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**Report No. 9479**

**PROJECT COMPLETION REPORT**

**MALAYSIA**

**TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)**

**APRIL 5, 1991**

Agriculture Operations Division  
Country Department II  
Asia Regional Office

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## CURRENCY EQUIVALENTS

Name of Currency:	Malaysian Ringgit (M\$)
Appraisal Year Average (1980):	US\$1.00 = M\$2.18
Completion Year Average (1989):	US\$1.00 = M\$2.70

## GOVERNMENT OF MALAYSIA FISCAL YEAR

January 1 - December 31

## WEIGHTS AND MEASURES

1 hecare (ha)	=	2.47 acres
1 kilometer (km)	=	0.62 mile
1 meter (m)	=	3.28 feet
1 kilogram (kg)	=	2.2 pounds
1 ton	=	2,205 pounds

## ABBREVIATIONS

ac	=	acres
C.H.O.	=	Constant Head Orifice
DID	=	Drainage and Irrigation Department
D.O	=	Drainage Outlet
DOA	=	(Perak) State Department of Agriculture
EPU	=	Economic Planning Unit
ERR	=	Economic Internal Rate of Return
FELCRA	=	Federal Land Consolidation and Rehabilitation Authority
FELDA	=	Federal Land Development Authority
ffb	=	fresh fruit bunch (oil palm)
F.O.	=	Field Offtake
FOA	=	Farmers Organization Authority
GOM	=	Government of Malaysia
ha	=	hectare(s)
_BRD	=	International Bank for Reconstruction and Development
ICB	=	International Competitive Bidding
LCB	=	Local Competitive Bidding
LPN	=	Lembaga Padi dan Beras Negara = National Padi and Rice Authority
MARDI	=	Malaysian Agricultural Research and Development Institute
MLRD	=	Ministry of Land and Regional Development
MOA	=	Ministry of Agriculture
mt	=	metric tonne
MUV	=	Manufacturing Unit Value
PLI	=	Poverty Line Income
PWD	=	Public Works Department
SAR	=	Staff Appraisal Report
SEDC	=	State Economic Development Corporation
SEPU	=	State Economic Planning Unit
SOE	=	Statement of Expenditures

THE WORLD BANK  
Washington, D.C. 20433  
U.S.A.

Office of Director-General  
Operations Evaluation

April 5, 1991

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Malaysia  
Trans-Perak Area Development Project (Loan 1960-MA)

Attached, for information, is a copy of a report entitled "Project Completion Report on Malaysia: Trans-Perak Area Development Project (Loan 1960-MA)" prepared by the Asia Regional Office. No audit of this project has been made by the Operations Evaluation Department at this time.

Attachment

A handwritten signature in black ink, appearing to be 'A. Khan', is written over the word 'Attachment'.

PROJECT COMPLETION REPORT

MALAYSIA  
 TRANS-PERAK AREA DEVELOPMENT PROJECT  
 (LOAN 1960-MA)

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MAP IBRD 22846

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PROJECT COMPLETION REPORT

MALAYSIA

TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)

PREFACE

This is the Project Completion Report (PCR) for the Trans Perak Area Development Project in Malaysia, for which Loan 1960-MA in the amount of US\$50 million was approved on March 26, 1981. The loan closed on schedule on June 30, 1989. Following cancellations on May 22, 1986 and July 28, 1987 of US\$4.0 million and US\$15.35 million respectively, the remaining loan balance of US\$30.65 million was fully disbursed and the last disbursement was on September 15, 1989.

The PCR was prepared by the Borrower's Federal Land Consolidation and Rehabilitation Authority (FELCRA), the lead implementing agency for the project, and the Preface, Basic Data Sheet, Evaluation Summary and Overview were prepared by the Agriculture Operations Division, Country Department II, Asia Region.

The Overview is based, inter alia, on the Staff Appraisal Report No. 3220-MA, dated February 27, 1981; Loan Agreement dated May 6, 1981; President's Report No. P-2917-MA, dated March 5, 1981; a Reformulation Report dated April 28, 1986; Bank supervision reports and internal memoranda; correspondence between the Bank and the Borrower; and the Borrower's progress reports.

