

Document of
The World Bank
FOR OFFICIAL USE ONLY

→ Report No. 1906-MA

FILE COPY

Report No. 1906-MA

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

STAFF APPRAISAL REPORT

June 30, 1978

East Asia and Pacific
Projects Department

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

US\$1.00 = M\$2.40

M\$1.00 = US\$0.42

WEIGHTS AND MEASURES

1 pound	=	0.453 kg
1 pikul	=	133.3 lb
1 long ton	=	16.8 pikuls
1 gallon	=	4.546 liters
1 liter	=	0.22 gal
1 acre	=	0.404 hectare (ha)
1 hectare	=	2.47 acres

ABBREVIATIONS

AI	-	Artificial insemination
BPM	-	Bank Pertanian Malaysia
CP	-	FAO/World Bank Cooperative Programme
CCPC	-	Coconut Collection and Processing Center
CPC	-	Crop Production Center
CRC	-	Cattle Raising Center
CR/RS	-	Coconut Replanting/Rehabilitation Scheme (1963-75)
CSDS	-	Coconut Smallholder Development Scheme (prior to the Bank project)
DID	-	Federal Draining and Irrigation Department
DOA	-	Federal Department of Agriculture
DVS	-	Federal Department of Veterinary Services
EPU	-	Economic Planning Unit
FAMA	-	Federal Agriculture Marketing Authority
FDC	-	Farmers' Development Center
FMP	-	First Malaysia Plan
FOA	-	Farmers' Organization Authority
IH	-	Institut Haiwan in Kluang
LID	-	Local Indian Dairy (cattle)
MARDI	-	Malaysian Agricultural Research and Development Institute
MCC	-	Milk Collection Center
MD	-	Malaysian Dwarf (coconut)
MOA	-	Ministry of Agriculture
MT	-	Malaysian Tall (coconut)
PWD	-	Public Works Department
SDOA	-	State Department of Agriculture
SG	-	Specific gravity
SMP	-	Second Malaysia Plan (1971-75)
TMP	-	Third Malaysia Plan (1976-80)
UHT	-	Ultra high temperature (processed milk)

MALAYSIACOCONUT SMALLHOLDERS' DEVELOPMENT PROJECT
STAFF APPRAISAL REPORTTABLE OF CONTENTS

	<u>Page No.</u>
1. <u>THE AGRICULTURAL SECTOR</u>	1
The Sector in the Economy	1
Agricultural Resource Base	2
2. <u>THE COCONUT SUBSECTOR</u>	2
Coconut Resource Base	2
Coconut Production	4
Smallholder Income	4
Coconut Smallholder Development Strategy	5
The Role of Intercropping and Cash Cropping	5
Integrated Livestock Development	6
3. <u>INSTITUTIONS SERVING COCONUT SMALLHOLDERS</u>	6
Ministry of Agriculture	6
Department of Agriculture (DOA)	7
Department of Veterinary Services (DVS)	7
Federal Agricultural Marketing Authority (FAMA)	7
Drainage and Irrigation Department (DID)	7
Malaysian Agriculture Research and Development Institute (MARDI)	7
Farmers Organization Authority (FOA)	7
Credit Institutions	8
Implementing Agency, Alternatives and Future Development Institutions	8
Strengths and Weaknesses of Implementing Agencies	9
4. <u>PROJECT CONCEPTS AND COMPOSITION</u>	9
Introduction	9
Project Description Summary	10
Criteria and Conditions for Participation in CSDP	11
Detailed Features	12
Subsidy Policy	12
Crop Component	14
Smallholder On-Farm Development	14
Government Facilities Development	15
Integrated Dairy and Beef Component	16
Smallholder On-Farm Development	17
Government Facilities Development	18
Training and Technical Assistance Component	19
Monitoring and Evaluation	20

	<u>Page No.</u>
5. <u>PROJECT COSTS AND FINANCING</u>	21
Project Costs	21
Project Cost Summary	22
Financing	23
6. <u>PRODUCTION, MARKETING AND PRICING POLICY</u>	23
Production	23
Marketing and Markets	24
Pricing Policy and Prices	24
7. <u>TECHNOLOGY AND PRODUCTION SPECIFICATIONS</u>	25
Crop Component	25
Integrated Dairy/Beef Component	27
Farm Model Summary	28
8. <u>PROJECT IMPLEMENTATION</u>	29
Organization and Management	29
Implementation Procedure	30
Crop and Dairy/Beef Components	30
Disbursements	32
Accounts and Audits	33
Procurement	33
Project Phasing	34
9. <u>FINANCIAL ANALYSIS</u>	34
Farm Model Rate of Return	34
Other Components' Rate of Return	35
10. <u>ECONOMIC ANALYSIS</u>	36
11. <u>RISKS AND ENVIRONMENTAL EFFECTS</u>	37
Risks	37
Environmental Effects	37
12. <u>RECOMMENDATIONS</u>	37

SUPPORTING TABLES AND CHARTS

Table No.:

- 1 Coconut Acreage and Production in Peninsular Malaysia
- 2 Statistics Smallholder Sector Acreage Distribution (1975)

- 3 Calculation of Annual Income Levels of Coconut Smallholders Who Have Yet to Benefit from the Project
- 4 Comparative Development Expenditure of CR/RS with DOA
- 5 Subsidized Rates per Acre - Historical Justification
- 6 Progress of Rehabilitation and Replanting under CR/RS From 1963-1975
- 7 Acreage of Intercropping Since Inception of CR/RS (1963)
- 8 Phasing of Replanting and Rehabilitation Program
- 9 Physical Phasing of Project Activities
- 10 Yield Assumptions
- 11 Farm Model Summary
- 12 Farm Incomes Preproject and Full Development
- 13 Total Staffing Distribution
- 14 Project Cash Flow (1977 M\$'000)
- 15 Estimated Quarterly Disbursement Schedule
16. Major Agricultural Production, Exports and Imports

CHARTS AND MAPS

Map - IBRD 13277: Coconut Area and DID Drainage Schemes in Peninsular Malaysia

Chart - WB 18526: CSDP Proposed Organization

ANNEXES - Selected information, physical implementation, and cost details are available in the Project File.

Annex 1 - Crop Component

Annex 2 - Processing/Marketing Component

Annex 3 - Integrated Dairy and Beef Component

Annex 4 - Recapitulative Financial and Economic Analysis Tables

This report is based on the findings of a Bank mission which visited Malaysia in October 1977, comprising Messrs. Downing, Delsalle, and Ms. Graves (Bank) and McEvoy (Consultant).

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

1. THE AGRICULTURAL SECTOR

The Sector in the Economy

1.01 Malaysia's agricultural sector is largely oriented to export markets and occupies a predominant position in international trade for natural rubber, oil palm, hardwoods and pepper. Agricultural production has grown at about 6% p.a. during 1970-75 and should continue to grow at the same rate during 1976-80. The major part of this growth has been and will continue to be based on investments in rubber and oil palm. However, the major change between the second and third development plans has been the increased emphasis on development of established agriculture while continuing new land development. Particular attention will be given to smallholder crops such as rubber, coconut, padi, rainfed agriculture crops, and to crop diversification and intercropping. Although this investment will not have as rapid an impact on production as new land development, it is essential to meet the objective of the elimination of poverty and achieve Malaysian agriculture's full growth potential in the longer term. More than 60% of all families live in rural areas, agriculture provides employment for about 50% of the labor force and 50% of rural families are classified as poor. The majority of smallholders living in poverty are padi, rubber and coconut farmers.

1.02 Padi production has been increased through the provision of irrigation, high-yielding varieties and double cropping, and Malaysia is now reaching self-sufficiency in rice. Malaysia, as a major exporter of pineapple, is finding it increasingly difficult to maintain its share of the market. Other crops such as coconut, fruits and vegetables are grown mainly for domestic consumption.

1.03 A large investment was made in new land development during the Second Malaysia Plan (SMP) and is continuing under the Third Malaysia Plan (TMP), 1976-80. Land development provides a large proportion of jobs created in the agricultural sector and will account for one third of incremental production during the present decade. The Government has also made a large investment in irrigation infrastructure, and controlled water supply has facilitated higher yields of padi and made double cropping of more than half a million acres possible. Although these irrigation facilities have greatly increased yields and farmer incomes, there are few further opportunities for large-scale irrigation.

1.04 The TMP's emphasis on existing agriculture is fundamental to achieving the social objective of alleviating poverty throughout Malaysia. The development targets for achieving this objective include: (a) a 20% increase in double cropping of padi from 590,000 to 690,000 acres; (b) new and improved drainage on 559,000 acres (a large percentage in coconut producing areas of the west coast) which would facilitate coffee and cocoa intercropping under coconut; (c) replanting and new planting of 500,000 acres

of rubber; (d) replanting and rehabilitation of 100,000 acres of coconut (including 22,800 acres to be intercropped and the introduction of livestock under coconut); (e) crop diversification of rainfed agriculture; and (f) general strengthening of agricultural services, particularly extension.

Agricultural Resource Base

1.05 The principal crops and areas cultivated in Peninsular Malaysia are rubber 4,300,000 acres, oil palm 1,300,000 acres, coconut 575,000 acres, padi 1,000,000 acres, pineapple 65,000 acres, cocoa 90,000 acres, tapioca 32,000 acres, sugar 25,000 acres, coffee 30,000 acres, groundnuts 20,000 acres, tobacco 20,000 acres, and miscellaneous fruits, vegetables, seed grains and other crops a total of over 8,000,000 acres, or over 9,000,000 acres including double cropping and intercropping. Tree crops account for two thirds of the agricultural area. Apart from about 40% of rubber and 50% of oil palm in estates, all peninsular agricultural production is in the hands of over 900,000 smallholders. Major agricultural production, exports and imports are shown in Table 16.

2. THE COCONUT SUBSECTOR

Coconut Resource Base

2.01 In Peninsular Malaysia coconut is predominantly a smallholders crop and provides an important rural occupation. The crop meets many basic food requirements of the rural population and, traditionally, is closely associated with the smallholders' way of life. It is estimated that 13% ^{/1} of the coconut acreage is in scattered plantings around the home and along roadways and drainageways. The nuts harvested from these palms are utilized for domestic subsistence requirements and the surplus, if any, is sold locally, as fresh nuts.

2.02 In the estate sector, the economic status and importance of coconut have declined gradually, mainly because coconut areas were replanted with oil palm, which under estate management has become a higher income crop than coconut. During 1971-75 estate acreage declined from 53,488 to 42,844 acres, with copra production also dropping from 23,307 to 19,830 tons; however, in the smallholder sector, this crop has increased in importance. This is reflected in the fairly substantial increase in planted acreage, from 470,300 acres in 1971 to 533,200 acres in 1975 (i.e. 90% of the total planted area of 576,044 acres), with a corresponding increase in copra production from 137,200 tons to more than 162,000 tons. It is estimated that more than 80,000 households (450,000 persons) are dependent wholly or

^{/1} Malaysia: Coconut Statistics submitted to Asian Coconut Community, November 1972.

partly on coconut as their primary source of income, while only 4,100 persons were employed on 40 coconut estates.^{/1} Official estimates of acreages and production are shown in Table 1.

2.03 Coconut smallholdings are concentrated in the west coast states of Johore, Selangor, Perak and Penang which account for about two thirds of Peninsular Malaysia's acreage. Table 2 gives the distribution of coconut areas by district, while Map 1 shows the coconut growing areas of the country.

2.04 The average size of smallholdings ^{/2} varies from state to state as shown by the following figures:

Perak	11.6 acres
Selangor	11.6 acres
Johore	9.5 acres
Kelantan	2.7 acres
Other states	5.7 acres
Average Peninsular Malaysia	<u>6.5 acres</u>

Smallholder management of coconut plantings is not based on modern agronomic techniques that contribute to high levels of production. There is a tendency to overplant at irregular intervals depending on the availability of planting materials, the price of nuts and family food requirements; a high density of palms per acre is generally found in Johore, Selangor, Perak and Penang/Province Wellesley.

2.05 Without intercropping the labor input per annum per acre of coconut is estimated at about 20 man-days in Selangor/Perak and 6 man-days in Kelantan.^{/3} With low levels of labor and other production inputs, smallholdings are often overgrown with weeds, especially lalang (Imperata cylindrica), the young palms stunted with yellow fronds, and the old palms with pencil tops due to lack of fertilizers and/or inadequate on-farm drainage in low-lying areas. Poorly maintained holdings are also susceptible to damage by pests.

^{/1} Source: Oil Palm, Coconut and Tea Statistics, 1973, Department of Statistics.

^{/2} Source: Agriculture in Peninsular Malaysia, 1977, by S. Selvadurai, Ministry of Agriculture.

^{/3} Socio-Economic Survey of Coconut Smallholdings, 1965, Ministry of Agriculture.

Coconut Production

2.06 Yields on smallholdings are generally low and there is much scope for improvement through better husbandry, drainage improvement and replanting. There are great variations in yields not only between estates and smallholdings but also between states and even districts. Overall yields of smallholdings average less than 0.3 tons of copra per acre compared with an average estate yield of 0.5 tons per acre. In a survey of coconut smallholdings, carried out in 1963 ^{/1} when the Coconut Replanting and Rehabilitation Scheme (CR/RS) was implemented, the highest smallholder yields were recorded in the Sabak Bernam district of Selangor with 0.5 tons of copra per acre, while in Johore and Kelantan the average was 0.2 tons. Low yields are obtained from smallholding palms in Peninsular Malaysia (over 70% of which are in the bearing stage) because of:

- (a) flooding or persistent waterlogging due to poor drainage or breakdown of drainage systems in some of the west coast areas;
- (b) the high percentage of old palms;
- (c) low fertility, especially in the bris soil areas of the east coast; and
- (d) damage by crop pests.

2.07 An evaluation survey of the CR/RS areas of Lower Perak, carried out by the Ministry of Agriculture (MOA) in 1971, found that yields from rehabilitated holdings averaged 0.6 tons of copra per acre (double the national average). This indicates that smallholder yields can be increased with good husbandry and provision of adequate production inputs. Replanting/rehabilitation schemes have been implemented for this purpose and would be strengthened and expanded under this project.

Smallholder's Income

2.08 Average yields of 0.3 tons (1,150 nuts) per acre at current prices (of M\$0.16 per husked nut) result in a gross income of about M\$1,200 (US\$500) per farm unit (average 6.5 acres). The low income from coconut forces small farmers to supplement their income from other food and cash intercrops and off-farm employment. Average total net income from coconut smallholders (6 acres or less) is estimated at about M\$2,400 (50% from coconuts) as shown in Table 3. Even including income from off-farm employment, the majority of coconut smallholders still have incomes below the Economic Planning Unit (EPU) poverty line (M\$3,600/US\$1,500).

2.09 Considering the low average yields, there is ample opportunity for improvement through better husbandry, increased inputs, drainage and replanting. Intercropping with coffee, cocoa, fruits and pastures for livestock offers

^{/1} Survey of Coconut Smallholdings by S. Selvadurai, Ministry of Agriculture.

good potential for increasing smallholder incomes above the poverty level. Rehabilitation of Malaysian Tall (MT) coconuts can increase income by 50% and replanting with MAWA hybrid varieties can produce a 300% increase in income per acre, or even more with intercropping. Internal consumption of copra and coconut oil is presently increasing faster than production; also, in view of the relatively small coconut production base, it is expected prices and demand would continue to be favorable.

2.10 The opportunity for off-farm employment for coconut smallholders is good in the industrialized areas such as Selangor and adjacent to urban centers. However, the majority of coconut growers are located in the coastal fringe area where opportunities for off-farm employment are scarce and consist of low paying, casual jobs such as padi transplanting and harvesting, and rubber tapping. On the east coast where coconut yields are lower than average, off-farm employment is even more limited, and fishing is one of the primary means of supplementing subsistence and income. Earnings from off-farm employment range from about M\$750 p.a. on the smallest farms to M\$400 on larger, 10-12 acre farms which generally have little excess family labor.

Coconut Smallholder Development Strategy

2.11 The need to assist the smallholder sector of the coconut industry has been recognized by the Government for many years and in 1963 the CR/RS began as a pilot 4,000-acre operation in southwest Johore. This became an important part of the Government's smallholder development program under the First and Second Malaysia Plans and has been expanded under the TMP (see Table 4). In the 14 years of CR/RS operations, more than 120,000 acres have been rehabilitated and replanted. The program has been renamed the Coconut Smallholders Development Scheme (CSDS) and has the following basic objectives:

- (a) replanting and/or rehabilitation of coconut palms;
- (b) crop diversification; and
- (c) provision of extension services.

The Role of Intercropping and Cash Cropping

2.12 Encouraged by high prices of agricultural products and the opportunity to substantially increase the income of coconut smallholders, the Department of Agriculture (DOA) is promoting intercropping of rehabilitated coconuts with cocoa, coffee, fruits and temporary cash crops. Cocoa is the most important intercrop; the area planted has more than doubled between 1971 (40,000 acres) and 1976 (more than 90,000 acres) and should exceed 150,000 acres by the end of the TMP. About 70% of this cocoa acreage is in Peninsular Malaysia; it is divided between estates and smallholdings where it is primarily grown as a coconut intercrop. Cocoa production reached 22,000 tons in 1976 and should exceed 30,000 tons by 1980. Technical knowledge and management ability should not be a constraint to achieving projected cocoa acreage and production increases; research and extension services are adequate to support

this development. The main problem of the cocoa industry is the high acidity of the beans which reduces the demand for and the price and quality of Malaysian cocoa. Research in this area is making some progress.

2.13 Many coconut smallholders produce subsistence crops such as vegetables, bananas, tapioca, maize and groundnuts which also supplement incomes for the three to four years before maturation of new coconut plantings. These food crops can later be replaced with permanent intercrops of cocoa, coffee and fruits when shading of palms makes production of feed and food crops uneconomical. On the less productive sandy soils of the east coast, food crops can be grown in the immature period; later intercropping would be limited to tobacco, chili peppers, mangoes, bananas and cashew nuts, or the pastures used for livestock production.

