantine is a purely technical one to quarantine import plants and to prevent the invasion of injurious diseases and pests.

In general, diseases and pests newly entering from foreign countries possess kinds of dangerous potentiality different from those of native diseases and pests.

The quarantine system in Japan puts its base on inspection. In principle, the system permits the immediate entry of plants with phytosanitary certificates issued by the proper government agency of the exporting country.

"If the sterilization technique is developed in the exparting country and it is recognized as a sufficient technique by a import country's quarantine specialist and has gone through required procedures for revision of the system, opportunities are opened for import prohibited plants to the permitted entry under special conditions provided by import country's agency." 1/

Import prohibited plants and import permitted palnts are declared by the Government Excerpts in relations to Malaysia are shown in Appendix Table 5.

Source: 1/ Plant Quarantine in Japan, by Japan Ministry of Agriculture, Forestry and Fisheries. (Malaysian Export Trade Center, Ministry of Trade and Industry, Kuala Lumpur, June 1984)

5. Actions in Malaysia

Increase in the export of fruit is emphasized as one of important policies of the Government of Malaysia. Some programmes are implemented, however, additional plans should be studied by the Federal agencies. In line with this policy, MARDI will be involved further in the means to assist farmers for fruit cultivation designated to export (Refering to New Sunday Times, March 17, 1985). Issue of quarantine certificates is also subject to be taken by the Government.

In the case of the South Terengganu Area, it should find how it is influenced by the policy of encoragement of fruit exports. Coordinated work between the State and Federal governments are necessary.

Specific points concerned with the area is that in order to find the potential of fruit export a survey should be concentrated into the problems of availability of suitable land. The export oriented production system should determine the applicability of large scale plantation system or other alternative systems, means to maintain quality conditions, and scheduled shipment. Cooperation among the agencies of MARDI, KETENGAH, DOA, SEDC and others are necessary in these studies.

APPENDIX
TABLE 3 MALAYSIA'S EXPORT AND RE-EXPORT OF FRUIT, 1982

Fruit	Exported To	Quantity (ton) by country	Quantity (ton) total	Value $
Oranges (Fresh)	Brunei	0.17	126.09	72086
	Hong Kong	0.07		
	India	0.12		
	Indonesia	8.94		
	Singapore	116.78		
	Taiwan	0.01		
Oranges (Dried)	Indonesia	0.10	2.74	2183
	Singapore	2.64		
Mandarins (Fresh)	Hong Kong	24.16	52.33	41955
	Philippines	1.50		
	Singapore	26.67		
Mandarins (Dried)	Singapore	0.02	0.02	340
Clementines, Wilkings and Other Similar Citrus (Fresh or Dried)	Singapore	0.36	0.36	144
Lemons and Lime (Fresh or Dried)	Brunei	1.78	1207.41	422869
	Hong Kong	0.17		
	Indonesia	0.26		
	Singapore	1205.26		
Grapefruit (Fresh or Dried)	Brunei	0.12	0.72	1274
	Indonesia	0.14		
	Singapore	0.46		
Other Citrus Fruit (Fresh or Dried)	Hong Kong	6.45	109.54	65425
	India	0.01		
	Indonesia	0.28		
	Qatar	11.11		
	Singapore	91.69		
Banana(Incl. Plantains) (fresh or Dried)	Brunei	301.51	26053.33	4869226
	Hong Kong	4.01		
	Singapore	25747.80		
	United Kingdom	0.01		
Apples (Fresh)	Indonesia	27.25	37.73	97710
	Singapore	0.32		
	Thailand	10.16		
Grapes (Fresh)	Indonesia	167.01	175.86	36322
	Singapore	8.85		