The Asia Regional Office expresses its appreciation to FELCRA for preparing a comprehensive PCR.

The draft PCR was sent to the Borrower for comments and the comments have been incorporated in the final PCR.

**PROJECT COMPLETION REPORT**

**MALAYSIA**

**TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)**

**BASIC DATA SHEET**

**KEY PROJECT DATA**

	Appraisal estimation	Actual or current estimate	Actual as % of appraisal estimate
Project costs (US\$ million)	200.0	104.8	52.2
Loan/Credit amount (US\$ million)	50.0	30.85	61.3
Date Board approval	03-28-61	-	-
Date effectiveness	08-04-61	10-28-61	-
Date annual components completed	08-30-68	02-28-69	-
Preparation then completed (A)	100.0	90.0	90.0
Final date	08-30-69	08-30-69	-
Economic rate of return (%)	18.0	10.0	-
Financial rate of return (%)	-	-	-
Institutional performance	-	Excellent after change of Project Management	
Economic performance	-	Satisfactory after poor beginning	
Number of direct beneficiaries	6,900	2,000	-

**CUMULATIVE DISBURSEMENTS**

	FY62	FY63	FY64	FY65	FY66	FY67	FY68	FY69	FY90
Appraisal estimate (US\$ mln)	7.8	17.3	27.9	36.4	43.1	47.4	49.0	50.0	-
Actual (US\$ million)	-	1.93	6.40	10.14	14.78	17.98	23.70	29.91	30.85
Actual as % of estimate	-	24.7	23.0	28.0	34.0	38.0	48.0	60.0	61.0
Date of final disbursements	-	-	09/15/69	-	-	-	-	-	-
Principal repaid to (m\$/day/yr) (US\$ mln)	-	-	US\$ 12.64 million as of March 31, 1990						

**MISSION DATA**

Mission	Date (m/yr)	No. of persons	Man-days in field	Specializations represented /a	Performance rating /b	Trend /c	Type of problems /d
Identification	03-78	3	22	b, s, d	-	-	-
Preparation 1	10-78	3	35	b, s, d	-	-	-
Preparation 2	03-79	3	38	b, s, d	-	-	-
Preparation 3	01-80	4	40	d, e, s, b	-	-	-
Appraisal	06-80	4	59	c, s, d, e	-	-	-
Subtotal			194				
Supervision 1	11-81	1	10	f	2	1	M
Supervision 2	05-82	3	15	d, b, s	3	2	H, P
Supervision 3	10-82	3	24	d, b, s	3	2	H, P
Supervision 4	03-83	3	3	b, s, d	3	2	H, P
Supervision 5	12-83	3	18	d, s, e	3	2	H, P
Supervision 6	06-84	3	18	d, s, e	3	2	H, P
Supervision 7	01-85	3	9	a	3	2	H, P
Supervision 8	08-85	3	10	a	3	2	H, P
Supervision 9	03-86	2	10	a, e	3	2	H, P
Supervision 10	10-86	2	12	a, e	3	2	H, P
Supervision 11	08-87	1	10	a	3	2	H, P
Supervision 12	08-88	1	4	a	3	2	H, P
Supervision 13	02-89	1	6	a	3	2	H, P
Subtotal			142				
Total			336				

**OTHER PROJECT DATA**

**Total Time (staffweeks) Reported by Fiscal Year/Activity**

	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90	Total
LEAD	4.3	16.7	38.3	78.1	-	-	-	-	-	-	-	-	-	137.4
LEAD	-	-	13.1	7.3	-	-	-	-	-	-	-	-	-	20.4
LEAD	-	-	12.8	1.1	9.1	16.5	13.1	24.4	13.4	4.7	4.6	3.1	1.5	91.1
LEAD	-	-	-	1.1	2.1	2.5	1.4	1.1	1.4	1.1	-	-	4.8	14.5 (estimated)
LEAD	-	-	-	1.2	2.2	2.5	1.4	1.1	1.4	1.1	-	-	4.8	14.5 (estimated)
Total	4.3	16.7	52.2	99.2	2.3	17.0	13.5	24.5	13.8	4.8	4.6	3.1	6.0	289.1