2.14 The tendency for more farmers to process their own produce is also creating problems. Their lack of knowledge about processing copra, coffee and cocoa adversely affects the quality of the products. For example, many cocoa smallholders have inadequate experience and knowledge to process their cocoa and use a low level of technology; their procedures result in moldy and tainted beans that give an off-taste chocolate product. These problems can be overcome by: (a) establishing standards and licensing processors, and (b) farmer training in processing of copra, cocoa and coffee. The latter is essential to maximize the return to the farmer.

Integrated Livestock Development

2.15 Small-scale livestock production, especially dairying, is a relatively new enterprise for coconut smallholders. Dairying is particularly attractive for the small farmers as it provides the best opportunity to raise total farm income above the poverty level, provides a regular cash income, and can often be achieved without eliminating intercropping. Some farmers can provide adequate roughage to maintain two or three dairy animals from drainageway and roadside cuttings; the roughage can be supplemented with concentrates to obtain satisfactory levels of milk production. The opportunity for dairying is, however, limited to the more affluent, densely populated areas of the west coast states. Smallholder production of pasture and beef could be adapted for the remote areas and the poorer soils of the east coast where the market for fresh milk is limited.

3. INSTITUTIONS SERVING COCONUT SMALLHOLDERS

Ministry of Agriculture

3.01 Responsibility for the Government's coconut smallholder development programs rests with the MOA. Under the MOA, the DOA supported by the Department of Veterinary Services (DVS) and the Federal Agricultural Marketing Authority (FAMA), would be the principal executing agencies (see Chart No. 1). Program activities must also be coordinated with other MOA agencies.

Department of Agriculture

3.02 The federal DOA and the State Departments of Agriculture (SDOAs) are the main agencies supporting coconut growers. The CSDS is a subbranch of the DOA that has the specific task of coconut replanting and rehabilitation. CSDS is supported by the federal and state extension services, as well as the technical branches of the federal DOA (soils, crop protection, crop production, farm mechanization, education and training). The DOA also provides seeds and planting materials through its Crop Production Centers (CSPs).

Department of Veterinary Services

3.03 The DVS has overall responsibility for animal health and also carries out livestock development projects for the small farmers. In 1973, the DVS started a dairy development program in coconut areas which included the provision of dairy animals, dairy extension services and concentrates, as well as the collection of milk.

The Federal Agricultural Marketing Authority (FAMA)

3.04 FAMA has been assigned the task of assisting coconut smallholders in the collection, processing and marketing of coconut and copra, as well as cocoa and coffee. This assistance consists of establishing marketing and processing centers, and training farmers (in cooperation with the DOA extension services) in copra, cocoa and coffee processing techniques. FAMA also carries out the function of market intervention to cushion price declines.

Drainage and Irrigation Department (DID)

3.05 Much of the coconut along the west coast is grown on poorly drained soils, but more than 250,000 acres have already been provided with adequate drainage infrastructure (see Map 1). The Northwest Selangor Rural Development Project will provide drainage for an additional 131,000 acres, which will complete the drainage requirements for 90% of the coconut areas needing such rehabilitation. The on-farm drainage channels and connecting drains will be completed by the farmers with the advice and assistance of the DOA and DID.

Malaysian Agriculture Research and Development Institute (MARDI)

3.06 Coconut and related intercrop research is a relatively new activity for MARDI, but the institute is beginning to produce results from its specialized coconut research station at Telok Anson in Hilir Perak. Other MARDI activities related to coconut farming include cocoa and coffee research, animal production research, food crop research, pasture research and specialized bris (sandy) soils research on the east coast.

Farmers' Organization Authority (FOA)

3.07 FOA provides input, credit, marketing and machinery services through the Farmers' Cooperatives. Although the initial emphasis when

establishing Farmers' Cooperatives has been in the padi and other high production agricultural areas, a special effort is now being made to extend these services to all farmers including coconut smallholders.

Credit Institutions

3.08 Two institutions have been providing credit to coconut farmers: (a) Bank Pertanian Malaysia (BPM); lending to coconut growers is a new activity and loans in the past four years totaled about M\$160,000; and (b) the Planters' Loan Board has made loans of about M\$3,000,000 to coconut growers during the past four years; however, most of this credit is provided to farmers who have not benefited from the CR/RS. Credit institutions will need to play a larger role in providing operating and development capital after completion of the CSDS replanting and rehabilitation phase for all coconut producers. BPM credit would be administered by FOA.

Implementing Agency, Alternatives and Future Development Institutions

3.09 Considering the various components of the CSDS, the Government has decided that the DOA with its various technical branches (training, farm mechanization, soils, crop protection, crop production, development, and extension) is the most suitable department to have primary responsibility for implementation of the scheme. The DOA has all the technical staff and subject matter services to support the broad crop production aspects of the project. The DOA would be supported by FAMA to provide a reliable and fair marketing system for coconut growers' produce. The DVS would provide technical support for the relatively small (by number of beneficiaries) livestock component.

3.10 An alternative to the DOA as the primary executing agency would be the establishment of a smallholder coconut development institute or agency. This alternative was rejected because:

- (a) coconut rehabilitation and replanting has already been carried out for 14 years by a special subunit of the DOA; and
- (b) at the present and projected rates of development, smallholder coconut replanting and rehabilitation may be completed in the next decade.

3.11 The MAWA hybrid variety coconut has been demonstrated and proven in the estate sector and will be introduced in the smallholder sector under the project. The full potential of MAWA hybrids for new planting and replanting in the smallholder sector will not be known for several years and could create the need for a permanent coconut development program. This aspect would be reviewed and considered during the project. MAWA may develop as a competitive alternative to oil palm and rubber and could become a viable primary crop for commercial smallholder land settlement projects in the future.

Strengths and Weaknesses of the Implementing Agencies

3.12 The primary implementing agency, DOA, has 14 years of experience in coconut rehabilitation and replanting and controls all the supporting technical services for agricultural development. Likewise, the DVS and FAMA have many years of relevant experience for their respective roles in the project, dairy development and marketing. CSDS, as a subunit of the DOA, has had some difficulty in attracting and retaining qualified staff because it was looked upon as a temporary program and unit. Many staff members were seconded from SDOAs or temporarily employed on a fixed-term basis. There has also been a tendency to recall seconded staff to their parent agency. In 1976, all temporary staff were made part of the DOA-CSDS permanent establishment.

3.13 The proposed project is designed to overcome some of these problems. The implementation of a five-year, Bank-financed project would add permanence to the organization and ensure adequate resources to make the unit more attractive in terms of career development and as a place of employment in the DOA. The appointment of a Project Coordinator and two project component leaders (coconut replanting and rehabilitation, and livestock development) will also strengthen the organization. The establishment of a project implementation secretariat would relieve technical and management staff of routine administrative duties and strengthen the unit's agricultural development capacity.

4. PROJECT CONCEPTS AND COMPOSITION

Introduction

4.01 The Government has asked the Bank to provide financial assistance for expansion and strengthening of its coconut smallholder development program over the five-year period 1979-83. The primary objective of the project would be to raise the production and income of more than 19,000 coconut smallholders. The project would be a continuation of the CR/RS that began in 1963 and was carried out under the First and Second Malaysia Plans and is continuing during the TMP; more than 120,000 acres have been rehabilitated or replanted since the program began in 1963. The project would provide staff, facilities and equipment for the CSDS (a subunit of the DOA) and the DVS.

4.02 The project would assist the Government to achieve its main development policy objective, the alleviation of rural poverty. The project would strengthen the organization of the CSDS within the DOA and provide training for staff and farmers. The project would focus on the smallest and poorest coconut growers by setting the limit for participation to 10 acres, establishing an income ceiling for eligibility for participation, of about M\$3,600 (US\$1,500) and limiting the total development grant per beneficiary to about M\$6,600 (US\$2,750). The project would result in a 50% increase in acreage developed, increase the rate of replanting by 100%, and increase the number of beneficiaries by 75% during the five-year project period. Incremental

annual income would be increased by about M\$850 on the smallest 2 acre model and about M\$3,500 on the 8 acre model with rehabilitation and/or replanting and intercropping (see Table 11).

4.03 The project would assist the Government to support a five-year time slice of an ongoing, long-term development program designed to assist the majority of the approximately 80,000 coconut smallholders, particularly the 35,000 smallholders classified as being in poverty. By the end of the proposed five-year project, cumulative figures of about 34% of the area (180,000 acres) and 50% of the smallholders (45,000) would have received some kind of assistance by the end of the project period.

4.04 The project would utilize an integrated agricultural development approach, with the following objectives:

- (a) replanting of part of the area with high-yielding hybrids in association with temporary cash cropping; and
- (b) rehabilitation of existing MT coconut area including either permanent intercropping and/or livestock production.

Project Description Summary

4.05 The project would consist of the following components:

Crop Component

- (a) Smallholder on-farm development would include:
 - (i) the replanting of about 17,000 acres with high-yielding MAWA hybrids on about 16,700 smallholdings;
 - (ii) the rehabilitation of about 40,500 acres (plus 3,700 acres under the integrated dairy/beef component below) of traditional MTs on about 18,000 smallholdings and their diversification into various intercrops estimated as follows: about 22,000 acres of cocoa, 8,500 acres of coffee, 8,500 acres of fruits and cashews, 3,700 acres of pasture for livestock and other crops.
- (b) Government facilities development would include:
 - (i) the improvement and extension of regional infrastructure and the creation of two additional (total of eight) nurseries;
 - (ii) the establishment of two coconut seed gardens totaling 150 acres to supply the long-term replanting program with hybrid seed nuts.

Integrated Dairy and Beef Component

(a) Smallholder on-farm development would include:

- (i) the provision of about 2,150 crossbred pregnant heifers to about 1,075 coconut smallholders, and the establishment of about 3,500 acres of pasture and forage under the traditional MT coconuts being rehabilitated;
- (ii) the provision of about 4,250 pregnant heifers to about 2,125 smallholders who have benefited from the crop component and have sufficient grass available locally to raise livestock without specific pasture and forage development;
- (iii) the distribution of about 280 animals to about 140 smallholders (average 3 acres with 1.5 acres of coconut) and the development of 210 acres of pasture and forage for beef production under rehabilitated MT coconuts;

(b) Government facilities development would include:

- (i) provision for the importation of about 6,600 head of crossbred heifers to be raised and inseminated in government cattle raising centers (CRCs);
- (ii) establishment of sufficient additional pasture (about 3,000 acres) on two cattle raising centers;
- (iii) establishment of nine additional milk collection centers (MCCs) to ensure efficient milk collection, provide veterinary and animal husbandry services, and assure a satisfactory rate of return to project beneficiaries.

4.06 The project would thus continue the process of converting more than 530,000 acres of marginal coconut lands into highly productive mixed farming operations. Between 1963 and 1977 about 120,000 acres have been developed on a similar basis since the CR/RS began, and 61,000 additional acres would be developed under the five-year project.

Criteria and Conditions for Participation in the Project

4.07 Participation in the project's replanting and rehabilitation program would be on a voluntary basis in all 11 peninsular states. In line with the Government's objective of alleviating poverty it was agreed that the following criteria and conditions for selection of participants would generally be applied:

The Holding:

- (a) would be classified as coconut land by the borrower and would exclude areas already classified as nonagricultural in existing town plans;

- (b) would be less than 10 acres in aggregate;
- (c) would qualify for replanting grants only if the stand is less than 10 productive palms per acre.

The Smallholder:

- (c) would have a net income below the Borrower's prevailing poverty level;
- (d) could not receive a total grant exceeding \$2,750 (M\$6,600) or such other amount as may be agreed between the Government and the Bank;
- (e) when taking part in coconut replanting and/or rehabilitation shall also carry out recommended cash cropping and/or permanent intercropping; and
- (f) when taking part in rehabilitation and livestock production may also receive assistance for pasture development.

Detailed Features

4.08 Subsidy Policy. During the development phase, project beneficiaries would receive 100% of on-farm, nonlabor inputs in the form of grants in kind, i.e. planting materials, chemicals and fertilizers (see Table 5), as well as limited cash grants for hired labor primarily for the construction of farm drains. The Government considers these grants necessary because of the poverty status of the coconut smallholders (present net family incomes from coconut range from M\$350 to M\$1,200) and the long maturation period of the development. The use of grants with no direct cost recovery is consistent with the Government's income redistribution policy and such grants are systematically available for other tree crop and cash crop production in the smallholder sector. These grants would serve to (a) demonstrate the benefits of new and improved inputs and agricultural practices, and (b) reduce the risks associated with long-term development for farmers who have neither the knowledge nor the resources to introduce them.

4.09 Table 5 indicates the proposed changes in subsidies and grants for the transition from the CR/RS to the project, as well as the proposed reallocations and extension of fertilizer grants beyond the present period. The yield estimates are therefore based on the assumption that the fertilizer grants will be extended beyond the present period for coconut, and permanent and temporary intercrops. The original grants of M\$500 per acre for replanting coconut with food crops and M\$300 per acre for rehabilitation with permanent intercropping have recently been increased by the Government to M\$900 and M\$600 respectively. Grants and subsidies (see Table 5) would be allocated as follows:

- (a) MAWA replanting: M\$675/acre, over a five-year period
 - Associated cash crop garden: M\$225/acre intercropped, over a three-year period. Total M\$900/acre
- (b) MT rehabilitation: M\$300/acre, over a three-year period
 - Permanent intercropping: M\$300/acre, over a three-year period all in kind. Total M\$600/acre
- (c) Pasture and forage development: Dairy - M\$160/acre, over a three-year period; and Beef - M\$280/acre over a three-year period;
- (d) Livestock production development:
 - Dairy: M\$560 per beneficiary for facilities, plus at least 25% of the purchase cost of two heifers (presently assumed to be M\$1,400).
 - Beef: M\$410 per beneficiary for facilities, plus M\$600 for the purchase of two animals.

4.10 Because of the long implementation period, the five-year immaturity for MAWA hybrid palms and the 12 years necessary to reach peak production on the one hand, and the slow response of existing MTs to increased inputs on the other, the full benefits from coconut rehabilitation and/or replanting would not be attained by beneficiaries until several years after disbursements on the project have been completed. Even the major intercrops, cocoa and coffee, would not begin to realize a net return until about the seventh year after planting. To ensure that the smallholders would continue to use inputs (particularly fertilizers), the Government has taken action to extend the fertilizer subsidy from the present three years for rehabilitation and five years for replanting by an additional four years at a progressively decreasing rate, as indicated in Table 5. The additional grant in kind available for fertilizers and herbicides, if required, would be as follows:

- (a) MAWA replanting: total additional subsidy of M\$160/acre applied decreasingly from year 6 to year 9;
- (b) MT rehabilitation: total additional subsidy of M\$90/acre applied decreasingly from year 4 to year 7;
- (c) permanent intercrops: total additional subsidy of M\$140/acre applied decreasingly from year 4 to year 7; and
- (d) pasture and forage: for dairy and beef M\$70 and M\$50 respectively applied decreasingly from years 4 through 7.

Crop Component - Smallholder On-farm Development

4.11 MAWA Replanting and Associated Temporary Cash Crop Garden.

Replanting during the project period would concentrate on the high-yielding MAWA hybrids (Y and R) resulting from crossing Malaysian Dwarfs (Yellow and Red) as mother parent and West African Tall as father parent. These hybrids grow to a height of less than one half of the MT and begin to bear in year 4 or 5, reaching, in the estate sector, an average yield of 150-160 nuts (75 lb of copra) per tree per year, from year 11 onwards.

4.12 Considering the limited availability of MAWA seed nuts, farmers' unfamiliarity with these new varieties and voluntary participation, it is expected that only an average of 1 acre per holding would be replanted with dwarf varieties, making a total of about 17,000 acres over the project period.

4.13 Development would normally take place over a two-year period during which 0.5 to 2.0 acres of unproductive palms would be clear-felled, on-farm drains constructed, and land weeded and prepared for replanting at a rate of 65 palms per acre; participants would plant 0.5 to 1.0 acre per year.

4.14 MTs can be permanently intercropped effectively and economically; however, further experience is required for intercropping under MAWA hybrids. During the MAWA palms' immaturity period, participants would receive a grant for three years to plant food crops such as cassava (in a separate cash crop garden), maize, groundnuts, vegetables, et al.

4.15 MT Rehabilitation - Permanent Intercropping. Under the criteria for participation in the project and with the new limit of 10 acres or less of coconut, it is assumed that an average of 2.25 acres per holding would be rehabilitated, giving a total of about 40,500 acres over the project period.

4.16 Except for the smallest farm model, on-farm development would be phased equally over two years. In accordance with the typical farm models, a portion of the uneconomic palms on 1-6 acres would be felled, the old trees destroyed, an on-farm drainage network installed where required, noxious weeds eradicated and the land prepared for permanent intercropping. Additional selected MT polybagged /1 palms would be planted in the gaps to achieve an average density of 55 palms per acre.

4.17 Permanent intercropping of rehabilitated MTs would consist primarily of:

- (a) cocoa (Upper Amazone hybrid) on 22,000 acres on the west coast;
- (b) coffee (Liberica), on 8,350 acres mainly on the west coast; and
- (c) fruit trees and cashews on 8,545 acres mainly on the east coast.

/1 Maximum usage of polybagged planting materials would be encouraged.

4.18 Cocoa and coffee have already been successfully intercropped at the rate of 250-300 plants per acre and would be established simultaneously with the rehabilitation of the MT coconuts. Upper Amazone hybrid cocoa begins bearing after three to four years with a pay back period of about seven years. Traditional Liberica coffee begins bearing four to five years after planting and gives a net return seven to eight years after planting.

Crop Component - Government Facilities Development

4.19 Physical Infrastructure. Under the project, the crop component would be peninsula-wide and have a larger annual acreage and number of beneficiaries than the existing CR/RS. To introduce a higher level of technology, additional staff and facilities would be required, including new central, regional and suboffices to replace the existing temporary structures. Thus two regional offices (in Batu Pahat and Klang), five central offices, and two suboffices would be constructed during the project period.