CONT'D

Fruit	Exported To	Quantity (ton) by country	Quantity (ton) Total	Value $
Grapes (Dried)	Philipines	1.44	29.50	77786
	Thailand	28.06		
Figs (Fresh)	Singapore	1.60	1.60	603
Figs (Dried)	Singapore	3.54	3.54	2387
Coconuts (Fresh)	Australia	2727.50	236284.49	4846880
	Brunei	2333.95		
	China	235.00		
	Greece	250.00		
	Hong Kong	31743.30		
	Indonesia	200.00		
	Italy	25.00		
	Netherlands	112.50		
	Pakistan	47.00		
	Philippines	240.00		
	Singapore	174727.34		
	Taiwan	6959.40		
	Thailand	40.00		
	United Kingdom	16643.50		
Coconuts(Desiccated)	Austrialia	0.01	2105.48	4111204
	Austria	130.64		
	Bahrain	39.58		
	Brunei	2.09		
	Czechoslovakia	86.19		
	France	82.26		
	Federal Republic of Germany	11.34		
	Hong Kong	0.30		
	Ireland	20.33		
	Italy	13.38		
	Japan	0.01		
	Republic of Korea	11.34		
	Kuwait	211.73		
	Morocco	30.76		
	New Zealand	204.52		
	Norway	0.06		
	Oman	11.18		
	Papua New Guinea	59.90		
	Qatar	50.80		
	Saudi Arabia	22.49		
	Singapore	624.20		
	Taiwan	149.72		
	Thailand	0.04		
	Turkey	25.88		
	United Arab Emirates	21.77		
	United Kingdom	259.63		
	U.S.A.	9.00		
	Yemen Arab Republic	4.58		
	Yugoslavia	21.77		

Cont'd

Fruit	Exported To	Quantity (ton) by country	Quantity (ton) Total	Value
Cashew Nuts (Freshe or Dried)	Germany	20.06	48.10	232250
	Hong Kong	5.00		
	New Zealand	10.38		
	Thailand	7.24		
	U.S.A.	5.41		
Almonds (Fresh or Dried)	Indonesia	0.50	23.11	98902
	Philippines	0.44		
	Singapore	22.16		
	United Kingdom	0.02		
Hazelnuts (Fresh or Dried)	Thailand	0.03	0.03	2714
Arecanuts (Fresh or Dried)	Bangladesh	603.29	5287.45	7001512
	Hong Kong	3.56		
	India	10.00		
	Nepal	663.59		
	Pakistan	1130.14		
	Saudi Arabia	44.00		
	Singapore	2799.67		
	Taiwan	1.20		
	United Arab Emirates	5.00		
	United Kingdom	27.00		
Other Edible Nuts (Fresh or Dried)	Hong Kong	1.04	139.89	225835
	India	10.00		
	Kuwait	5.00		
	Nepal	27.00		
	Saudi Arabia	20.00		
	Singapore	60.11		
	Thailand	1.30		
	United Arab Emirates	15.40		
	united Kingdom	0.04		
Pears and Quinces (Fresh)	Indonesia	6.61	13.05	38708
	Thailand	6.44		
Peaches (Fresh)	Philippines	6.86	6.86	24750
Other Stone Fruit (Fresh)	Hong Kong	2.60	2.75	2926
	Thailand	0.15		
Pineapples (Fresh or Dried)	Singapore	28734.12	28734.27	2182438
	Yugoslavia	0.15		

cont'd

Fruit	Export To	Quantity (ton) by country	Quantity (ton) total	Value $
Dates (Fresh or Dried)	Indonesia	1.98	12.15	20425
	Singapore	2.98	12.15	20425
	Thailand	7.19		
Avocados (Fresh or Dried)	Singapore	9.18	0.18	108
Mangoes (Fresh or Dried)	Brunei	89.53		
	Federal Republic of Germany	0.04	950.20	392836
	Singapore	860.62		
	U.S.A.	0.01		
Guavas (Fresh or Dried)	Singapore	6.07	6.07	2746
Mangosteens (Fresh or Dried)	Hong Kong	1.85		
	Singapore	935.76	940.81	325161
	Thailand	3.20		
Rambutan (Fresh)	Brunei	1.28		
	Hong Kong	0.26	801.06	323926
	Singapore	999.52		
Durian (Fresh)	Brunei	0.60		
	Hong Kong	0.94	15300.93	14083319
	Singapore	15299.39		
Langsat (Fresh)	Brunei	0.49	853.20	360386
	Singapore	852.71		
Watermelon (Fresh)	Brunei	7.02		
	Indonesia	3.00	15609.68	2475843
	Singapore	15599.66		
Papaya (Fresh)	Hong Kong	0.10		
	Kampuchea	1.87	9494.45	1116477
	Singapore	9492.31		
	Taiwan	0.17		
Jack Fruit (Fresh)	Hong Kong	0.02	151.51	62041
	Singapore	151.49		
Mata Kuching (Fresh)	Brunei	0.36		
	Indonesia	0.03	253.31	201805
	Singapore	252.92		