Borrower: Government of Malaysia  
 Executing agency: Ministry of Agriculture from 01-84, then Malera together with cooperating agencies  
 Fiscal year of borrower: Calendar year

Name of currency (abbreviation)	MS
Appraisal year average	1980 US\$1.00 = 2.18
Intervening years average	US\$1.00 = 2.44
Completion year average	1989 US\$1.00 = 2.70

Follow-on project: None

/a a = agriculturist; b = agricultural economist; c = engineer; d = irrigation engineer; e = tree-crope specialist; f = financial analyst.  
 /b 1 = problem-free or minor problems; 2 = moderate problems; and 3 = major problems.  
 /c 1 = improving; 2 = stationary; 3 = deteriorating.  
 /d F = financial; M = managerial; T = technical; P = political; and O = other.

PROJECT COMPLETION REPORT

MALAYSIA

TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)

EVALUATION SUMMARY

Project Objectives and Description

Poverty alleviation, by settling landless families or those with uneconomic holdings on newly-developed land and by assisting existing farmers to increase productivity and incomes, was the major objective of the project. In addition, the project would assist rice self-sufficiency, increased exports, and more balanced regional development. About 6,900 settler farm families were to benefit directly. The project, to be implemented over seven years (mid-1981 to mid-1988), provided for improvement of about 3,700 ha of existing rice land and development of about 6,400 ha of new rice land and 8,400 ha of tree crops; improvement and construction of canals, drains and flood embankment; construction of farm roads, project access roads and a 27 km section of the West Coast Highway; construction of a township and improvement of the Sungei Dedap village settlement; construction of a palm oil factory and a cocoa drier/fermentary; agricultural support services and facilities; and consulting services for detailed design and construction supervision of project works and preparation of future projects. The project was to be implemented by the Ministry of Agriculture (MOA) with the assistance of agencies under MOA and other ministries.

Implementation Experience

There were significant early implementation delays due to the late appointment of the Project Coordinator; delays in surveys, designs (including Township Masterplan), and land acquisition; inadequate budget allocations; uncertainty as to agency responsibility for main road construction; and additional structure requirements (for the flood bypass) for the West Coast Highway section. Due to coordination difficulties, the responsibility for project coordination and implementation was transferred on January 1, 1984 from MOA to the Ministry of Land and Regional Development, which appointed the Federal Land Consolidation and Rehabilitation Authority (FELCRA) as the lead implementing agency. Due to changing economic and technical conditions, a project reformulation was finalized in February 1986, which revised targets downwards for new rice land to 4,500 ha, for tree crops to 7,600 ha and for settler families to 4,000, and upwards for existing rice land to 4,370 ha. The new rice area was, however, to be operated by FELCRA as a fully mechanized rice estate with all operations contracted out. Settlers would earn income from wages or contract work in both rice and tree crop estate operations and get a share in profits. The reduction in the target number of settlers was due to the reduction in the target for new rice land; decline in commodity

prices, particularly of palm oil, which necessitated a larger area per settler to ensure incomes above the poverty level; and the declining interest of individual farmers in rice growing, leading FELCRA to operate the new rice area as an estate, which, however, required fewer settlers due to its fully mechanized operations.

Project completion date was extended from June 30, 1988 to December 31, 1988; project cost was revised from M\$430 million (US\$200 million) to M\$344 million (US\$143 million); and Bank loan amount was reduced to US\$46 million from the original US\$50 million. At completion, project cost was only M\$264 million (US\$104.5 million) and the final Bank loan amount US\$30.65 million. The loan closed on schedule on June 30, 1989.