4.20 The management of nurseries and distribution of planting material would remain the responsibility of the CSDS crop component staff. In addition to the six existing nurseries (five are on the west coast), two new nurseries would be created under the project at the suboffices, one at Mersing in Johore, and one at Rhu Tapei in Trengganu. Physical facilities would also provide for the expansion of the existing nurseries which, over the last three years (1974-76), have produced about 780,000 MT coconut seedlings, 1.4 million cocoa seedlings, and 260,000 coffee seedlings.

4.21 Seed Supply. Since DOA's Crop Production Branch cannot supply MAWA seednuts during the project period, all the replanting material required would be purchased from the estate sector (United Plantations and Barlow Boustead Estates Agency). To meet project requirements, the DOA has arranged to purchase MAWA seed nuts from these two estate suppliers at an agreed price of M\$1.90 per nongerminated MAWA nut, or MS\$2.43 per germinated selected nut. After visiting United Plantations' seed gardens, the mission concluded that the skill of hybridization by the seed producer and the quality of MAWA germinated nuts are adequate. The estates have given their assurance of a continued supply of seed nuts and the mission is satisfied that arrangements are adequate.

4.22 CPC Seed Gardens. The annual average requirement of replanting materials under the project would reach about 410,000 MAWA hybrid palms in year 5 for distribution to participants; about 480,000 germinated nuts would be required to supply the project nurseries. Two CPCs designed for the production of hybrid seed nuts would be established under the project.

4.23 During the five-year period, the project would provide the necessary facilities for the establishment of two coconut seed gardens on a total of 150 acres, at two locations in Perak (100 acres at Lekir) and Johore (50 acres at Mukim Jorak), for the production of hybrid seed nuts (the CSDS would begin supplying hybrid seed nuts from its own seed gardens six years after

planting). These facilities would also provide for the establishment of additional cocoa and coffee seed gardens. Planting of the parental palms would be completed in year 3 as follows:

- 120 acres of Malaysian Yellow/Red Dwarfs, as female parent,
- 30 acres of West African Tall, or other suitable Tall male parents (not to exceed 30%)

MAWA hybrid seed production using pollen imported from the Ivory Coast would begin in year 7 and at full development (year 10) would produce about 800,000 hybrid nuts, sufficient to plant about 7,000 acres per year.

Integrated Dairy and Beef Component

4.24 General. Holstein cows primarily crossbred with LID animals were introduced to Malaysia in the late 1960s on an experimental basis; Peninsular Malaysia now has about 10,000 of these crossbred dairy animals. Milk production from these animals varies from 1,000 to 8,000 lb per lactation: although with good management crossbred animals can produce 8,000 lb per lactation, the average would be about 4,500 lb. Crossbred animals are tolerant of the tropical climate and local management conditions, and they are more resistant to ticks and tick-borne diseases. Based on this experience the DVS embarked on an artificial insemination program to upgrade dairy animals and increase milk production among smallholder farmers. Although the program has been moderately successful, increasing the number of crossbred dairy animals and milk production is a slow process. To meet the immediate demand for quality dairy animals, the DVS has initiated an accelerated program to import heifers. Because of the large number of animals required and the time constraints in developing local breeding stations, the project would continue to rely on the supply of imported heifers. It is envisaged that long-term dairy development would be based on local breeding and raising programs (see para. 4.34).

4.25 In 1975, the DVS established two MCCs to provide a convenient and regular market for fresh milk. These centers have been very successful and now collect about 30,000 gallons of fresh milk each month which is sold to the Nestles' Dairy Plant in Kuala Lumpur. While most of the smallholder dairy production is sold and consumed locally as fresh milk, most of that collected by the MCCs is processed and packaged as ultra high temperature (UHT) milk which can be stored without refrigeration for three months or more.

4.26 The success of this program and the rapidly increasing demand for fresh milk by the more affluent section of Malaysian society have been recognized as an opportunity to increase the small farmer's income as well as to decrease dependence on imported milk products. At present only 5% of the milk products consumed in Malaysia are domestically produced by Malaysian farmers.

4.27 The Government also recognizes the present constraint of a limited supply of feedstuff and proposes to utilize by-products of agricultural

production (currently amounting to more than six million tons, most of which is waste) and convert these into animal feedstuffs (i.e. broken rice, rice bran, palm kernel cake, oil palm sludge, copra cake, cassava refuse, pineapple waste, sugarcane waste, rubber seed meal and many others). In addition research is being undertaken for local production of traditional animal feeds such as maize, sorghum, soybeans, cassava meal and chips, and sugarcane.

4.28 The dairy component of the project would focus on the smallest coconut holdings and would have two primary objectives: to provide regular cash income and to raise the smallest farmer's income above the poverty level.

Smallholder On-farm Developments

4.29 The integrated coconut-dairy/beef diversification program would cover about 10,000 acres of coconut under the project.

4.30 MT Coconut Rehabilitation with Cultivated Pasture for Dairy Development. One thousand and seventy five smallholders owning a total of 3,500 acres on the west coast would participate in dairy development under the five-year project. The selected participants would be trained in dairy husbandry for a period of 15 days at the Kluang Cattle Raising Center. After completing their training, farmers would begin establishing pastures sufficient to maintain their animals under the rehabilitated MTs, build a cattle shed and develop dairy facilities. In addition to the MT rehabilitation subsidy, beneficiaries would be eligible for a grant of M\$160/acre for three years to develop cultivated pasture, followed by an additional, progressively decreasing fertilizer grant amounting to M\$70/acre over a four-year period. Each farmer would be provided initially with two 6-month pregnant heifers at an estimated cost of M\$2,200 to the farmer (this includes M\$200 for insurance), and receive, over the first three years, a grant of M\$560 for a cattle shed, water facilities and feed storage. Sixty percent, or such other amount that may be agreed upon, of the cost of each heifer (M\$2,200 out of the total cost of M\$3,600) would be made available on credit arranged by the DVS and financed by local commercial banks. The credit system includes risk insurance arranged by the DVS to protect the farmer and the lending institution.

4.31 MT Rehabilitation with Dairy Development Without Cultivated Pasture. It is envisaged that cultivated pasture would initially play a minor role in dairy development and that the main source of feeds would be natural grasses on and about the farm. Forage and grasses would be supplemented by concentrates available to the farmers on a commercial basis. Thus it has been assumed that about 2,125 smallholders with an average of 3 acres of coconut (about 6,400 acres) would each be provided with an estimated grant of M\$1,400 (up to 40% of the cost of the animals) and the remainder on credit for the purchase of two 6-months pregnant heifers after completing their training and construction of dairy facilities.

4.32 MT Rehabilitation with Pilot Beef Development. This pilot beef subcomponent would be established on the east coast where lack of demand for

fresh milk makes dairying impractical. Two hundred and eighty feeder animals (primarily culls from the dairy imports) would be provided as a grant to 140 beneficiaries with an average of 1.5 acres of coconut. Participants selected with the assistance of the SDOA, MARDI and the local DVS office would be trained in planting and management of grass/legume forage and livestock husbandry at the Kota Bahru DVS station. After completing their training they would prepare land, plant grass under rehabilitated MTs and fence their holding. Each would be provided with two 12-14 month old feeders (as a grant) and receive grants of M\$410 for cattlesheds and fencing and M\$280 per acre for pasture development over a three-year period. An additional decreasing grant amounting to M\$50 per acre, would be available over the next four years for fertilizer.

Government Facilities Development

4.33 Importation of Crossbred Heifer Calves. It is assumed that only 450 good crossbred dairy heifers would be available locally for distribution in year 2. The balance needed to meet project requirements would thus be imported. Over a five-year period, the project would provide for the importation of six thousand six hundred 5-9 month old crossbred heifers to be raised on DVS's CRCs up to the sixth month of pregnancy, i.e. about 30 months of age. With losses due to mortality, culls and infertility assumed at about 10%, 6,400 pregnant dairy heifers and 280 cull feeder animals would be distributed to about 3,300 coconut smallholders under the project. All the dairy heifers would be inseminated at about 18-24 months with semen from crossbred bulls.

4.34 Cattle Raising Centers. The raising of heifers would be undertaken at DVS's existing cattle center of Kluang (Institut Haiwan, IH). Additional raising capacity would be required for the dairy heifers imported and distributed under the project. Under the project the holding areas would be expanded by the development of an additional 3,000 acres in Johore during years 1 and 2. The finance for developing these CRCs to a full capacity of about 3,900 animals would be provided under the project. The Department of Veterinary Services has agreed that the long-term interest of Malaysia may be better served through providing local facilities for reproduction of dairy animals. Thus DVS would study the feasibility of, and prepare a plan for the possible conversion of CRCs to cattle breeding and raising centers so as to gradually eliminate the need to import dairy heifers; production of dairy animals by the private sector would also be encouraged. The results of the study and the plans for future production of dairy animals would be submitted to the Bank by December 1981.

4.35 Milk Collection Centers. The area of the dairy diversification program would be spread along the west coast. The project would cover nine localities, each area being an independent unit with all the necessary facilities and infrastructure for dairy services and milk collection. Initially about 500 beneficiaries with a total of 1,000 dairy cows would be selected

around each MCC. The MCC would have facilities to test, cool and store milk in addition to facilities for administration. The first of the nine MCCs under the project are planned to be constructed in year 1 to begin operation in year 2. Because participation in the coconut rehabilitation and integrated dairy scheme is on a voluntary basis it would be necessary to continuously review the selection of sites for construction of MCCs. It is estimated that at least two years of experience would be required before final selection of all sites can reasonably be determined. The Department of Veterinary Services would review its plans, including site locations, and phasing of construction of the proposed 9 MCCs and furnish an updated plan and program to the Bank for comment by January 31, 1981.

Training and Technical Assistance Component

(a) Extension Services

4.36 Farmer training would be one of the most important aspects of the project and would reach all 19,000 project beneficiaries. Most farmer training would be in the form of regular extension service education (training, visits and demonstrations) carried out on the farm through village leaders, farmer groups and individual farmers. This service would be provided by special agricultural technicians assigned by the DOA to the crop component staff, supported by Subject Matter Specialists (soils, crop protection, crop production) and state agricultural extension services now being strengthened under the Bank-financed National Extension Project, Loan 1493-MA.

4.37 In addition to the regular crop production extension services the farmers would receive specialized training and assistance in modern methods for on-farm processing and handling of copra, cocoa, and coffee. The project would provide for 7 training officers assigned to the Department of Agriculture working under the direction of the Crop Component Leader in coordination with the FAMA Coconut Collection and Processing Centers (CCPCs); the 4 already established and the 14 CCPC proposed to be established in the Project area would become the focal point for their training activities (the CCPC would be financed and managed separate from the project). The training officers provided under the project would be assisted by the copra, cocoa and coffee processing specialist provided under the project (para. 4.42). Vehicles and equipment would be provided under the project for the training officers.

4.38 The DVS, responsible for conducting initial animal husbandry training courses for dairy beneficiaries at the IH in Kluang, would provide a follow-up dairy extension service through the MCCs, including animal disease control, fodder production, animal husbandry, artificial insemination, and other extension advisory services. About half of the staff costs involved would be charged to the project. Veterinary and animal husbandry extension officers based at the MCCs would serve all farmers and livestock in the area.

4.39 All technical agricultural services provided by DOA and the DVS for project implementation would be under the authority of Crop Component and Dairy Component leaders, respectively (see Organization Chart 1). Agriculture extension would be provided in the context of the National

Extension Project. The Ministry of Agriculture and project authorities are well aware of the problems of and need for coordination of agricultural services and will continue to promote and facilitate coordination of activities at all levels.

(b) Fellowships

4.40 Training of staff for the crop (DOA), and dairy (DVS) components of the project would also play an important role in strengthening the supporting agencies. A fellowship program would be prepared and submitted to the Bank and would be implemented according to arrangements acceptable to the Bank. The project would provide 23 man-years of fellowships distributed approximately as follows:

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Total five-year project</u>
Crop component/DOA's Crop Production Branch Staff	-	4	4	2	-	10 man-years
Processing and Marketing DOA/FAMA Staff	-	2	2	-	-	4 man-years
Dairy component/DVS staff	-	2	3	4	-	9 man-years
<u>Total</u>	<u>-</u>	<u>8</u>	<u>9</u>	<u>6</u>	<u>-</u>	<u>23 man-years</u>

(c) Technical Assistance

4.41 For the CPC seed gardens, the project would provide 12 man-months of technical assistance at the rate of 3 man-months from year 2 through year 5. The Government also has agreed that an additional 4 man-months of technical assistance would be provided in years 6 and 7, to advise and assist the Crop Component Leader and his staff in the design, establishment and management of the two seed gardens as well as in the formulation and implementation of courses for hybrid seed and crop production. Technical assistance could be provided locally by private estates in coordination with MARDI.

4.42 For processing, a copra, cocoa and coffee processing and marketing specialist would be engaged for three years to advise and assist the DOA and FAMA in modern techniques for processing, storage and marketing of produce. The project authorities have agreed to employ consultants whose qualifications, experience and terms and conditions of employment are acceptable to the Bank.

Monitoring and Evaluation

4.43 The DOA and DVS would continue to regularize and strengthen their monitoring and evaluation systems being developed under the National Extension Project and assisted by consultants from the UNDP/IBRD State Rural Development Project. In particular, this would include production control

through the MCCs and CCPCs, monitoring of development subsidies and grants to ensure that they are properly used, and evaluation of the benefits of these subsidies and grants. In addition, the DVS would strengthen its monitoring of the artificial insemination (AI) program. The monitoring and evaluation systems being developed under the National Extension Project would also be applied to the project; in addition special monitoring and evaluation systems would be for the DVS's artificial insemination program; technicians would also receive regular, in-service training.

5. PROJECT COSTS AND FINANCING

Project Costs

5.01 Total project costs in 1978 dollars are estimated at US\$44.2 million, of which US\$19.5 million would be foreign exchange. Project costs have been calculated on the basis that the implementing agencies would be tax exempt; however, it is assumed that some taxes would be paid for civil works and off-the-shelf procurement and to that extent taxes are included in project costs. Physical contingencies, set at 15% for civil works and 10% for vehicles and equipment, are included and amount to 2% of project costs. Price contingencies, totaling 24% of project costs, are based on a projected annual inflation rate between 1978 and mid-1980 of 7.5% for equipment and vehicles and 9% for all other items. After mid-1980, annual inflation is assumed to be 7% for equipment and vehicles and 8% for all other items.

5.02 Project costs for the 9 MCCs include sufficient working capital to enable the enterprises to finance raw material purchases without having to delay payments to suppliers. All the regular operating and staff costs of these processing facilities would be covered by sales revenue and hence are not included in project costs.

5.03 Details of project costs are provided in the project file and summarized below:

PROJECT COST SUMMARY
(Baseline costs in constant 1978 dollars)

	Local (M\$ million)	Foreign	Total	Local (US\$ million)	Foreign	Total	Foreign exchange (%)
<u>Crop Component</u>							
Civil works /a	1.49	0.98	2.47	0.62	0.41	1.03	40
Vehicles	-	0.50	0.50	-	0.21	0.21	100
Equipment	-	0.58	0.58	-	0.24	0.24	100
On-farm grants	20.27	12.90	33.17	8.44	5.38	13.82	39
Other operating costs	1.20	0.66	1.86	0.50	0.28	0.78	35
Staff	8.04	-	8.04	3.35	-	3.35	0
<u>Total Crop Component</u>	<u>31.00</u>	<u>15.63</u>	<u>46.62</u>	<u>12.91</u>	<u>6.52</u>	<u>19.43</u>	<u>34</u>
<u>Livestock Component</u>							
Civil works	4.47	2.97	7.44	1.86	1.24	3.10	40
Vehicles	-	0.96	0.96	-	0.40	0.40	100
Equipment	-	1.70	1.70	-	0.71	0.71	100
Animal procurement	-	7.13	7.13	-	2.97	2.97	100
On-farm grants	2.70	0.53	3.23	1.13	0.22	1.35	17
Other operating costs	2.75	4.20	6.95	1.15	1.75	2.90	60
Staff	1.90	-	1.90	0.79	-	0.79	0
Working capital	0.75	-	0.75	0.31	-	0.31	0
<u>Total Livestock Component</u>	<u>12.56</u>	<u>17.49</u>	<u>30.06</u>	<u>5.24</u>	<u>7.29</u>	<u>12.53</u>	<u>60</u>
<u>Training & Technical Assistance</u>							
Fellowships	-	0.60	0.60	-	0.25	0.25	100
Consultants /a	0.12	0.84	0.96	0.05	0.35	0.40	85
Vehicles	-	0.14	0.14	-	0.06	0.06	100
Operating costs	0.05	0.21	0.26	0.02	0.09	0.11	80
<u>Total Training & Technical Assistance</u>	<u>0.17</u>	<u>1.79</u>	<u>1.96</u>	<u>0.07</u>	<u>0.75</u>	<u>0.82</u>	<u>79</u>
<u>Total Base Costs</u>	<u>43.73</u>	<u>34.91</u>	<u>78.64</u>	<u>18.22</u>	<u>14.56</u>	<u>32.78</u>	<u>45</u>
<u>Contingencies</u>							
Physical	0.86	0.99	1.85	0.35	0.40	0.75	54
Price	14.91	10.94	25.85	6.05	4.60	10.65	42
<u>Total Contingencies</u>	<u>15.77</u>	<u>11.93</u>	<u>27.70</u>	<u>6.40</u>	<u>5.00</u>	<u>11.40</u>	<u>43</u>
<u>Total Project Cost</u>	<u>59.50</u>	<u>46.84</u>	<u>106.34</u>	<u>24.62</u>	<u>19.56</u>	<u>44.18</u>	<u>44</u>

/a Including architect and engineering services.

Note: Any difference between M\$ (Ringit) and US\$ due to conversion and rounding.