CONT'D

Fruit	Exported To	Quantity (ton) by country	total	Value $
Other Tropical Fruit (Fresh)	Brunei	0.66	6751.54	1658271
	Hong Kong	552.67		
	Indonesia	0.19		
	Singapore	6187.78		
	Taiwan	2.05		
	Thailand	1.68		
	United Kingdom	6.51		
Other Fresh Fruit	Hong Kong	1.30	111.60	43890
	Singapore	110.30		
Other Dried Fruit	Hong Kong	7.18	58.10	125683
	Indonesia	0.06		
	Philippines	0.10		
	Singapore	23.41		
	Thailand	27.34		
	United Kingdom	0.01		

Source: Annual Statistics of External Trade, 1982

APPENDIX
TABLE 4

JAPAN'S FRESH FRUIT IMPORTS

(Unit: ton)

Item / Year	1976	1977	1978	1979	1980	1981	1982	1983	Main Origin
Bananas	832,228	824,924	804,095	790,090	726,088	707,903	757,917	575,895	Philippines, U.S.A. Taiwan
Pineapples	62,384	77,607	104,478	109,190	105,013	122,829	121,877	101,987	Philippines, U.S.A. Taiwan
Mangoes				1,074	1,216	1,573	1,362	1,792	Taiwan, Philippines, Maxico, Fiji
Avocados and Mangosteens	607	1,154	1,590	706	479	976	784	1,777	U.S.A. Mexico
Lemons and Limes	92,763	104,684	116,945	99,994	100,695	112,527	104,601	119,555	U.S.A.
Oranges	24,401	22,499	51,008	54,075	71,401	75,471	82,421	89,190	U.S.A.
Grapefruit	151,757	161,242	142,154	159,408	135,213	166,933	153,704	177,289	U.S.A.
Oranges (Mandarine, tangerine, unshu, clemintine wilking and all other similar products)	969	199	488	275	410	212	237	299	
Grapes	1,562	994	1,796	1,514	1,403	1,184	1,673	1,564	U.S.A.
Apples	82	-	-	514	-	-	-	-	
Pears and quinces	168	353	295	6	26	23	-	7	
Cherries	244	166	1,333	2,556	2,652	2,650	1,751	1,568	U.S.A.
Stone fruit						28	61	4	
Berries	16	79	599	956	1,573	692	1,420	1,398	U.S.S.R., U.S.A. New Zealand
Merons (including orient melons)	2,036	2,427	5,286	5,018	5,172	2,586	3,218	3,580	U.S.A. Mexico, New Zealand
Papayas				2,360	2,538	3,267	2,983	2,757	
Kiwi fruits	3,441	3,905	6,120	4,313	5,101	6,412	5,472	12,415	U.S.A. New Zealand
Others						1,280	818	1,155	
Total	1,172,663	1,200,233	1,236,187	1,232,049	1,158,980	1,206,546	1,240,299	1,092,530	

Source: Customs Statistics, Ministry of Finance, Japan

APPENDIX
TABLE 5 PROHIBITED PLANTS AND PERMITTED PLANTS

Nation	Prohibited Plant		* Remark (injurious pests as an object)
	Fresh fruit	Vegetables	
Malaysia Singapore Indonesia	Citrus, loquat, plum, pomegranate, fig, papaya, longan, litchi, carambola, guava, avocado, rambutan, betel nut, santol, persimmon, breadfruit, mango, jujube, pessionfruit, star apple, sapodilla, myrtle, moschatel, sweetsop, mangosteen, mature banana, melon water melon	Tomato, egg-plant red pepper, cucumber, pumpkin, kidney bean, cowpea, sweet potato, cassava, ginger, horse-radish, radish, carrot, turnip, yam	Mango fly melon fly sweet potato weevil sweet potato stem borer, burrowing nematode

Nation	Permitted Plant	
	Fresh fruit	Vegetable
Malaysia Singapore Indonesia	Pineapple, coconut, immature banana, grape, durian, apple, pear, quince, apricot, cherry, walnut	Chinese cabbage, spinach, lettuce, celery, burdock, onion, welsh onion, arrowhead, taro, garlic, broad bean, green soybean, pea

Source: Plant Quarantine in Japan, by Japan Ministry of Agriculture Forestry and Fisheries. (Malaysian Export Trade Center, Ministry of Trade and Industry, Kuala Lumpur, June 1984)