### Results

Despite early implementation problems, the project was an overall success and increased productivity and incomes of settlers. At project completion in early 1989, rehabilitated padi area was 4,035 ha (109% of appraisal and 92% of reformulation target), new padi area 4,353 ha (68% of appraisal and 97% of reformulation target) and tree crop area (mostly oil palm) 8,218 ha (97% of appraisal and 108% of the reformulation target). The achievement of a 200% cropping intensity for padi was particularly remarkable and yields of about 4 tons/ha per season are close to appraisal estimates. There have also been major changes in farm cultural and agronomic practices in the project area, such as the introduction of dry ploughing followed by puddling, direct seeding and mechanized harvesting. Except for the rehabilitated rice area, the entire newly developed land for rice and tree crops is now managed as a FELCRA estate where settlers provide labor. Irrigation works construction exceeded targets; project access roads construction (54.6 km) was 103% of appraisal and 90% of reformulation target; and West Coast Highway section (24.3 km) was 90% of appraisal and 100% of reformulation target. However, due to a substantial under-estimation at appraisal, cost of access roads and the West Coast Highway section exceeded appraisal estimates by almost 100%. Due to a decision to reduce the number of settlers consistent with project employment opportunities, only 1,434 settler houses were constructed compared to the appraisal and reformulation targets of 6,900 and 4,000 respectively. Other settlement infrastructure costs were only 44% of appraisal and 62% of reformulation estimates. Although the number of settlers, as decided by the State Government, is to be 4,000, for the time being only those who can be fully employed by the project, estimated at 2,000, will be emplaced. Palm oil mill construction (40 ton fresh fruit bunch/hour) was postponed due to delayed plantings and production and cocoa drier/fermentary was constructed with a capacity of 2 tons dried beans/day compared to the expected 5 tons/day, due to lower production of cocoa. Consultancy services were utilized except for the preparation of future projects.

The economic rate of return (ERR), estimated at completion only for the agricultural component, is 10% compared to 18% at appraisal and 9% at reformulation. The main reason for the lower ERR compared to that at appraisal is the decline in world commodity prices, particularly for rice,

which has an ERR of 6% compared to 20% at appraisal. The annual operation and maintenance costs are also substantially higher than appraisal estimates, mainly due to a significant increase in wage rates in real terms.

### Sustainability

Overall, the project is sustainable. However, this is due to the economic and financial viability of oil palm. Padi, which will account for the major part of agricultural and irrigation recurrent costs, is economically not viable, given the projected world rice prices. Its financial viability depends on whether the Government will continue to subsidize padi production. Given the projected world prices, cocoa is also economically and financially not viable. However, actual yields and cropping intensity of padi are very satisfactory and irrigation works are being properly maintained. An upturn in world rice prices will render project sustainability beyond question. The West Coast Highway, if its proper maintenance continues, is likely to yield sustained benefits. Organizationally, the project is sustainable as FELCRA continues to manage it through a project office, which is adequately funded and staffed. However, the Government needs to determine the desirable number of settlers and beneficiaries which the project can sustain over the long run. Moreover, with a view to effectively divest FELCRA of the project management responsibility in the long run, FELCRA should continue to strengthen the settlers' cooperative, which is already actively engaged in tendering for land preparation, field maintenance and harvesting, and in transporting project output.

### Findings and Lessons Learned

Typifying the experience of many multi-component projects, the late appointment of the Project Coordinator caused early implementation delays. For projects of this nature, early appointment of Project Coordinator is essential.

Delay in infrastructure development, particularly access road construction, delayed agricultural development. Moreover, access road and West Cost Highway costs were grossly underestimated at appraisal. In projects of this nature, where infrastructure development must precede agricultural development, greater attention to preparation and supervision of the infrastructure component is needed.

The project demonstrated that the estate form of management, usually associated with tree crops, can also be successfully used for large-scale mechanized rice cultivation, provided that large investments in machinery and workshop facilities are avoided.

Overseas visits by the technical staff had a marked beneficial impact on their skills through exposure to technological developments in other countries, particularly for management of mechanized padi.

The Statement of Expenditure (SOE) procedure was introduced only in the later period of the project. The use of this procedure from the very start, recognizing that small contracts and payments are a common feature of land development, would have accelerated disbursement.

In the early years, Bank supervision missions did not show enough flexibility in response to changing conditions and, consequently, project implementation suffered. Later, the flexibility and appropriate skill mix of Bank missions had a favorable impact, particularly on the implementation of large-scale mechanized rice cultivation.