Financing

5.04 A Bank loan of US\$19.5 million is proposed to assist with the project as follows:

	<u>Government</u>		<u>IBRD</u>		Total
	US\$ million	% of item's total cost	US\$ million	% of item's total cost	
Civil works	2.48	60	1.65	40	4.13
Vehicles and equipment	-	-	1.62	100	1.62
On-farm inputs	9.57	63	5.60	37	15.17
Operating costs (Services and supplies)	2.00	50	2.11	50	4.11
Staff	4.14	100	-	-	4.14
Animal procurement	-	-	2.97	100	2.97
Technical assistance and engineering services <u>/a</u>	0.05	15	0.35	85	0.40
Fellowships	-	-	0.25	100	0.25
Contingencies	6.40	55	5.00	45	11.40
<u>Total</u> *	<u>24.50</u>	56	<u>19.50</u>	44	<u>44.00</u>

* Note: Figures have been rounded.

/a Architect and Engineering Services estimated at 2.5% of cost of civil works.

6. PRODUCTION, MARKETING AND PRICING POLICY

Production

6.01 At full development the incremental on-farm production generated by the project would be:

Item	Incremental at full development	Total 1975 production	Incremental as % of 1975 production
Coconuts	116.7 million nuts	1,210 million nuts	10%
Cocoa	5,800 tons dry beans	17,600 tons	33%
Coffee	1,800 tons dry beans	6,000 tons	30%
Raw milk	12,360 tons	n.a.	n.a.

In addition, about 800,000 ungerminated hybrid seed nuts would be produced, and 25,500 tons of raw milk (includes milk produced by farmers who would not be direct beneficiaries) collected and processed.

Marketing and Markets

6.02 Marketing of incremental production would present no problems. Not only is the private sector active in the area of coconut, cocoa and coffee marketing, but FAMA has also started to involve itself in the collecting, processing and selling of all three products. All milk would be marketed through the MCCs except for small quantities sold to local shops.

6.03 In addition, the location of markets should present no difficulties. Traditionally, Malaysia has been a net exporter of coconuts, coconut oil and cocoa. The exportation of cocoa to the German Federal Republic, Singapore, the US and the Netherlands is expected to continue. Domestic consumption of coconut products is expected to increase at a rate that would substantially reduce exports in the 1980s. Although many Malaysians prefer to drink imported Robusta and Arabica coffee, domestic consumption of Liberica coffee, is expected to increase, while Singapore is a potential export market for Liberica coffee. The demand for fresh milk is difficult to predict given the traditional emphasis on canned and powdered milk. However, as personal incomes increase rapidly and tastes change, as children become accustomed to fresh milk through school programs and as the price of fresh milk falls, so demand would increase. Nestles have indicated that they would continue to buy all fresh milk offered for sale by MCCs, most of which would be processed as UHT milk. Adequate markets for UHT milk exist in Malaysia and Singapore.

Pricing Policy and Prices

6.04 The prices of coconuts, copra, cocoa, coffee and livestock are determined through the interplay of both domestic and international market forces. Aside from FAMA's market intervention, government intervention in

the pricing process is limited to a small export duty on copra to discourage the export of an intermediate product and import duties on chocolate products to encourage domestic processing.

6.05 FAMA's CCPCs are committed to using "fair prices" in the purchase of coconuts from smallholders. The fair price is based on the prevailing f.o.b. price of coconut oil minus appropriate deductions for processing and handling. Thus unlike private middlemen, CCPCs do not adjust prices in accordance with anticipated international price shifts, and consequently during speculative price declines, smallholders can obtain higher prices at CCPCs.

6.06 The prices at which MCCs buy and sell fresh milk are and will remain fixed by the Government. Because much of the growing middle class cannot afford fresh milk, the DVS is committed to a gradual lowering of prices. A decrease in the ex-farm price from M\$2.60 per gallon to M\$2.30 per gallon by 1980 is assumed in this report.

6.07 Output prices used in this report are based on projected 1980 prices expressed in constant 1977 M\$. With the exception of milk, for which domestic markets are virtually unaffected by international price levels, the 1980 economic and financial prices for each product are identical.

7. TECHNOLOGY AND PRODUCTION SPECIFICATIONS

Crop Component

7.01 Physical Background. Climatic conditions in Malaysia are considered excellent for coconut production. Most coconuts are grown on high potential, coastal alluvial soils which generally give good yields when provided with adequate drainage. Completion of basic drainage infrastructure, including on-farm drains, is a prerequisite for participation in the project, and is being carried out in close coordination with the DID. Construction of drainage systems in part of the project area is being financed and implemented under the Western Johore Agricultural Development Project and Northwest Selangor Agricultural Development Project.

7.02 The Soils and Analytical Branch of the DOA would continue to give priority to the project areas in conducting semidetained and detailed soil surveys. Soil information would not only be essential for economic MAWA hybrid development and production but would also be the key to successful permanent intercropping with cocoa, coffee or fruit trees under MT coconuts.

7.03 Coconut varieties grown in Peninsular Malaysia belong to two main types - the Talls (MTs) and the Dwarfs (MDs). Domestic production of fresh

nuts and copra is derived predominantly from the MTs which grow and produce better than the MDs under a wide range of soil conditions. Almost all smallholdings are still planted with unselected MTs averaging a yearly yield of 1,150 nuts/acre or 20 nuts/tree. Better yielding tall varieties selected from the estate sector became available to the smallholders with the introduction of the CR/RS in 1963. On well-managed estates the MT varieties may produce up to one ton of copra per acre, per year. The introduction of MAWA hybrids (Y and R) would facilitate production of up to two tons of copra an acre under estate management conditions. Production potential in terms of oil equivalent to commercial levels of palm oil production and offers new possibilities for the coconut industry and the smallholder sector.

7.04 MAWA Replanting. The decision to use MAWA hybrids (Y and R) under the project requires the introduction of a new technology to the coconut smallholders. To obtain the full economic benefit of hybrids, field planting and management have to be supervised to ensure that the following practices are implemented:

- (a) old palms - complete disposal by burning the trunk and stumps as a basic pest control measure;
- (b) on-farm drains - improvement and maintenance;
- (c) noxious weeds - complete eradication;
- (d) triangular spacing of polybagged palms (optimum 65 palms to an acre);
- (e) fertilizing program - regular application;
- (f) phytosanitary control - regular spacing; and
- (g) intercropping - careful management

With improved field management, MAWA hybrids introduced under the project are assumed to come into bearing in year 5 and reach an average yield of 6,525 nuts (3,000 lb of copra) per acre, i.e. 3 tons of copra per hectare, see Table 9.

7.05 MT Rehabilitation. Clean land cultivation, disposal of uneconomic and excess palms, improvement and maintenance of on-farm drains and regular fertilizing would produce a minimum increase in yield of 30% (from 1,150 nuts to 1,500 nuts/acre) five years after rehabilitation (Table 9).

7.06 MT Permanent Intercropping. The most popular permanent intercrops cultivated under MTs would be cocoa, coffee, bananas and fruits. To date, intercropping of cocoa has been concentrated in Selangor, Perak and Johore. Under the project, cocoa would be planted as an intercrop in all west coast states, where soils are suitable and adequately drained. Coffee would be planted as an alternative on less fertile soils, and cashew and fruits would be the main intercrops on the east coast sandy soils.

7.07 With appropriate planting density, good maintenance and regular fertilizing programs, the following production would be expected:

- (a) UA hybrid cocoa: yields in year 4 would be about 100 lb/acre (dry beans), reaching 600 lb dry beans in year 10;
- (b) Liberica coffee: yields in year 6 would be about 100 lb/acre (dry beans) reaching 460 lb in year 9.

7.08 Nurseries. The nurseries under the project would normally use polybags and provide the participants with: (a) 6-7 month old MAWA hybrid palms or selected MT palms (when additional stands are required on a rehabilitated area); (b) 3 month old UA cocoa polybagged seedlings; and (c) 6-8 month old Liberica coffee polybagged seedlings.

7.09 CPC Seed Gardens. Due to the economic impact expected from MAWA, the establishment of two MAWA hybrid seed gardens would be a component of the project. Separate parental plantings would be recommended, which would require further assisted pollination. High standards of field husbandry would be required and necessary inputs have been provided for in the cost estimates. The following yields would be expected from the present area (120 acres) of the MD coconuts:

year 6:	40 MAWA hybrid nuts/palm, i.e. 2,920 nuts/acre MD (Y or R)
year 7:	80 MAWA hybrid nuts/palm, i.e. 5,840 nuts/acre MD (Y or R)
year 8 onwards:	90 MAWA hybrid nuts/palm, i.e. 6,570 nuts/acre MD (Y or R)

Integrated Dairy/Beef Component

7.10 Background. Cattle rearing is practiced by many smallholders in Peninsular Malaysia. The project would assist the DVS in converting the traditional system of cattle husbandry into more efficient dairy and beef operations. Emphasis would be given under the project to pasture/forage development under coconuts, provision of crossbred dairy animals and improved animal husbandry.

7.11 Pasture/Forage Development. Natural grasses are abundant on the west coast soils and are adequate when supplemented with concentrates; however some farms would need to develop cultivated pastures. Thus, with seeds made available from DVS stations, Panicum, Brachiaria, and Setaria species would be introduced under the project in areas intended for grazing, whereas Panicum and Pinnisetum species would be planted where the cut-and-carry system would be used. With supplementary concentrates, the carrying capacity in the farm model is assumed to average 1.3 AU/acre of cultivated pasture/forage.

7.12 Choice of Animals and Assumed Performance. For technical and economic reasons, only pregnant crossbred heifers rather than purebred dairy heifers would be distributed to participants under the project. These heifers, imported when 6 to 9 months old, would be raised and artificially inseminated at the two CRCs financed under the project. The culling rate, including mortality and infertility, is assumed to be 10%, of which 30%-40% would be recoverable for fattening and distributed free as 12-14 month feeders to the beef pilot project participants on the east coast. These crossbred animals tolerate local climatic conditions very well, are more resistant to tick infestation than the purebred cattle and do not appear to be much affected by tick fever. Their assumed performance with improved husbandry practice is as follows:

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5 onwards</u>
(a) <u>2-3 year crossbred heifers</u>					
Calving rate (%)	80	60	65	70	75
On-farm mortality rate (%)	5	3	3	2	2
Total milk production (gal/cow)	260	320	380	400	400
Net milk production (gal/cow)	200	260	320	340	340
(b) <u>12-14 month feeders</u>					
On-farm mortality rate (%)	2	2	2	2	2
Weight gain	1 to 1.1 lb/day; i.e. about 550 lb in 18 months				

7.13 On-farm Animal Husbandry. Malaysia enjoys freedom from the major epizootic diseases; however, Haemorrhagic Septicemia, which is still a problem, would be combated by prophylactic vaccinations in endemic areas. To improve the present results of AI (approximately 40-45% conception rate), more emphasis would be placed during participants' training on heat detection and similar basic management techniques.

7.14 Milk Collection Centers. The MCCs would follow existing procedures and organize the collection of milk twice a day. All milk from individual suppliers would be tested for specific gravity (SG); if satisfactory, the milk would be accepted and the quantity weighed and recorded. All milk would reach the MCC between 6:30 and 8:30 a.m. and 5:00 and 7:00 p.m. After being tested for SG and dirt, it would be chilled to 5-8 degrees and stored in cold rooms at 0 degrees C. The milk would be transported from the MCC to the factory either daily or once in two to three days, depending on the quantity collected.

Farm Model Summary

7.15 Farm models, grants, production, costs and benefits are summarized in Table 11. There are four models (1-4) dealing exclusively with the crop component, and 3 models (5-7) that contain integrated crop and livestock components. Detailed individual farm models are contained in the project file for reference. The development grants for each farm model are shown in the Summary Table 11 and vary from M\$1,360 (US\$550) in model 1 to M\$5,440 (US\$2,200) in model 3. This includes the provision to extend the fertilizer grant (in kind) for an additional four years (see item 22 of Table 11).

7.16 Item 35, Table 11 shows that the total grant under the project would be equivalent to approximately two years of incremental annual income or benefit (with family labor included as a cost) earned at full development, except for models 6 and 7 which would not include intercropping or replanting with MAWA. The various financial rates of return for the respective models are shown in items 41 and 42, Table 11, and are discussed in Chapter 9.

7.17 Farm Model Incomes. As a consequence of the project (as shown in Table 12), farm incomes would be increased by about 70% for the east coast pilot project, between 70% and 80% for the smallest participants on the west coast and to over 140% for some of the larger west coast participants. These substantial increases, which would raise all farmers with more than 2.5 acres above the poverty line through a combination of rehabilitation and intercropping, would increase per acre income from M\$200 to M\$750 for cocoa and to M\$600 for coffee; replanting with MAWA would raise per acre income from M\$200 to M\$1,100; and the introduction of dairying would raise per farm income by over M\$2,000, less any income loss due to reduced off-farm employment.

8. PROJECT IMPLEMENTATION

Organization and Management

8.01 Project Coordinator. It is proposed that a Project Coordinator would, under general policy guidance from MOA, be in charge of planning, coordinating and administering the project's two component activities; he would be a competent, senior level officer. He would be reporting to, and be guided by, a National Coordinating Committee, chaired by the Secretary General of the MOA or his representative, on which the following agencies would be represented: EPU, DOA, DVS, FAMA, Majuternak, DID and FOA. The National Coordinating Committee would meet at least twice a year. Eleven state coordinating committees would also guide the three project component leaders at the state level (most states already have agricultural advisory committees that would also serve the project). Assurances were obtained during negotiations that a Project Coordinator and the two project component leaders would be appointed as a condition of loan effectiveness; adequate supporting staff would also be made available.

8.02 Projects Secretariat. It is recognized by the MOA and DOA that in any Bank-assisted project there exist at least two basic components: (a) the technical component, i.e., the technical and physical program per se as embodied in the project; and (b) the administrative component, which encompasses all routine administration for servicing and implementing the project.

8.03 There is a need to provide the Project Coordinator with an implementing secretariat and supporting professional and clerical personnel. The DOA already has the responsibility for implementing two Bank-assisted projects: the Extension Liaison Unit (ELU) under Loan 1115-MA and the National Extension Project under Loan 1493-MA. Assurances were obtained at negotiations that a

project implementation secretariat with adequate staff and facilities would be established to deal with the administrative functions of all DOA projects under implementation.

8.04 This secretariat would coordinate all administrative functions and activities of Bank-financed agricultural projects executed under DOA. The projects secretariat would be located in the DOA in Kuala Lumpur and be organized into four functional units (or in accordance with other agreed arrangements) as follows: (a) Project Programming and Budgets, Monitoring and Evaluation; (b) Procurement, Finance and Accounts; (c) Technical Assistance/ Fellowships Administration; and (d) administrative support.

8.05 Project Component Leaders. The proposed organizational structure of the project is illustrated in Chart WB15526. Under the Project Coordinator, two Project Component Leaders would be responsible for the implementation of their component activities. The Component Leaders would continue to be technically answerable to the Directors General of their departments (DOA and DVS), but their development activities would be within the provisions and terms of the project. The Component Leaders and all their subordinate staff assigned to the project would remain under their department from the point of view of staff regulations and administration.

8.06 The creation of a specialized agency to implement any expanded nationwide MAWA hybrid coconut development, should be considered before the end of the project implementation period. A suitable institution could be evolved from the proposed project organization.

Implementation Procedure

Crop and Dairy Beef Components

8.07 Selection of Participants. Participants would be selected by crop and/or dairy component staff. Eligibility for participation in the project would be in accordance with the Government's existing regulations for the CSDS. Once a farmer is determined to be eligible and has declared how and with what area of his holding he intends to participate, he would carry out the following prescribed work:

- (a) Replanting MAWA Hybrids. In year 1 the participant would fell and dispose of all designated coconut palms; cultivate the land and eradicate noxious weeds; dig, deepen and maintain 3' x 3' x 2' farm drains between each two rows of coconut (where required); put up fencing where specified; and prepare holes and plant 65 polybagged MAWA palms per acre according to materials and plans supplied by the project staff. In year 2 and thereafter he would regularly apply fertilizers at recommended rates, carry out an approved level of weeding and maintain farm drains.
- (b) Rehabilitation with Permanent Intercropping. In year 1 the participant would fell and dispose of all palms over 55 per acre

and fell and dispose of all uneconomic palms regardless of stand; prepare holes and plant approved additional palms to a maximum density of 55 per acre; eradicate all noxious weeds; dig, deepen and maintain 3' x 3' x 2' farm drains between every two rows of palms (where required); cultivate land and plant approved intercrops; and put up fencing where required. In year 2 and thereafter he would regularly apply fertilizer at the recommended rates, carry out weeding and phytosanitary treatment, maintain farm drains, and if fair prices are obtained, sell his production to the CCPCs.

- (c) Rehabilitation with Cultivated Pasture. Same as (b) above except land preparation would be for pasture; regular recommended fertilizer applications for pasture would apply.
- (d) Dairy and Beef. As a prerequisite to receiving any grants the beneficiary or a member of his family would have attended an approved animal husbandry course. In year 1 pasture would have been established, and livestock housing and fencing constructed where required. Upon certification that adequate arrangements have been made for feed, housing and water, the beneficiary would receive his animal(s).

These conditions are prerequisites for receiving the next stage of inputs. All on-farm developments would be strictly supervised by project component staff, and the participants' eligibility for continuing government grants would require certification (by field staff) of satisfactory execution of the prescribed works.

8.08 Development Grants. The replanting, rehabilitation and diversification grants would be administered by project headquarters in Kuala Lumpur. Requests would be completed by project component regional staff on behalf of the participants and submitted to project headquarters with their endorsement. Payments in kind and cash would then be authorized through project headquarters. The crop component regional centers would also forecast requirements for planting materials, fertilizers and pesticides. Planting materials would be ordered from the nurseries in the case of polybagged plants, or from DOA's CPCs and DVS in the case of seeds. Fertilizers and pesticides would be purchased in bulk by project authorities and distributed to the farmers. Utilization of planting materials, fertilizer, chemicals and materials would be closely supervised by project staff.

8.09 Production of Planting Materials. Crop component nurseries would obtain the supplies of seeds from DOA's CPCs and private estates. The polybagged plants would be raised in strategically located nurseries where selection would ensure that only healthy and true-to-type MAWA hybrid seedlings are distributed to farmers.