## PROJECT COMPLETION REPORT

### MALAYSIA

#### TRANS-PERAK AREA DEVELOPMENT PROJECT (LOAN 1960-MA)

### OVERVIEW

1. This overview utilizes information from documents (listed in the Preface) other than the PCR and supplements parts of the PCR relating to project implementation and reformulation, project sustainability, Borrower performance and Bank performance.

#### Project Implementation

2. Loan Effectiveness. Loan effectiveness was declared some three months later than anticipated on October 23, 1981 due to the late appointment of the Project Coordinator (the appointment was a condition of loan effectiveness). However, the appointed person could not take up his position until December 22, 1981 because of delays in issuing the formal letter of appointment.

3. Early Implementation. The project was to be implemented over a period of 7 years from mid-1981 to mid-1988. Construction of major irrigation and drainage works was already in progress and it was expected that on-farm development works would start in 1982. Most of the township facilities were expected to be completed in 1984 and construction of settler houses would be phased with land development. The West Coast Highway section was expected to be completed in 1985. However, there were significant early implementation delays due to the late appointment of the Project Coordinator; delays in surveys, designs (including Township Masterplan), and land acquisition; inadequate budget allocations; uncertainty as to agency responsibility (Federal and State Public Works Department) for main road construction; and additional structure requirements (for the flood bypass) for the 27 km long section of the West Coast Highway, which resulted in a 1½-year delay in starting construction and over 100% increase in cost over the appraisal estimate. Delays in crop area development were due to contractual failures and severe crop damage by wild boars, which necessitated considerable replanting.

4. Project Reformulation. During a period of project coordination difficulties, the responsibility for project coordination and implementation was transferred on January 1, 1984 from MOA to the Ministry of Land and Regional Development, which appointed FELCRA as the lead implementing agency. With the significantly decreased interest in smallholder rice growing, the Government of Malaysia (GOM) decided, on the Bank's request, to review the project concept, the implementation schedule and costs. In the meantime, land development and civil works construction had been progressing satisfactorily, although behind the original schedule.

Only township development remained stalled. A project reformulation report was to be completed by June 1984. However, GOM then contemplated changes in its Rice Policy and a reformulation report was delayed until late April 1985. In the meantime, the Bank had reviewed a draft of the GOM reformulation proposal which recommended that: (a) new padi development should stop at 1,630 ha already completed since rice price projections and high development costs made this component economically unviable; (b) the balance (2,852 ha) of the rice area be converted to oil palm (with drainage and internal roads only); and (c) the settler number be reduced to about 2,500 (due to insufficient employment creation from fully mechanized rice growing). During the mid-1985 Reformulation Mission, the issues were discussed but no final decision could be made since GOM had not decided on its new Rice Policy.

5. Although rice growing continued to be highly subsidized (300 kg/ha free fertilizer; a padi delivery bonus of M\$ 165/ton; and low cost irrigation water and agricultural credit), farmer interest diminished. This resulted in much idle rice land. GOM, therefore, reviewed its policy for rice self-sufficiency, which at the time of appraisal had reached 90%, but had declined to about 70% in 1984. It was decided in September 1985 to reduce this to about 60% with rice growing to be concentrated in the major Granary Areas.

6. During the long review period, construction and agricultural activities continued strongly under FELCRA's new Project Coordinator and Senior Agriculturist. In January 1985, a strong management team was emplaced. Project reformulation was finalized in February 1986 after the Government had decided to retain Trans Perak as one of its Granary Areas. Since, by that time, all irrigation and drainage works contracts were already ongoing, the Bank agreed to continue financing rice development although the ERR for this component was calculated at about 7% and the overall revised ERR for the project was about 9%. Under the reformulated project, there were only minor changes in crop area. The rehabilitated rice area continued to be operated as individual farms, but with FELCRA assisting in arranging and supervising contract operations for land preparation and harvesting, and Department of Agriculture assisting in other activities. The new rice area would, however, be operated by FELCRA as a fully mechanized rice estate with all operations contracted out. This decision to contract out eliminated the purchase of tractors, cultivating equipment and combine harvesters as well as the establishment of substantial workshop facilities by FELCRA and was thus quite cost-effective. Settlers were to provide labor for both rice and tree crop estate operations (for daily wages and contractual work) and get a share in profits. The State Government decided that the number of settlers should be 4,000. The reduction in the target number of settlers from 6,900 at appraisal to 4,000 at reformulation was necessitated by several factors: (a) the target for new rice land was reduced from 6,400 ha at appraisal to 4,500 ha; (b) commodity prices, particularly for palm oil, were substantially lower than those envisaged at appraisal whereas the poverty threshold (in peninsular Malaysia) increased from M\$290/month per family in 1981 to M\$360/month by 1986 (M\$380/month by 1988), requiring larger amount of land per settler to ensure incomes above the poverty level; and (c) due to the declining interest of individual farmers in rice growing and