8.10 Credit for Dairy Animals. MCC staff, under the authority of the Dairy Component Leader would continue the present practice of arranging

credit through private and public banks to finance the purchase of dairy animals by project beneficiaries.

8.11 Civil Works. Site selection and development of facilities for the crop component would be carried out in a timely manner. MCCs would be located to serve the needs of the dairy farmer participants and would utilize existing sites such as FDCs, or existing DVS sites for the purposes of economy and efficiency. Site development, architectural designs and construction would be carried out by the Public Works Department (PWD) or private contractors in accordance with approved procedures.

8.12 Equipment, Materials and Supplies. Equipment, materials and supplies would be purchased in accordance with arrangements agreed upon by each project component department or authority and approved by the Project Coordinator. Administration of procurement, including phasing, preparation of documentation and control, would be handled by the projects secretariat.

8.13 Livestock. All dairy animals would be purchased by approved breeding contracts and would be the female offspring of approved dams, artificially inseminated with BOS INDICUS semen. Five to seven month old heifer calves would be imported, raised at holding stations, bred at 18 to 24 months and distributed to beneficiaries as 6-month pregnant heifers. The DVS would provide evidence that adequate holding and raising capacity would be available before breeding contracts are let. Upon arrival in Malaysia, the DVS would inspect the heifer calves for general health and condition. Selected animals (6 to 24 months of age) that do not meet the requirements for dairying would be distributed as feeder animals under the pilot beef component.

8.14 Cattle Raising Centers. Importation of dairy animals would be dependent upon development and maintenance of adequate cattle raising and holding facilities. This would require the cultivation and seeding, in a timely manner, of 3,000 additional acres of pasture in Johore. CRC pasture would be cultivated, seeded and maintained by the DVS. The DOA and DVS would keep the Bank advised of the rate of development of CRC pastures and provide evidence that adequate holding capacity would be available prior to letting each contract for procurement of dairy animals (see para. 8.20).

8.15 CPC Seed Gardens. It is intended that land preparation, including mechanical felling and clearing, legume cover establishment, on-farm drains and roads construction, be done by private contractors after competitive bidding. The projects secretariat, technically assisted by the DOA's Crop Production Branch, would be responsible for the procurement of seeds and particularly for the import of West African Tall selected seed nuts and pollen from the Ivory Coast and others.

Disbursements

8.16 Disbursements would be made at the rate of 100% against foreign exchange expenditures for directly imported equipment, vehicles, chemicals,

fertilizers, livestock, materials and supplies; 100% of ex-factory cost of items manufactured locally, and 90% of the total cost of imported but locally procured items. Disbursements would be 85% of the total expenditure for consultants including engineering services and 100% of the foreign expenditures for fellowships. Disbursements for civil works would be 40% of the total expenditure. The loan amount includes \$100,000 of retroactive financing for civil works associated with the coconut seed gardens for expenditures incurred after January 1, 1978. These works have been initiated so that seed production could commence before the end of the project period.

Estimated Disbursement Schedule
(US\$ million)

<u>Bank FY</u>	<u>Annual disbursement</u>	<u>Cumulative disbursements</u>
79	0.3	0.3
80	2.4	2.7
81	4.7	7.4
82	5.8	13.2
83	3.8	17.0
84	2.5	19.5

Accounts and Audits

8.17 The agencies involved in the project are all subject to normal government control and audit procedures as follows:

- (a) all agencies involved in project implementation would maintain separate accounts for the project;
- (b) all project accounts would be collated by the Project Coordinator;
- (c) the Government's Auditor General or other auditors satisfactory to the Bank would audit these accounts; and
- (d) the Project Coordinator would send the audited project accounts, together with the auditor's comments, to the Bank within nine months of the close of each financial year.

Procurement

8.18 The Project Coordinator would have overall responsibility for procurement of goods and services initiated by the two project component leaders under the project. The Project Coordinator would utilize the projects secretariat to carry out the mechanics of administration, monitoring and control of all aspects of procurement (see para. 8.04). Procurement requirements would normally be scheduled and budgeted annually in accordance with a plan coordinated and approved by the Project Coordinator.

8.19 Contracts for construction of civil works (including site development), totaling about US\$5.2 million (including contingencies), would

generally be small (averaging less than US\$100,000), dispersed in time and place, and could not be grouped for simultaneous tendering. All civil works contracts would be awarded following local procedures which are satisfactory to the Bank. All other contracts of \$100,000 or more would be carried out under international competitive bidding in accordance with Bank guidelines. Vehicles, equipment, fertilizers, goods and chemicals (totaling about US\$20.0 million including contingencies) would be procured under international competitive bidding in accordance with Bank guidelines. A 15% preference margin, or the prevailing customs duty if lower, would be extended to local manufacturers. Small, off-the-shelf items, such as office supplies and equipment, consumable laboratory supplies and chemicals, not exceeding US\$1.25 million, would be procured through normal government procedures for prudent shopping.

8.20 For animal health reasons, livestock purchases (totaling about US\$3.7 million including contingencies) would be from countries meeting the DVS's requirements, and invitations to bid would be submitted to the Bank for approval. The Bank would finance all animals actually imported during the project period, provided the selection of countries and procurement documentation have been cleared by the Bank (15 to 18 months lead time is required for breeding contracts to be let for supply of heifers to the project).

8.21 The project would provide 4 man-years of consultants at an estimated cost of US\$6,000 per man-month for foreign consultants and US\$3,000 per man-month for national consultants, the average cost of consultants including architect and engineering services is estimated to be \$4,000 per month. The project would also provide 23 man-years of fellowships. Terms and conditions of employment of specialists and arrangements for fellowships would be managed under arrangements acceptable to the Bank at a total cost of about US\$0.75 million including contingencies.

Project Phasing

8.22 Phasing of physical implementation is detailed in Tables 8 and 9, and the project cash flow is shown in Table 14.

9. FINANCIAL ANALYSIS

Farm Model Rate of Return

9.01 The financial rates of return to the project for the seven farm models range from 14% to 20% for the crop models and 17% to 22% for the livestock models. Separate financial rates of return to the farmer, as opposed to the project, have also been calculated based on the actual costs incurred by the farmer (i.e. excluding development grants in kind) and on actual benefits received (i.e. including cash subsidies). These rates of return range from 22%-38% for the crop models and from 24% to over 100% for the livestock models. Given the fact that the models are based on 1980 prices expressed in constant 1977 prices and that after 1985 these prices are projected to change substantially, the financial rate of return to the

farmer has also been estimated in long-run, post-1985 prices. The use of long-run prices reduces the range of financial rates of return for the crop models to 10%-28%, but raises it to 29%-100%+ for the livestock models. These three sets of rates of return, to the project, to the farmer, and to the farmer in long-run prices, indicate respectively that the project would be financially attractive to the Government when instituted as well as financially attractive to the farmers when proposed, and that in fact, the farmer would earn a respectable rate of return from his participation in the project. As the Malaysian economy is highly commercial, both family labor and home consumption have been included in the financial analysis.

FINANCIAL RATES OF RETURN - CROP MODELS
(Coconut with intercrop)

Model No.	Cocoa			Coffee		
	To project	To farmer	To farmer in long-run prices	To project	To farmer	To farmer in long-run prices
1	20.2	36.4	28.2	16.8	31.2	26.4
2	20.4	37.6	28.0	16.8	32.0	26.4
3	20.4	37.8	28.2	16.8	32.2	26.6
4	18.8	28.8	15.6	13.8	22.4	9.8

FINANCIAL RATES OF RETURN - LIVESTOCK MODELS

Model No.	To project	To farmer	To farmer in long-run prices
5 dairy	21.8	34.8	30.4
6 dairy	18.0	24.4	29.0
7 beef	21.8	100.0 +	100.0

Other Components' Rate of Return

9.02 Financial rates of return for two other project components have also been calculated. The rates of return for the MCCs and seed gardens (when ungerminated nuts are sold at M\$0.75 per nut) are clearly satisfactory at 11.6%, and 11.0% respectively.

10. ECONOMIC ANALYSIS

10.01 Through the rehabilitation of coconut areas, the replanting with MAWA hybrids and the introduction of improved cultivation practices, coconut yields and total production should increase substantially on over 60,000 acres of coconut land owned by more than 19,000 farm families. The production of cocoa, coffee and other crops should also increase due to their introduction or expansion as intercropped on 40,500 acres of coconut land. In addition, about 3,200 coconut smallholders would diversify into commercial dairying, an activity which would represent a major source of alternative income for these smallholders. At full development, the project would generate more than M\$20 million or US\$8.5 million of foreign exchange earnings through the export of cocoa and coffee, and about M\$40 million or US\$16.7 million of foreign exchange savings through the reduction in dairy imports.

10.02 The project at full development would result in the production of 25 million coconuts per year. The pricing policy followed by the CCPCs, would result in a cushioning of smallholders' incomes during a price decline and would be an advantage in stabilizing the smallholder income. In addition, the extension services provided at the CCPCs would enable farmers to increase their value added on-farm through improved processing.

10.03 The off-farm dairy components would help to form the basis for expansion of the domestic dairy industry in a country where growing income levels would greatly increase the demand for fresh milk. As MCCs and dairy beneficiaries are spread over much of the west coast, the interest in commercial dairying and the focus on appropriate and sound husbandry practices should expand to encompass a far larger number of smallholders than just project beneficiaries.

10.04 At full development, the project would generate 10,000 man-years of additional on-farm employment. In addition, about 22,000 man-years, much of which should be hired labor, would be required for such development work as the felling of palms, eradication of noxious weeds and improvement of drains. Staff requirements in the DOA would increase by 143 positions, and in the DVS by 168 positions (see Table 13).

10.05 As can be seen from Table 12, the average per family income of project beneficiaries would increase from M\$1,892 to M\$4,164. This 118% increase would raise the average coconut smallholder family substantially above the World Bank poverty line of M\$2,950 per family. Indeed of the more than 100,000 project beneficiaries, almost all of whom are now living in poverty, only 20% should remain below the poverty line after the project.

10.06 The economic rate of return would be 18% for the project, including CSDS and DVS support activities. The shadow price of foreign exchange is assumed equal to the official exchange rate, while labor is shadow priced at 70% of the market wage rate. Adjustments for taxes and/or subsidies are only necessary in the case of civil works, vehicles and equipment, where the average tax rate borne by the project is estimated to be 10%. As the

Singapore market appears willing to buy increasing amounts of fresh milk from Malaysia, fresh milk is priced in accordance with the level that is expected to prevail in the Singapore market after 1980. The prices of coconut, copra, coffee and cocoa are assumed to fluctuate in accordance with the cyclical fluctuations forecast by the IBRD's Economic Analysis and Projections Department in October 1977. Owing to the lack of sufficient information, no cyclical fluctuations are assumed for the other output prices.

10.07 The rates of return are moderately sensitive to the price of labor and value of benefits. When labor is costed at its full market wage, the rate of return decreases to 14%, while a 10% reduction in benefits reduces the rate of return to the project to 15%. A decrease in benefits greater than 10% is highly unlikely, given the use of conservative yields for coconut, cocoa, and coffee. Sensitivity to changes in investment costs is slight. A 10% increase maintains the overall rate to 17.5%.

11. RISKS AND ENVIRONMENTAL EFFECTS

Risks

11.01 Implementation of the project would require a high level of organizational effectiveness and coordination between the DOA, DVS and FAMA as well as between federal and state agricultural service agencies and public institutions in Malaysia. The major risks involved would be farmers' acceptance of replanting and rehabilitation and dairying; farmers' acceptance of regular and continuous use of a higher level of inputs; development of the market for cocoa and coffee; and delays in implementation (including availability of qualified staff, funds, equipment, planting materials and dairy animals).

11.02 The MOA and the implementing agencies are well aware of the organizational and administrative requirements of the project and are confident that adequate coordination and cooperation can be achieved to overcome these potential constraints. This confidence is justified.

Environmental Effects

11.03 The project would not adversely affect the environment as it would only complete the on-farm portion of drainage projects and intensify water control. The lands now subject to periodic flooding would be made more productive for agriculture. On-farm drainage would also reduce the habitat for mosquitoes and other insect pests. The project would result in a more intensive use of fertilizers and chemicals, but the amount of run-off would not be significant.

12. RECOMMENDATIONS

12.01 At negotiations it was agreed that a condition of effectiveness of the proposed loan would be that a Project Implementation Secretariat with

adequate supporting staff would be established in the Department of Agriculture. It was also agreed that as a condition of effectiveness the borrower shall have authorized the following post and designated the appointments:

- (a) Project Coordinator;
- (b) Project Component Leader - Integrated Dairy Beef Component; and
- (c) Project Component Leader - Crop Component.

12.02 Satisfactory assurances having been received on all major points, the proposed project is recommended for a Bank loan of US\$19.5 million with a 17 year term and a grace period of 4 years. The Borrower would be the Federation of Malaysia.

Table 1

Basic Data

MALAYSIACOCONUT SMALLHOLDERS' DEVELOPMENT PROJECTCROP COMPONENTSTATISTICSCoconut Acreage and Production in Peninsular Malaysia

<u>Year</u>	<u>Acreage</u>			<u>Copra production (in tons)</u>		
	<u>Estate (1)</u>	<u>Small- holding (2)</u>	<u>Total</u>	<u>Estate (1)</u>	<u>Small- holding (2)</u>	<u>Total</u>
1971	53,488	470,290	523,678	23,307	137,190	160,497
1972	51,182	470,910	522,092	22,878	138,760	161,638
1973	46,481	491,210	537,691	20,836	146,210	167,046
1974	44,393	493,770	537,763	21,095	149,020	170,115
1975	42,844	533,196	576,040	19,830	162,160 (3)	181,990

1975 Coconut Acreage and Production by States

<u>State</u>	<u>Acreage</u>			<u>Copra production (in tons)</u>		
	<u>Estate (1)</u>	<u>Small- holding (2)</u>	<u>Total</u>	<u>Estate (1)</u>	<u>Small- holding (2)</u>	<u>Total</u>
Kedah/Perlis	230	31,760	31,990	103	7,550	7,653
Penang/P.W.	1,509	36,748	38,257	78	13,140	13,218
Perak	28,352	83,626	111,978	16,918	34,840	51,758
Selangor	9,485	106,207	115,692	2,706	44,260	46,966
N. Sembilan	-	7,440	7,440	-	2,230	2,230
Malacca	-	13,041	13,041	-	3,900	3,900
Johore	260	164,632	164,892	-	39,200	39,200
Pahang	-	17,013	17,013	-	4,050	4,050
Trengganu	3,008	28,234	31,242	25	5,040	5,065
Kelantan	-	44,495	44,495	-	7,950	7,950
<u>Total</u>	<u>42,844</u>	<u>533,196</u>	<u>576,040</u>	<u>19,830</u>	<u>162,160</u>	<u>181,990</u>
Average yield (ton copra/acre)	-	-	-	463	304	316

- Sources: (1) Department of Statistics, Malaysia.
 (2) Planning and Development Division, Ministry of Agriculture.
 (3) 1975 Production figures are provisional.

TABLE 2

Basic Data

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

Statistics - Smallholder Sector Acreage Distribution (1975)

State/district	Total acreage (1975)	State/district	Total acreage (1975)
1. <u>Perlis</u>	<u>3,420</u>	7. <u>Malacca</u>	
2. <u>Kedah</u>		Alor Gajah (*)	2,034
Kubang Pasu (*)	2,329	Malacca Tengah (*)	3,405
Kota Setar (*)	7,795	Jasin (*)	7,602
Langkawi (*)	6,390	<u>Total Malacca</u>	<u>13,041</u>
Yen (*)	1,946	8. <u>Johore</u>	
Kuala Muda (*)	4,236	Muar (*)	22,882
Baling	1,046	Batu Pahat (*)	88,621
Bandar Bahru	111	Pontian (*)	40,981
Kulim	1,810	Johor Bahru (*)	1,833
Padang Terap	470	Kota Tinggi (*)	4,300
Sik	2,270	Mersing (*)	4,819
<u>Total Kedah</u>	<u>28,340</u>	Kluang	220
3. <u>Penang/P.W.</u>		Segamat	976
Penang N.E. (*)	1,872	<u>Total Johore</u>	<u>164,632</u>
Penang S.W. (*)	4,699	9. <u>Pahang</u>	
P.W. North (*)	13,807	Pekan (*)	5,326
P.W. Central (*)	8,305	Kuantan (*)	4,851
P.W. South (*)	8,065	Bantong	592
<u>Total Penang/P.W.</u>	<u>36,748</u>	Jerantut	279
4. <u>Perak</u>		Lipis	1,319
Krian (*)	5,422	Raub	1,070
Larut/Matang (*)	6,783	Rompin	2,190
Dinding (*)	6,880	Temerloh	1,386
Hilir Perak (*)	59,866	<u>Total Pahang</u>	<u>17,013</u>
Batang Padang	303	10. <u>Trengganu</u>	
Kinta	1,190	Kemaman (*)	2,951
Perak Tengah	2,105	Dungun (*)	1,759
Selama	527	Marang (*)	1,497
Perak Ulu	550	K. Trengganu (*)	10,169
<u>Total Perak</u>	<u>83,626</u>	Bewt (*)	9,520
5. <u>Selangor</u>		Ulu Treng	2,338
Sabak Bernam (*)	49,868	<u>Total Trengganu</u>	<u>28,234</u>
Kuala Selangor (*)	22,155	11. <u>Kelantan</u>	
Kelang (*)	15,165	Pasar Putih (*)	10,776
Kuala Langat (*)	17,830	Bachok (*)	12,673
Gombak	139	Kota Bharu (*)	9,049
Ulu Langat	70	Tumpat (*)	6,429
Ulu Selangor	200	Pasar Mas (*)	2,754
Sepang	780	Machang	391
<u>Total Selangor</u>	<u>106,207</u>	Tanang Merah	730
6. <u>Negeri Sembilan</u>		Ulu Kelantan	1,693
P. Dickson (*)	959	<u>Total Kelantan</u>	<u>44,495</u>
Jelebu	962	<u>Total Peninsular Malaysia</u>	<u>533,196</u>
Kuala Bilah	2,744		
Rimbau	750		
Seremban	1,287		
Tempin	737		
<u>Total N. Sembilan</u>	<u>7,440</u>		

Note: (*) coastal districts.

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

CALCULATION OF ANNUAL INCOME LEVELS OF COCONUT SMALLHOLDERS WHO HAVE YET TO BENEFIT FROM PROJECT
(in 1977 M\$)

Total holdings (acres)	Area in coconuts (1) (acres)	Gross income from coconuts (2)	Farm expenses attributed to coconuts (3) (M\$)	Net additional farm income (4)	Income from off-farm employment (5)	Total net income (6) [(2)-(3)+(4)+(5)]	% of total income from coconut	% of total coconut smallholders
2.0	1.5	276	9	215	731	1,213	22	12
4.0	3.0	552	18	430	731	1,695	32	13
6.0	4.0	920	24	860	547	2,303	39	18
8.0	6.0	1,104	81	860	547	2,430	42	24
10.0	8.0	1,472	183	860	365	2,514	51	17
12.0	10.0	1,840	330	860	365	2,735	55	9
14.0	11.0	2,024	225	1,230	-	3,029	59	5
16.0	12.0	2,208	387	1,600	-	3,421	53	2

Assumptions:

1. Gross income from coconuts is equal to \$184/acre.
2. Farm expenses equal to \$6/acre for land taxes and drainage charges plus M\$45/acre to harvest coconuts for each acre of coconuts above 5 acres.
3. Net additional farm income equals M\$250 per farm for 1 acre of household garden (vegetables, poultry, rice, tapioca, fruit); plus M\$60/acre for coconut intercrops for the first 4 acres under coconut; plus \$370/acre for rubber for each acre not in coconuts or household gardens.
4. Income from off-farm employment is based on the fact that the average smaller smallholder can only find 112.5 man-days of off-farm employment at M\$6.5/man-days; between 5-8 acres, the smallholder works only 84 man-days off-farm; between 9-12 acres, off-farm employment is limited to 56 man-days and above 12 acres, no off-farm employment is sought.

Average income pre-project: M\$2,257.

Table 4

MALAYSIACOCONUT SMALLHOLDERS' DEVELOPMENT PROJECTCROP COMPONENTComparative Development Expenditure of CR/RS with DOA

(1) <u>First Malaysia Plan</u>							
	<u>Total DOA allocation (M\$'000)</u>		<u>CR/RS allocation (M\$'000)</u>		<u>% of CR/RS of DOA allocation</u>		<u>Acreage achieved</u>
1965-70	74,000		11,200		15.1		40,772
(2) <u>Second Malaysia Plan</u>							
	<u>Total DOA (M\$'000)</u>		<u>CR/RS (M\$'000)</u>		<u>% of CR/RS of DOA total</u>		<u>Acreage achieved</u>
	<u>Alloca- tion</u>	<u>Expen- diture</u>	<u>Alloca- tion</u>	<u>Expen- diture</u>	<u>Alloca- tion</u>	<u>Expen- diture</u>	
1971	7,650	6,543	3,135	1,711	40.9	26.1	5,219
1972	11,778	9,309	3,218	2,985	27.3	32.1	10,129
1973	13,580	11,153	3,132	2,649	23.1	23.7	12,948
1974	15,406	10,765	4,126	3,397	26.8	31.6	12,167
1975	12,476	12,363	3,723	3,745	29.8	30.3	14,833
<u>Total</u>	<u>60,890</u>	<u>50,133</u>	<u>17,334</u>	<u>14,487</u>	<u>28.5</u>	<u>28.9</u>	<u>55,296</u>
(3) <u>Third Malaysia Plan</u>							
	<u>Total DOA allocation (M\$'000)</u>		<u>CR/RS allocation (M\$'000)</u>		<u>% of CR/RS of DOA allocation</u>		<u>CSDS acreage achieved</u>
1976-80	268,516		62,303		23.2		70,860

MALAYSIA
COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT
CROP COMPONENT

Subsidized Rates Per Acre - Historical Justification

	<u>Preproject period under CR/RS</u>					<u>Preproject period under CSDS (end 1977)</u>						<u>Period under CSD Project</u>						<u>Proposed extension to</u>							
	Year 1	Year 2	Year 3	Year 4	Total Years 1-4	Year 1	Year 2	Year 3	Year 4	Year 5	Total Years 1-5	Year 1	Year 2	Year 3	Year 4	Year 5	Total Years 1-5	Year 6	Year 7	Year 8	Year 9	Total			
<u>Replanting</u>																									
Felling uneconomic palms; improvement of on-farm drains)						101.50/a	-	-	-	-	101.50/a														
Noxious weed eradication (including herbicides))	204.00/a	-	-	-	204.00/a	30.00/a	-	-	-	-	30.00/a	105.00/a	35.00/a	15.00/a	20.00/a	-	175.00/a	-	-	-	-	-	175.00/a		
<u>Planting materials</u>																									
Coconut P.B. palms	50.00	-	-	-	50.00	175.50	-	-	-	-	175.50	245.00	-	-	-	-	245.00	-	-	-	-	-	245.00		
Intercrops/cash crops garden	30.00	-	-	-	30.00	10.00	-	-	-	-	10.00	5.00	5.00	5.00	-	-	15.00	-	-	-	-	-	15.00		
<u>Fertilizers</u>																									
Coconut	16.00	63.00	48.00	22.00	149.00	33.00	30.00	30.00	30.00	30.00	153.00	-17.00	40.00	50.00	55.00	73.00	235.00	64.00	48.00	32.00	16.00	395.00			
Intercrops/cash crops garden	-	17.00	22.00	28.00	67.00	33.00	70.00	70.00	70.00	70.00	313.00	40.00	40.00	40.00	-	-	120.00	-	-	-	-	120.00			
Pesticides	-	-	-	-	-	37.00	20.00	20.00	20.00	20.00	117.00	33.00	30.00	30.00	10.00	7.00	110.00	-	-	-	-	110.00			
<u>Total</u>	<u>300.00</u>	<u>80.00</u>	<u>70.00</u>	<u>50.00</u>	<u>500.00</u>	<u>420.00</u>	<u>120.00</u>	<u>120.00</u>	<u>120.00</u>	<u>120.00</u>	<u>900.00</u>	<u>445.00</u>	<u>150.00</u>	<u>140.00</u>	<u>85.00</u>	<u>80.00</u>	<u>900.00</u>	<u>64.00</u>	<u>48.00</u>	<u>32.00</u>	<u>16.00</u>	<u>1,060.00</u>			
<u>M.T. Rehabilitation</u>																									
Felling uneconomic palms; improvement of on-farm drains)	94.00/a	-	-	94.00/a		90.00/a	-	-	-	90.00/a							70.00/a	20.00/a	20.00/a	110.00/a	-	-	110.00/a		
Noxious weed eradication)						30.00/a	-	-	-	30.00/a															
<u>Planting materials</u>																									
Coconut P.B. palms	50.00	-	-	50.00		11.00	-	-	-	11.00							15.00	-	-	15.00	-	-	15.00		
Intercrops	45.00	-	-	45.00		45.00	-	-	-	45.00							50.00	-	-	50.00	-	-	50.00		
<u>Fertilizers</u>																									
Coconut	36.00	36.00	36.00	108.00		58.00	40.00	40.00	138.00								45.00	45.00	45.00	135.00	36.00	27.00	18.00	9.00	225.00
Intercrops	20.00	14.00	14.00	48.00		94.00	57.00	60.00	211.00								45.00	55.00	75.00	175.00	56.00	42.00	28.00	14.00	315.00
Pesticides (including application)	-	-	-	-		32.00	23.00	20.00	75.00								45.00	35.00	35.00	115.00	-	-	-	-	-
<u>Total</u>	<u>200.00</u>	<u>50.00</u>	<u>50.00</u>	<u>300.00</u>		<u>360.00</u>	<u>120.00</u>	<u>120.00</u>	<u>600.00</u>								<u>270.00</u>	<u>155.00</u>	<u>175.00</u>	<u>600.00</u>	<u>92.00</u>	<u>69.00</u>	<u>46.00</u>	<u>23.00</u>	<u>830.00</u>

/a Subsidy in cash.

/b Proposed extensions: decreasing rates of subsidy applied to fertilizers.

MAWA Replanting: from year 6 to year 9 (total M\$160.00/acre)
Year 6: 80% of M\$80.00/acre, i.e. M\$64.00/acre.
Year 7: 60% of M\$80.00/acre, i.e. M\$48.00/acre.
Year 8: 40% of M\$80.00/acre, i.e. M\$32.00/acre.
Year 9: 20% of M\$80.00/acre, i.e. M\$16.00/acre.

MT Rehabilitation: from year 4 to year 7 (total M\$90.00/acre)
Year 4: 80% of M\$45.00/acre, i.e. M\$36.00/acre.
Year 5: 60% of M\$45.00/acre, i.e. M\$27.00/acre.
Year 6: 40% of M\$45.00/acre, i.e. M\$18.00/acre.
Year 7: 20% of M\$45.00/acre, i.e. M\$9.00/acre.

Coconut, Coffee, Fruit trees intercropping: from year 4 to year 7 (total M\$140.00/acre)
Year 4: 80% of M\$70.00/acre, i.e. M\$56.00/acre.
Year 5: 60% of M\$70.00/acre, i.e. M\$42.00/acre.
Year 6: 40% of M\$70.00/acre, i.e. M\$28.00/acre.

Table 6

MALAYSIA
COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT
CROP COMPONENT

Progress of Rehabilitation and Replanting Under CR/RS From 1963 to 1975

State	Cumulative target acreage (1)	<u>Replanting (M.T.)</u>		<u>Rehabilitation</u>		Total (2) + (4) (6)	Total (3) + (5) (7)
		No. of holdings (2)	Acreage (3)	No. of holdings (4)	Acreage (5)		
Penang/P. Well.	9,200	348	1,248	1,297	6,339	1,645	7,587
Perak	30,000	175	363	6,594	25,700	6,769	26,063
Selangor	18,300	2,166	5,292	4,245	12,320	6,411	17,612
Malacca	3,350	494	826	1,033	1,948	1,527	2,774
Johore	38,850	2,332	6,548	7,935	27,050	1,645	7,587
Trengganu	1,100	219	317	198	303	417	620
Kelantan	16,900	3,579	6,589	4,403	6,265	7,982	12,854
<u>Total</u>	<u>117,700</u>	<u>9,313</u>	<u>21,183</u>	<u>25,705</u>	<u>79,925</u>	<u>35,018</u>	<u>101,108</u>

Source: DOA 1977.

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

Acreege of Intercropping Since Inception of CR/RS (1963)

<u>Year</u>	<u>Maize</u>	<u>Pineapple</u>	<u>Mixed vegetables</u>	<u>Banana</u>	<u>Coffee</u>	<u>Cashew nut</u>	<u>Other fruits</u>	<u>Cocoa</u>	<u>Total</u>
1963	40	32	6	-	-	-	-	-	78
1964	218	180	15	-	-	-	-	-	413
1965	59	108	55	-	-	-	-	-	222
<u>Total</u>	<u>317</u>	<u>320</u>	<u>76</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>713</u>
1966	145	1,406	40	220	150	-	-	-	1,961
1967	-	1,060	-	31	365	-	-	-	1,456
1968	-	262	-	-	648	-	-	-	910
1969	-	-	-	42	1,191	-	-	35	1,268
1970	-	3	-	-	572	-	-	578	1,153
<u>Total</u>	<u>145</u>	<u>2,731</u>	<u>40</u>	<u>293</u>	<u>2,926</u>	<u>-</u>	<u>-</u>	<u>613</u>	<u>6,748</u>
1971	-	15	-	-	279	-	-	1,792	2,086
1972	-	-	-	-	352	267	-	3,155	3,774
1973	-	n.a.	-	-	746	-	-	4,086	4,832
1974	-	371	-	-	274	-	20	1,149	1,814
1975	-	-	-	-	169	20	10	1,102	1,301
<u>Total</u>	<u>-</u>	<u>386</u>	<u>-</u>	<u>-</u>	<u>1,820</u>	<u>287</u>	<u>30</u>	<u>11,284</u>	<u>13,807</u>

Source: DOA 1977.

Table 7

Table 8

MALAYSIA
COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

Phasing of Replanting and Rehabilitation Program
(In acres, including dairy development)

State	Preproject (under CR/RS)		Project year					Total project
	1963-76	1977	1	2	3	4	5	
(1) - <u>Replanting (MAWA hybrids)</u>								
Perlis	-	25	15	25	25	25	35	125
Kedah	-	50	35	75	75	75	215	475
P. Pinang/S.P. Wel.	1,348	100	100	200	200	250	450	1,200
Perak	589	200	175	350	350	350	725	1,950
Selangor	5,878	750	325	650	650	750	1,275	3,650
N. Sembilan	-	50	50	100	100	100	250	600
Malacca	990	100	100	200	200	250	450	1,200
Johore	6,845	400	300	600	600	700	1,200	3,400
Pahang	-	50	50	100	100	150	200	600
Trengganu	557	350	150	300	300	400	550	1,700
Kelantan	7,112	600	200	400	400	450	650	2,100
<u>Total acreage (1)</u>	<u>23,319 /a</u>	<u>2,661 /a</u>	<u>1,500</u>	<u>3,000</u>	<u>3,000</u>	<u>3,500</u>	<u>6,000</u>	<u>17,000</u>
No. of new holdings	-	-	2,184	2,504	2,504	3,227	6,238	16,657
Total no. of holdings	10,522	(n.a.)	2,184	4,368	4,368	5,091	9,431	-
Average acreage per holding	2.22	(n.a.)	0.69	0.69	0.69	0.69	0.65	1.02
(2) - <u>M.T. Rehabilitation with intercropping (with cocoa, coffee, fruit trees and other intercrops)</u>								
Perlis	-	25	25	25	25	50	50	175
Kedah	-	100	50	125	200	300	350	1,025
P. Pinang/S.P. Wel.	6,680	600	100	200	200	210	470	1,180
Perak	28,450	2,300	950	1,850	1,850	2,020	3,585	10,295
Selangor	15,178	2,500	975	2,000	2,000	2,220	3,625	10,820
N. Sembilan	-	100	50	250	250	400	400	1,350
Malacca	1,976	200	150	350	380	400	560	1,460
Johore	28,973	2,000	700	1,300	1,300	1,560	3,760	8,620
Pahang	-	100	70	200	225	305	500	1,275
Trengganu	527	300	200	350	350	400	450	1,750
Kelantan	6,611	600	300	495	390	475	550	2,210
<u>Total acreage (2)</u>	<u>88,395</u>	<u>8,825</u>	<u>3,570</u>	<u>7,145</u>	<u>7,145</u>	<u>8,340</u>	<u>14,300</u>	<u>40,500</u>
No. of new holdings	-	-	2,375	2,695	2,695	3,482	6,749	17,996
Total no. of holdings	29,887	(n.a.)	2,375	4,559	4,559	5,282	19,686	-
Average acreage per holding	2.95	(n.a.)	1.50	1.57	1.57	1.57	1.50	2.25
(3) - <u>Rehabilitation (M.T.) with pasture development</u>								
Dairy acreage	-	-	-	150	550	1,200	1,600	3,500
Beef acreage (Kelantan)	-	-	-	30	60	60	60	210
<u>Total acreage (3)</u>	-	-	-	<u>180</u>	<u>610</u>	<u>1,260</u>	<u>1,660</u>	<u>3,710</u>
No. of new holdings	-	-	-	95	240	440	440	1,215
Total no. of holdings	-	-	-	95	315	640	840	-
Average acreage per holding	-	-	-	1.90	1.94	1.98	1.98	3.05

PROJECT SUMMARY

	<u>Acreage</u>	<u>No. of holdings</u>	<u>Average acreage rehabi- litated per holding</u>
(1) <u>MAWA Replanting</u>	17,000	16,657	1.02
(2) <u>M.T. Rehabilitating with Intercropping</u>	40,500	17,996 /b	2.25
- Cocoa: 22,000 acres			
- Coffee: 8,350 acres			
- Fruit trees & other: 8,545 acres			
- Unallocated: 1,605 acres			
(3) <u>M.T. Rehabilitation with Pasture</u>	3,710	1,215	3.05
<u>Total</u>	<u>61,210</u>	<u>19,211</u>	<u>3.19</u>

/a Replanted with Malaysian Tallis until October 1977.

/b Including 16,657 holdings with MAWA replanting.

Table 9

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

Physical Phasing Project Activities

	Year 1	Year 2	Year 3	Year 4	Year 5	Total Yrs 1-5
A. CROP COMPONENT (Annex 1)						
1. On-farm Developments (ac)						
11 Replanting with MAWA	1,500	3,000	3,000	3,500	6,000	17,000
12 Associated cash crops garden	2,628	3,000	3,000	3,876	4,496	17,000
13 M.T. Rehab./Intercropping						
- cocoa	2,285	3,910	4,260	4,710	6,835	22,000
- coffee	400	1,500	1,700	1,800	2,950	8,350
- fruit trees, cashew & others	315	1,365	1,170	1,730	3,965	8,545
- unallocated	570	370	15	100	550	1,605
Subtotal 13	<u>3,570</u>	<u>7,145</u>	<u>7,145</u>	<u>8,340</u>	<u>14,300</u>	<u>40,500</u>
2. Off-farm Developments						
21 Additional regional infrastructure (no.)						
211-Regional offices	1	1	-	-	-	2
212-Main offices	2	2	1	-	-	5
213-Suboffices w/nursery	1	1	-	-	-	2
Subtotal 21	<u>4</u>	<u>4</u>	<u>1</u>	-	-	<u>9</u>
22 CPC Seed Gardens (ac)						
221-Lekir seed garden	-	50	50	-	-	100
222-Mukim Jorak seed garden	-	50	-	-	-	50
Subtotal 22	-	<u>100</u>	<u>50</u>	-	-	<u>150</u>
B. INTEGRATED DAIRY/BEEF COMPONENT (Annex 3)						
1. On-farm developments						
11 MT Rehab. w/cultiv. pasture & dairy development						
111-Pasture acreage	-	150	550	1,200	1,600	3,500
112-No. of pregnant heifers sup.	-	150	400	800	800	2,150
12 MT Rehab. w/dairy development						
121-Pasture acreage	-	-	-	-	-	-
122-No. of pregnant heifers sup.	-	300	1,810	1,120	1,020	4,250
13 MT Rehab. w/beef development						
131-Pasture acreage	-	30	60	60	60	210
132-No. of animals supplied	-	40	80	80	80	280
2. Off-farm Developments (no.)						
21 Import of cross-bred heifers	2,460	2,120	2,020	-	-	6,600
22 Supply of animals to the particip.	-	450/a	2,250	2,000	1,900	6,600
23 Expansion of Johore CRCs (acre pasture)						
24 Add'tl milk collection ctrs (MCCs) (construction)	1,500	1,500	-	-	-	3,000
	1	2	3	3	-	9
C. TRAINING AND TECHNICAL ASSISTANCE COMPONENT						
1. Training (add'tl staff)	-	1	1	2	2	6 /b
2. Technical Assistance (man-months)	-	15	15	15	3	48
3. Fellowships (man-years)	-	8	9	6	-	23

/a 2,250 animal units purchased prior to the project.