FELCRA's success in the estate form of management for tree crops, it was considered advisable to let FELCRA operate the new rice areas as an estate; however, the fully mechanized operations of the estate required fewer settlers than projected at appraisal.

7. The overall implementation period was increased from 7 to 7-1/2 years to December 31, 1988. The revised cost estimate was US\$143.0 million, and based on the already revised disbursement percentage for civil works of 40%, the loan amount was revised to US\$46.0 million (cancellation of US\$4.0 million was on May 22, 1986).

### Project Sustainability

8. FELCRA is continuing to manage the rice and oil palm/cocoa estate. With effective management, tree crop operations should continue to be satisfactory. Production and profitability of tree crops will depend greatly on the provision of timely inputs (fertilizers and pesticides); timely weeding, pruning, harvesting, transport and processing; adequate maintenance of infrastructure (drains and roads); and good international commodity prices. Harmonious relations with settlers for labor supplies are pre-conditions and this will to a great extent depend on their incomes from labor (daily rates as well as income from contracts and share in estate profits). Mechanized rice estate operations demand an extremely high standard of management, supported by continued research feed-back, and with many seasonal and on-the-spot decisions necessary to retain high production levels. Many of these decisions will depend on the outcome of the ongoing national research (choice of variety, and pest and weed control/management) and local verification research (fertilizer rates, pest management, water management, method of crop establishment, etc.). Management must be able to adhere to pre-set time tables for cultural operations to avoid slippage in the presently achieved exemplary 200% cropping intensity. High rice yields demand good plant densities and these can only be achieved by direct seeding on well levelled and well drained fields without pest damage. Once a satisfactory regular (without gaps) plant density has been obtained, adequate fertilizer has to be applied in a timely manner, while a high standard of water, weeds, and pest management is required. FELCRA has proven to be able to deliver (after an initial shaky start) and it is, therefore, of utmost importance that the high standard of management be retained. Despite the achieved high padi yields in the last few seasons, rice profitability is heavily dependent on the available subsidies (low irrigation fee, free fertilizers and a padi delivery bonus), as international rice prices continue to be lower than the cost of production in the project area. Settler incomes will, therefore, continue to be dependent on the profitability of tree crops and the availability of subsidies for rice (also on a high standard of maintenance of the irrigation, drainage and road infrastructure). Both rice and tree crops are well adapted to the Trans Perak area and available technologies can provide yields which are comparable with the best in other tropical areas.

### Borrower Performance

9. Immediately following project effectiveness, GOM was forced to cut budgets due to the general financial constraints. In the first two years after loan signing, only about 10% of the anticipated disbursements was actually achieved. During this period, management problems were evident and coordination between the various implementing agencies was weak. Most of these difficulties emanated from the lead agency issue dating back to the preparation and appraisal period when MOA wanted to execute the project as one of its integrated area projects and FELCRA wished to execute it as a settlement project. Since there were several agencies involved in project implementation, it had been agreed that MOA would appoint a Project Coordinator, who would be responsible to a high level Steering Committee, and would implement the project as an area development project. By mid-1983, MOA made two proposals for changes in project design:

- (a) MOA to take over management of the padi areas from FELCRA, while FELCRA would retain responsibility for the tree crop area and township development; and
- (b) farm sizes to be doubled to 4.9 ha (12 acres) to provide settlers with incomes well above the poverty line and to eliminate fertilizer subsidies for rice.