/b Seven processing extension agents in Year 6.

BASIC DATA

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

Yield Assumptions

Year	Coconut Replanting						Coconut Rehabilitated			Cocoa intercropping			Coffee intercropping			Cashew nut intercropping		
	M.T. (10% of rehab. area)			MAWA replanting			Average 45 palms/acre			Average 300 stands/acre			Average 300 stands/acre			Average 70 stands/acre		
	Nuts/ acre	Picul copra/ acre	Kg copra/ha	Nuts/ acre	Picul copra/ acre	Kg copra/ha	Nuts/ acre	Picul copra/ acre	Kg copra/ha	Lbs wet beans/ acre	Lbs dry beans/ acre	Kg dry beans/ha	Picul berries/ acre	Lbs dry beans acre	Kg coffee/ ha	Piculs raw kernels/ acre	Lbs raw kernels/ acre	kg/ha
1 (planting)	-	-	-	-	-	-	1,150	4.5	670	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	1,150	4.5	670	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	1,265	5.0	745	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	1,380 (+10%)	5.4	810	235	94	105	6.75	90	100	-	-	-
5	-	-	-	300	1.0	145	1,495 (+20%)	5.9	875	580	232	260	13.5	180	200	-	-	-
6	75	0.3	45	1,800	6.0	895	1,495 (+30%)	5.9	875	830	332	370	20.3	270	305	2.7	360	405
7	585	2.3	345	3,000	10.0	1,495	1,495	5.9	875	1,100	440	495	27.0	360	405	3.5	465	525
8	1,150	4.5	670	4,200	14.0	2,090	1,495	5.9	875	1,250	500	560	30.4	405	455	4.6	615	685
9	1,838	7.2	1,075	5,400	18.0	2,690	1,495	5.9	875	1,375	580	650	34.0	455	505	6.0	800	895
10	2,170	8.5	1,270	6,000	20.0	2,990	1,495	5.9	875	1,450	580	650	34.0 onward	455 onward	505 onward	7.7 onward	1,025 onward	1,150 onward
11	2,320	9.1	1,360	6,525	21.75	3,250	1,495	5.9	875	1,450	580	650						
12	2,320	9.1	1,360	6,525	21.75	3,250	1,495	5.9	875	1,450	580	650						
13 onw.	2,320	9.1	1,360	6,525	21.75	3,250	1,495	5.9	875	1,450	580	650						

Note: - 1 picul = 133.3 lb = 60.45 kg
- 1 picul of copra = 300 MAWA nuts
= 255 M.T. nuts
- Ratio weight of dry cocoa to weight of wet beans = .40.
- Ratio weight of dry beans to weight of coffee berries = .10.

Table 11

MALAYSIA
COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

Farm Model Summary

	Farm Models						
	1	2	3	4	5	6	7 /a
1. Physical Features							
11 - Holding size (ac)	2.0	4.0	8.0	8.0	4.0	6.0	2.0
12 - Coconut acreage	1.5	3.0	6.0	6.0	3.0	4.0	1.5
13 - Assumed number of participants	3,600	5,215	5,715	1,340	2,125	1,075	140
14 - MAWA replanting acreage	0.5	1.0	2.0	-	1.0	-	-
- Yearly phased replanted acreage	0.5	0.5	1.0	-	0.5	-	-
15 - Associated cash-crops garden equivalent yearly acreage	0.25	0.5	1.0	-	0.5	-	-
16 - M.T. rehabilitated acreage	1.0	2.0	4.0	6.0	2.0	4.0	1.5
- Yearly phased rehabilitated acreage	1.0	1.0	2.0	3.0	1.0	2.0	1.5
17 - M.T. permanently intercropped acreage	1.0	2.0	4.0	6.0	2.0	-	-
- Yearly phased intercropped acreage	1.0	1.0	2.0	3.0	1.0	-	-
18 - M.T. divers/pasture acreage	-	-	-	-	-	4.0	1.5
- Yearly phased pasture acreage	-	-	-	-	-	2.0	1.5
19 - Number of dairy heifers supplied	-	-	-	-	2	2	-
- Number of 12-14 m feeders supplied	-	-	-	-	-	-	2
2. Development Grants (M\$/holding)							
21 - Main grants received for:							
- MAWA replanting	337.50	675.00	1,350.00	-	675.00	-	-
- Ass. seed-garden	112.50	225.00	450.00	-	225.00	-	-
- M.T. rehabilitation	300.00	600.00	1,200.00	1,800.00	600.00	1,200.00	450.00
- M.T. permanent intercropping	300.00	600.00	1,200.00	1,800.00	600.00	-	-
- Cultivated pasture under M.T.	-	-	-	-	-	540.00	420.00
- Dairy/beef development	-	-	-	-	560.00	560.00	410.00
- Animal grant	-	-	-	-	1,400.00	1,400.00	600.00
Subtotal 21	<u>1,050.00</u>	<u>2,100.00</u>	<u>4,200.00</u>	<u>3,600.00</u>	<u>4,060.00</u>	<u>3,800.00</u>	<u>1,880.00</u>
22 - Additional grants received for:							
- MAWA replanting	80.00	160.00	320.00	-	160.00	-	-
- M.T. rehabilitation	90.00	180.00	360.00	540.00	180.00	360.00	135.00
- M.T. permanent intercropping	140.00	280.00	560.00	840.00	280.00	-	-
- Cultivated pasture under M.T.	-	-	-	-	-	280.00	75.00
Subtotal 22	<u>310.00</u>	<u>620.00</u>	<u>1,240.00</u>	<u>1,380.00</u>	<u>620.00</u>	<u>645.00</u>	<u>210.00</u>
Total 2	<u><u>1,360.00</u></u>	<u><u>2,720.00</u></u>	<u><u>5,440.00</u></u>	<u><u>4,980.00</u></u>	<u><u>4,680.00</u></u>	<u><u>4,440.00</u></u>	<u><u>2,090.00</u></u>
3. Benefits at Full Development (M\$/holding/year)							
31 - Production Value (sales + home consumption)							
- Coconut	798.00	1,596.00	3,192.00	1,656.00	1,596.00	1,104.00	399.00
- Cocoa	913.00	1,827.00	3,654.00	5,481.00	1,827.00	-	-
- Coffee	721.00	1,443.00	2,886.00	4,329.00	1,443.00	-	-
- Milk	-	-	-	-	1,955.00	1,955.00	-
- Livestock	-	-	-	-	971.00	971.00	915.00
Subtotal 31 - w/o intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>4,030.00</u>	<u>1,303.00</u>
- with cocoa	<u>1,711.00</u>	<u>3,423.00</u>	<u>6,846.00</u>	<u>7,137.00</u>	<u>6,349.00</u>	<u>-</u>	<u>-</u>
- with coffee	<u>1,519.00</u>	<u>3,039.00</u>	<u>6,078.00</u>	<u>5,985.00</u>	<u>5,965.00</u>	<u>-</u>	<u>-</u>
32 - Production Costs (M\$)							
- Family labor	435.00	873.00	1,726.00	1,849.00	1,780.00	1,130.00	123.00
- Fertilizers	155.00	310.00	620.00	690.00	310.00	320.00	105.00
- Chemicals	35.00	70.00	140.00	180.00	70.00	80.00	-
- Concentrate feeds	-	-	-	-	630.00	522.00	-
- Animal health	-	-	-	-	42.00	42.00	10.00
- Animal purchase	-	-	-	-	-	-	400.00
- Others	35.00	71.00	142.00	153.00	167.00	171.00	23.00
Subtotal 32	<u>600.00</u>	<u>1,324.00</u>	<u>2,628.00</u>	<u>2,872.00</u>	<u>2,999.00</u>	<u>2,265.00</u>	<u>661.00</u>
33 - Yearly Benefits (M\$/holding)							
- Without permanent intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1,765.00</u>	<u>642.00</u>
- With cocoa	<u>1,051.00</u>	<u>2,099.00</u>	<u>4,218.00</u>	<u>4,265.00</u>	<u>3,350.00</u>	<u>-</u>	<u>-</u>
- With coffee	<u>859.00</u>	<u>1,715.00</u>	<u>3,450.00</u>	<u>3,113.00</u>	<u>2,966.00</u>	<u>-</u>	<u>-</u>
34 - Preproject Benefits (M\$)							
	<u>202.00</u>	<u>401.00</u>	<u>798.00</u>	<u>802.00</u>	<u>401.00</u>	<u>506.00</u>	<u>188.00</u>
35 - Incremental Annual Benefits to the Farmer (M\$)							
- Without permanent intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1,259.00</u>	<u>454.00 /a</u>
- With cocoa	<u>849.00</u>	<u>1,698.00</u>	<u>3,420.00</u>	<u>3,463.00</u>	<u>2,959.00</u>	<u>-</u>	<u>-</u>
- With coffee	<u>657.00</u>	<u>1,314.00</u>	<u>2,652.00</u>	<u>2,311.00</u>	<u>2,565.00</u>	<u>-</u>	<u>-</u>
36 - Ratio - Total Grant/Incre. Annual Benefit							
- Without permanent intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>3.5</u>	<u>4.6</u>
- With cocoa	<u>1.6</u>	<u>1.6</u>	<u>1.6</u>	<u>1.4</u>	<u>1.6</u>	<u>-</u>	<u>-</u>
- With coffee	<u>2.1</u>	<u>2.1</u>	<u>2.1</u>	<u>2.2</u>	<u>1.8</u>	<u>-</u>	<u>-</u>
4. Financial Rate of Return (over 25 years)							
41 - To the Farmer							
- Without permanent intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>24.35%</u>	<u>over 100.00%</u>
- With cocoa	<u>36.35%</u>	<u>37.55%</u>	<u>37.75%</u>	<u>28.85%</u>	<u>31.45%</u>	<u>-</u>	<u>-</u>
- With coffee	<u>31.15%</u>	<u>32.05%</u>	<u>32.25%</u>	<u>22.45%</u>	<u>29.35%</u>	<u>-</u>	<u>-</u>
42 - To the Project							
- Without permanent intercropping	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>18.00%</u>	<u>21.75%</u>
- With cocoa	<u>20.25%</u>	<u>20.35%</u>	<u>20.45%</u>	<u>18.85%</u>	<u>20.15%</u>	<u>-</u>	<u>-</u>
- With coffee	<u>16.75%</u>	<u>16.75%</u>	<u>16.75%</u>	<u>13.75%</u>	<u>18.45%</u>	<u>-</u>	<u>-</u>

/a Incremental financial benefits to the farmer amounting to M\$280.00 in Year 2.

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

CROP COMPONENT

Farm Incomes Preproject and Full Development

	Model 1		Model 2		Model 3		Model 4		Model 5	Model 6	Model 7
	Cocoa	Coffee	Cocoa	Coffee	Cocoa	Coffee	Cocoa	Coffee			
Size of coconut area (ac)	1.5	1.5	3.0	3.0	6.0	6.0	6.0	6.0	3.0	4.0	1.5
<u>Total size of holding (ac)</u>	<u>2.0</u>	<u>2.0</u>	<u>4.0</u>	<u>4.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>4.0</u>	<u>6.0</u>	<u>2.0</u>
Pre-project net income from coconut area (M\$) /a	357	357	714	714	1,263	1,263	1,263	1,263	714	952	207
Other pre-project net income (M\$)	856	856	981	981	1,167	1,167	1,167	1,167	981	1,167	575
<u>Total pre-project net income (M\$)</u>	<u>1,213</u>	<u>1,213</u>	<u>1,695</u>	<u>1,695</u>	<u>2,430</u>	<u>2,430</u>	<u>2,430</u>	<u>2,430</u>	<u>1,695</u>	<u>2,119</u>	<u>782</u>
Post-project net income from coconut area excluding livestock (M\$)	1,317	1,197	2,635	1,396	5,266	4,788	4,511	3,793	2,635	1,025	349
Post-project net income from livestock (M\$)	-	-	-	-	-	-	-	-	2,158	2,077	490
Other post-project net income (M\$)	856	856	981	981	620	620	620	620	250	985	485
<u>Total post-project net income (M\$)</u>	<u>2,173</u>	<u>2,053</u>	<u>3,616</u>	<u>3,377</u>	<u>5,886</u>	<u>5,408</u>	<u>5,131</u>	<u>4,413</u>	<u>5,043</u>	<u>4,087</u>	<u>1,324</u>
Net increase in income (M\$)	960	840	1,921	1,682	3,456	2,978	2,701	1,983	3,348	1,968	542
Increase in income (%)	79	69	113	99	142	123	111	82	198	93	69

/a Using 1980 prices in constant 1977 M\$.

/b Using post-1985 prices in constant 1977 M\$.

Average pre-project income of beneficiaries: M\$1,892.

Average post-project income of beneficiaries: M\$4,164.

Table 13

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

Total Staffing Distribution

	Present project situation (CSDS - 1977)	Year 1	Year 2	Year 3	Year 4	Year 5	Total 5-year	Total general
A. CROP COMPONENT								
1. <u>HQ and Regional Infrastructure</u>								
- Managerial and profess. group	2	3	-	4	-	-	7	9
- Executive and subprofess. group	8	6	4	-	-	-	10	18
- Clerical and technical group	109	16	10	9	6	6	47	156
- Industrial and manual	62	10	27	5	8	5	55	117
Subtotal 1	<u>181</u>	<u>35</u>	<u>41</u>	<u>18</u>	<u>14</u>	<u>11</u>	<u>119</u>	<u>300</u>
2. <u>CPCs - Seed Gardens</u>								
- Managerial and profess. group	-	-	2	-	-	-	2	2
- Executive and subprofess. group	-	1	-	-	-	-	1	1
- Clerical and technical group	-	2	9	1	-	-	12	12
- Industrial and manual	-	-	8	1	-	-	9	9
Subtotal 2	-	<u>3</u>	<u>19</u>	<u>2</u>	-	-	<u>24</u>	<u>24</u>
<u>Total AP</u>	<u>181</u>	<u>38</u>	<u>60</u>	<u>20</u>	<u>14</u>	<u>11</u>	<u>143</u>	<u>324</u>
B. DAIRY COMPONENT								
1. <u>Cattle Holding/Raising Center (CRC)</u>								
- Managerial and profess. group	n.a.	4	-	-	-	-	4	4
- Executive and subprofess. group	n.a.	-	-	-	-	-	-	-
- Clerical and technical group	n.a.	26	6	-	-	-	32	32
- Industrial and manual	n.a.	13	10	-	-	-	23	23
Subtotal 1	<u>15</u>	<u>43</u>	<u>16</u>	-	-	-	<u>59</u>	<u>59</u>
2. <u>Additional MCCs</u>								
- Managerial and profess. group	-	-	1	3	3	3	10	10
- Executive and subprofess. group	-	-	1	2	3	3	9	9
- Clerical and technical group	-	-	5	12	19	21	57	57
- Industrial and manual	-	-	2	3	10	9	24	24
- General supporting staff	-	2	3	2	2	-	9	9
Subtotal 2	-	<u>2</u>	<u>12</u>	<u>22</u>	<u>37</u>	<u>36</u>	<u>109 /d</u>	<u>109 /d</u>
<u>Total B</u>	-	<u>45</u>	<u>28</u>	<u>22</u>	<u>37</u>	<u>36</u>	<u>168</u>	<u>168</u>
<u>Total A + B</u>	<u>196</u>	<u>83</u>	<u>88</u>	<u>42</u>	<u>51</u>	<u>47</u>	<u>311</u>	<u>311</u>
C. TRAINING AND TECHNICAL ASSISTANCE COMPONENT								
1. <u>Processing Extension Services</u>								
-	-	-	1	1	2	2	6 /b	6 /b
2. <u>Technical Assistance (man-months)</u>								
- CPCs - seed gardens	-	-	3	3	3	3	12 /c	12 /c
- FAMA's CCPCs	-	-	12	12	12	-	36	36
Subtotal 2	-	-	<u>15</u>	<u>15</u>	<u>15</u>	<u>3</u>	<u>48</u>	<u>48</u>
3. <u>Fellowships (man-years)</u>								
- Crop component staff	-	-	4	4	2	-	10	10
- Dairy component staff	-	-	2	3	4	-	9	9
- FAMA's CCPCs	-	-	2	2	-	-	4	4
Subtotal 3	-	-	<u>8</u>	<u>9</u>	<u>6</u>	-	<u>23</u>	<u>23</u>

/a Additional 9 staff and laborers in Year 6, bringing the total up to 118.

/b One additional extension agent in Year 6, bringing the total up to 7.

/c Additional 2 man-months in Years 6 and 7.