10. The Bank then, in a letter dated May 17, 1983, requested a detailed financial, technical, economic and social justification of the proposed project changes. Following internal GOM reviews, project coordination was transferred to FELCRA on January 1, 1984. FELCRA then appointed its own Project Coordinator, who began, with the assistance of an expatriate consultant, the reformulation study. This study took a long time, mainly due to uncertainties regarding the rice sub-component (paras. 4 and 5). When it was finally decided that Trans Perak would be included in Malaysia's official "Granary Areas", the proposal was completed. The Bank then agreed in March 1986 with FELCRA's proposal. Rice development, although not considered economically viable, was to continue since all development contracts had already been let, but on the basis of a fully mechanized rice estate (para. 6). Project progress for infrastructure development proceeded rapidly with good agency coordination. FELCRA's performance in record keeping, submission of progress reports, withdrawal applications and audited accounts was fully satisfactory. Due to changing requirements of canal and road layouts for mechanized rice farming, FELCRA had to make changes in roads, fieldsize, in-field drainage, land leveling and sanitation (for rat and other pest control/prevention). Additional drainage for rice had to be provided to allow rapid evacuation of excess water within the scheme area. FELCRA had considerable problems with some poor performing tree crop contractors, as well as poor plant survival rates in early years (because of rats and boars) and some incidence of lalang competition. Adaptation to the precise standards required for mechanized rice cultivation was slow, but after management personnel viewed and discussed operations and requirements during a study tour to Australia, significant improvements were made, which immediately resulted in higher yields. The Public Works Department (PWD) performed excellently on

the highway component, but due to some poor contractor performance, rectification proved necessary in one of the access roads.

#### Bank Performance

11. There were a substantial number of issues to be resolved both in Malaysia and in the Bank before Board approval of this rather complicated agricultural development project. The various issues were thoroughly reviewed and reasonably satisfactorily resolved. However, the project management issue could possibly have been addressed more decisively: the initial unsatisfactory management arrangement proved a major cause of delayed project implementation (apart from the factor of budgetary shortfalls in Malaysia's austerity years). Over the 7½-year implementation period, there were 13 supervision missions, initially comprising civil engineers and agricultural economists and, later, mostly an agronomist and a tree crops specialist. Revisions to cost estimates, mostly based on ongoing contract work, were poorly done by the Bank staff and FELCRA management and this led to a cancellation of almost 40% of the loan amount. The Bank's supervision missions in the early years showed less flexibility than was needed but later provided substantial technical assistance to FELCRA. Overall, the Bank's performance can be considered satisfactory.

## PROJECT COMPLETION REPORT

### MALAYSIA

#### TRANS-PERAK AREA DEVELOPMENT PROJECT (LOAN 1960-MA)

### PART I: INTRODUCTION

1.01 This Project Completion Report for the Trans-Perak Area Development Project is prepared in compliance with Section 3.05(d) of the Loan Agreement between Malaysia and the International Bank for Reconstruction and Development (IBRD) dated May 6, 1981. This is the first World Bank loan in which the Federal Land Consolidation and Rehabilitation Authority (FELCRA) was involved as an implementing agency. The US\$50 million loan which was approved on March 26, 1981, was to finance an integrated area development project covering an area of 18,500 hectares over a period of 7 1/2 years from 1981 to mid-1988. The project was originally under the Ministry of Agriculture (MOA) with the main implementing agencies being the Drainage and Irrigation Department (DID), the Public Works Department (PWD) and FELCRA. On January 1, 1984 responsibility for the management of the project passed from the MOA to the Ministry of Land and Regional Development (MLRD)<sup>1</sup> to be managed by FELCRA. Primarily as a result of changing economic and technical conditions and a reduction in scope of the project, the project was reformulated and the loan amount was reduced, initially to US\$46.0 million on May 22, 1986 and finally to US\$30.65 million on August 11, 1988. Following a half year extension, the loan was fully disbursed on September 15, 1989.

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<sup>1</sup> Effective from July 1, 1987 Felcra was transferred to the Ministry of National and Rural Development.