MALAYSIA
COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

Project Cash Flow (1977 M\$'000)

	<u>Year 1</u>		<u>Year 2</u>		<u>Year 3</u>		<u>Year 4</u>		<u>Year 5</u>		<u>Total</u>	
	<u>Total</u>	<u>F.E.</u>	<u>Total</u>	<u>F.E.</u>								
<u>Crop Component</u>												
Civil works	835.6	334.2	1,199.6	479.9	259.1	103.6	-	-	-	-	2,294.3	917.7
Vehicles	92.0	92.0	106.0	106.0	92.0	92.0	92.0	92.0	92.0	92.0	474.0	474.0
Equipment (includes office furniture)	116.2	103.2	212.2	192.2	87.0	83.0	79.4	79.4	76.0	76.0	570.8	533.8
On-farm grants	1,633.0	432.1	4,044.0	1,317.4	5,658.1	2,284.3	7,493.1	3,240.3	11,888.3	4,667.2	30,716.5	11,941.3
Other operating costs	155.7	38.9	330.1	118.8	403.7	149.4	405.1	149.9	428.6	158.6	1,723.2	615.6
Staff /a	433.3	-	1,150.8	-	1,746.7	-	1,954.7	-	2,158.5	-	7,444.0	-
<u>Total crop component</u>	<u>3,265.8</u>	<u>1,000.4</u>	<u>7,042.7</u>	<u>2,214.3</u>	<u>8,246.6</u>	<u>2,712.3</u>	<u>10,024.3</u>	<u>3,561.6</u>	<u>14,643.4</u>	<u>4,993.8</u>	<u>43,222.8</u>	<u>14,482.4</u>
<u>Livestock Component</u>												
Civil works	2,296.0	918.4	2,175.0	870.0	1,266.0	506.4	1,140.0	456.0	-	-	6,877.0	2,750.8
Vehicles	294.0	294.0	174.0	174.0	119.2	119.2	145.4	145.4	153.6	153.6	886.2	886.2
Equipment	321.0	321.0	390.3	390.3	390.3	412.6	412.6	420.9	24.9	24.9	1,569.7	1,569.7
Animal procurement	2,640.0	2,460.0	2,130.0	2,020.0	2,020.0	2,020.0	-	-	-	-	6,610.0	6,610.0
On-farm grants /b	-	-	170.0	11.9	762.0	53.3	925.0	157.2	1,142.0	274.0	2,999.0	496.4
Other operating costs	707.0	495.0	1,145.9	802.1	1,402.7	981.9	1,533.4	1,073.4	1,650.8	1,155.6	6,439.8	4,508.0
Staff /a	-	-	181.6	-	376.1	-	504.5	-	642.2	-	1,704.4	-
Working capital	-	-	50.0	-	130.0	-	230.0	-	280.0	-	690.0	-
<u>Total livestock component</u>	<u>6,078.0</u>	<u>4,488.4</u>	<u>6,416.8</u>	<u>4,378.3</u>	<u>6,488.6</u>	<u>4,093.4</u>	<u>4,899.2</u>	<u>2,252.9</u>	<u>3,893.5</u>	<u>1,608.1</u>	<u>27,776.1</u>	<u>16,821.1</u>
<u>Training/T.A. Component</u>												
<u>Extension Services/Processing</u>												
Vehicles	-	-	22.0	22.0	22.0	22.0	44.0	44.0	44.0	44.0	132.0	132.0
Operating costs	-	-	6.0	3.0	12.0	6.0	24.0	12.0	36.0	18.0	78.0	39.0
Staff /a	-	-	3.5	-	7.0	-	14.0	-	21.0	-	45.5	-
<u>Fellowships</u>	-	-	280.0	224.0	210.0	168.0	70.0	56.0	-	-	560.0	448.0
<u>Technical Assistance</u>												
Vehicles	-	-	12.0	12.0	-	-	-	-	-	-	12.0	12.0
Operating costs	-	-	194.4	168.5	194.4	168.5	194.4	168.5	21.6	-	604.8	505.5
<u>Total Training/T.A. Component</u>	<u>-</u>	<u>-</u>	<u>517.9</u>	<u>429.5</u>	<u>445.4</u>	<u>364.5</u>	<u>345.4</u>	<u>280.5</u>	<u>122.6</u>	<u>62.0</u>	<u>1,432.3</u>	<u>1,136.5</u>
<u>Total Base Costs</u>	<u>9,343.8</u>	<u>5,488.8</u>	<u>13,977.4</u>	<u>7,022.1</u>	<u>15,180.6</u>	<u>7,170.2</u>	<u>15,269.9</u>	<u>6,095.0</u>	<u>18,659.5</u>	<u>6,663.9</u>	<u>72,431.2</u>	<u>32,440.0</u>
<u>Contingencies</u>												
Physical	552.0	268.8	597.9	292.2	305.0	164.0	248.0	175.9	39.1	39.1	1,742.3	940.0
Price	957.9	548.6	2,962.7	1,461.8	4,034.0	2,223.0	6,502.7	2,575.2	10,166.4	3,608.4	24,623.7	10,417.0
<u>Total Contingencies</u>	<u>1,509.9</u>	<u>817.4</u>	<u>3,560.6</u>	<u>1,754.0</u>	<u>4,339.0</u>	<u>2,387.0</u>	<u>6,750.7</u>	<u>2,751.1</u>	<u>10,205.5</u>	<u>3,647.5</u>	<u>26,366.0</u>	<u>11,357.0</u>
<u>Total Project Costs /c</u>	<u>10,853.7</u>	<u>6,306.2</u>	<u>17,538.0</u>	<u>8,776.5</u>	<u>19,519.6</u>	<u>9,557.2</u>	<u>22,020.9</u>	<u>8,846.1</u>	<u>28,865.0</u>	<u>10,311.4</u>	<u>98,797.2</u>	<u>43,797.0</u>

/a Excludes staff merit increases.

/b Includes coconut rehabilitation grants when coconut rehabilitation is associated with pasture development.

/c When these estimates of total project cost are increased by 7% of an average inflation multiplier, they are equivalent to the Project Cost Table in the main text (1978 Constant US\$).

Table 15

MALAYSIACOCONUT SMALLHOLDERS' DEVELOPMENT PROJECTCROP COMPONENTEstimated Quarterly Disbursement Schedule

<u>IBRD fiscal year and quarter</u>	<u>Accumulated disbursements US\$ x 1,000 equivalents (1978)</u>
<u>1978/79</u>	
1st, September 30, 1978	-
2nd, December 31, 1978	-
3rd, March 31, 1979	100
4th, June 30, 1979	300
<u>1979/80</u>	
1st, September 30, 1979	600
2nd, December 31, 1979	1,000
3rd, March 31, 1980	1,800
4th, June 30, 1980	2,700
<u>1980/81</u>	
1st, September 30, 1980	3,700
2nd, December 31, 1980	4,800
3rd, March 31, 1981	6,000
4th, June 30, 1981	7,400
<u>1981/82</u>	
1st, September 30, 1981	9,000
2nd, December 31, 1981	10,500
3rd, March 31, 1982	12,000
4th, June 30, 1982	13,200
<u>1982/83</u>	
1st, September 30, 1982	14,000
2nd, December 31, 1982	15,000
3rd, March 31, 1983	16,000
4th, June 30, 1983	17,000
<u>1983/84</u>	
1st, September 30, 1983	18,000
2nd, December 31, 1983	19,000
3rd, March 31, 1984	19,500

MALAYSIA

COCONUT SMALLHOLDERS' DEVELOPMENT PROJECT

Major Agricultural Production, Exports and Imports (1975)

Malaysia - Agricultural Production, 1975 /a

Crops	Acres	Production
Rubber	4,300,000	1,500,000 tons
Oil palm	1,300,000	1,250,000 tons
Padi	1,500,000	2,000,000 tons
Coconut	800,000	223,000 tons copra and oil
Cocoa	79,000 /b	17,600 tons /c
Coffee	20,000	6,000 tons
Tobacco	30,500	9,000 tons
Fruit	142,000	735,000 tons /d
Tapioca	32,000	100,000 tons
Oxen	400,000 animal units /e	9,000 tons (fresh milk marketed)

Major Agricultural Exports, 1975

Product	Volume (tons)	Value (M\$ million)
Rubber	1,417,000	2,016.0
Palm oil	1,026,000	1,268.0
Palm kernel oil	104,000	107.0
Pepper	32,000	109.0
Pineapple	45,000	52.0
Copra and nuts	1,200	1.5
Coconut oil	34,000	40.0
Cocoa beans & powder	14,000	20.0
Coffee	1,800	4.0

Major Agricultural Imports, 1975

Product	Volume (tons)	Value (M\$ million)
Copra nuts and copra cake /f	7,600	0.9
Coconut oil /f	670	1.0
Cocoa & cocoa products	2,400	3.75
Coffee	2,650	4.5
Dairy products /g	53,000	118.0
Maize	201,500	37.0 /h
Rice bran	62,000	6.2 /h
Soybeans	21,000	5.8 /h
Other feedstuff	100,000	13.5 /h

/a 1974 and 1975 statistics. Source: TMP, Statistical Digest, Malaysia Coconut Statistics, et al.

/b Two thirds intercropped with coconut.

/c Low yield is the result of an increase in planted acreage of 19,000 in 1970 to 79,000 in 1975; thus production can be expected to increase dramatically with maturity.

/d Over 50% bananas.

/e 320,000 Kedah/Kelantan cattle, 70,000 local Indian dairy animals (LID), and 10,000 crossbred dairy animals.

/f Malaysia: Coconut Statistics submitted to Asian Coconut Community, November 1972.

/g Consists primarily of powdered, condensed and evaporated milk, and would be equivalent to several times this volume in fresh milk.

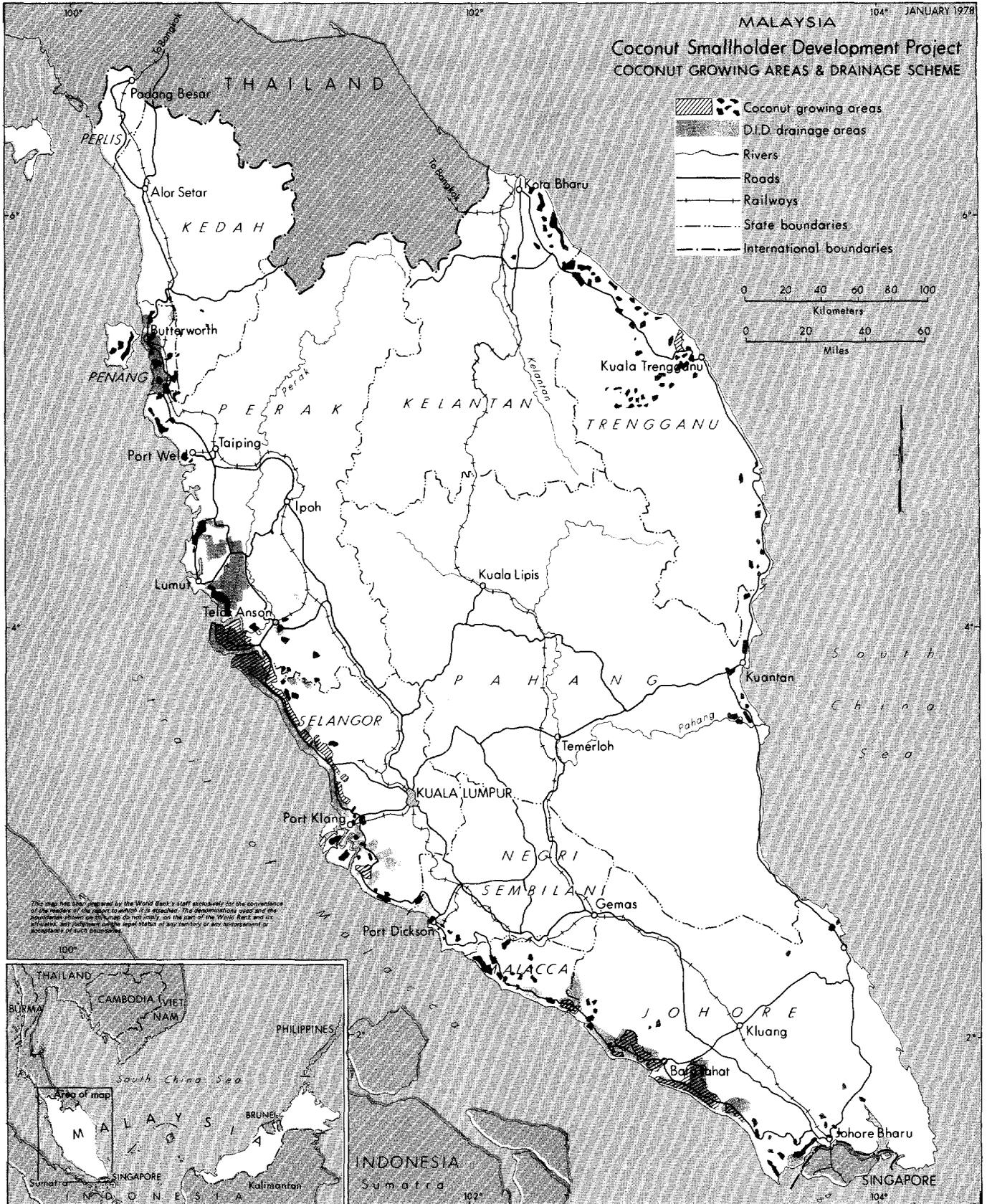
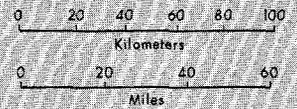
/h Estimated value.

Source: TMP, Statistical Digest, et al.

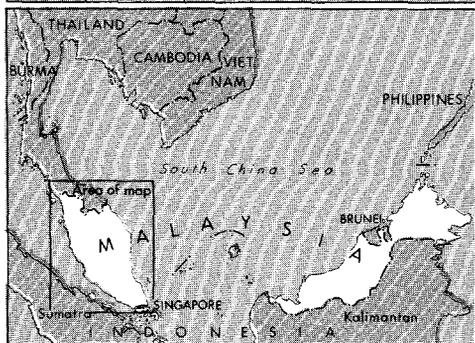
MALAYSIA

Coconut Smallholder Development Project
COCONUT GROWING AREAS & DRAINAGE SCHEME

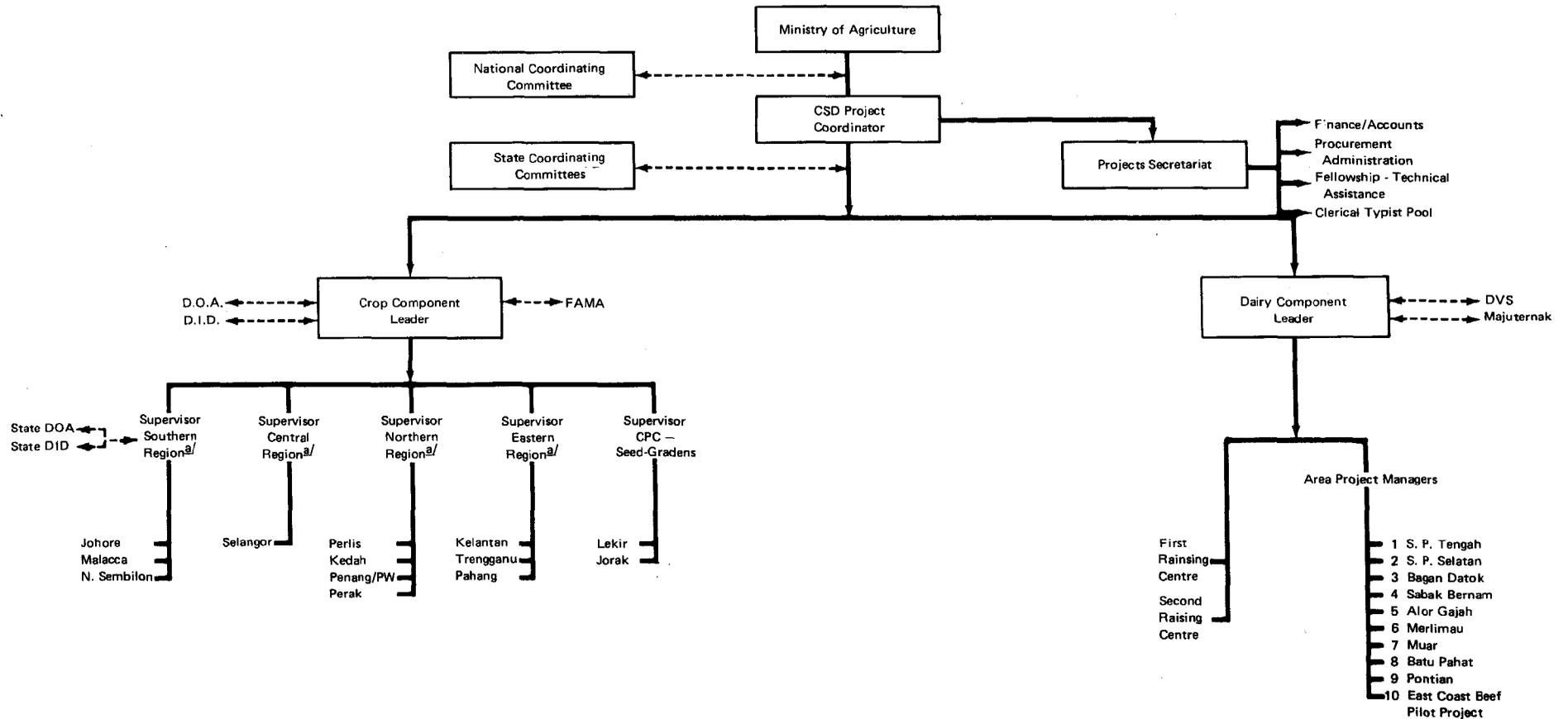
-  Coconut growing areas
-  D.I.D. drainage areas
-  Rivers
-  Roads
-  Railways
-  State boundaries
-  International boundaries



This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The descriptions used and the identification shown on this map do not imply on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any representation or acknowledgment of such boundaries.



**MALAYSIA
COCONUT SMALLHOLDER DEVELOPMENT PROJECT
ORGANIZATIONAL STRUCTURE OF CSDP**



Note: @/ Include CSDP nurseries
 ———> Functional /Responsibility Line
 - - - -> Coordination Line