PROJECT COMPLETION REPORT

MALAYSIA

TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)

PART II: PROJECT BACKGROUND

A. Project Formulation

2.01 The project was one of four projects identified by a regional development study of the Lower Perak basin undertaken in 1976 by ESAMS (Malaysia), in association with Howard Humphreys & Sons (UK). Project preparation took place in 1978/1979 during which the Perak State Economic Planning Unit (SEPU) and the Economic Planning Unit in the Prime Minister's Department jointly prepared the project with assistance from local consultants KPM Khidmat Sdn. Bhd., in association with Snowy Mountain Engineering Corporation (SMEC) (Australia). Advisors of the UNDP/IBRD State and Rural Development Project also provided substantial inputs into the project preparation. Pre-appraisal took place in September/October 1979 with a follow-up being carried out in January 1980. Project appraisal by the World Bank took place in June/July 1980. Following loan negotiations from January 22-29, 1981 in Washington D.C. and approval by the Bank's Board on March 26, 1980, the loan was signed on May 6, 1981 for a sum of US\$50.00 million and became effective on October 23, 1981.

B. Project Area

2.02 The project is located in the state of Perak on the west coast of Peninsular Malaysia. It lies at the south eastern edge of an 80,000 ha swampy floodplain on the right bank of the Perak River, some 10 km inland from the Straits of Malacca and about 80km from Ipoh, the state capital. It has a tropical climate characterised by high rainfall, humidity and temperature. Average annual rainfall is about 2100 mm with monthly peaks in April and October. Rainfall is much lower and more variable during January - February and June - July resulting in two short but distinct dry periods where evapotranspiration exceeds rainfall.

2.03 The project area slopes gently from north to south and the surface is generally flat with interwoven ridges and depressions. Distinct old river courses bisect the southern part of the project. The soil is mainly of riverine sediments with the remainder a mix of riverine and marine sediments, overlain with shallow peat and organic silt.

C. Project Objectives And Description

2.04 The main objectives of the project were to eradicate poverty by settling landless farmers or those cultivating uneconomic sized holdings on newly developed land and by assisting existing farmers to increase productivity and incomes. The project was also to assist in achieving rice self-sufficiency and increase foreign exchange earnings from tree crops and also to achieve a more balanced regional distribution of development.

2.05 The project was to provide for improvement of about 3,700 ha of existing rice land, development of about 6,400 ha of new rice land and 8,400 ha of tree crops. Settlement facilities were to have been provided for 6,900 families.

2.06 The Project was to comprise development activities over a period of eight years (1981-1988) and consisted of the following main components:-

- (a) improvement of about 122 km and construction of about 79 km of main and secondary canals;
- (b) improvement of about 73 km and construction of about 12 km of main and secondary drains;
- (c) development of about 6,400 ha of new land for rice cultivation, including land clearing and levelling, and construction of tertiary canals, drains and farm roads;
- (d) rehabilitation of about 3,700 ha of existing rice land, including levelling on 1,000 ha and construction of farm roads;
- (e) land development and crop establishment for about 8,400 ha of tree crops, including land clearing, internal drains and farm roads and bridges;
- (f) improvement of the existing 66 km and construction of 29 km of flood embankment;
- (g) construction of 53 km of project main roads;
- (h) construction of a 27 km section of the West Coast Highway;
- (i) construction of a township and improvement of the Sungai Dedap village settlement for 6,900 settler farm families;
- (j) provision of agricultural support services, including offices, workshops, and staff housing; and
- (k) construction of processing facilities for oil palm with a capacity of 40 ton fresh fruit bunch (ffb)/hr and for cocoa with a capacity of 5 ton dried beans/day.

2.07 In addition, the project was to provide vehicles and equipment for agricultural support services, operation and maintenance, and consulting services for detailed design and construction supervision of project works and preparation of future projects.

D. Project Organization

2.08 A Project Coordinator was appointed by the MOA in October 1981 to coordinate and manage the project and he was guided on policy matters by a Steering Committee composed of the Secretaries-General of the MOA and the MLRD, the State Secretary of Perak and other officials. The major implementing agencies were:

- (a) FELCRA - responsible for land development and settler housing.
- (b) Drainage and Irrigation Department (DID) - responsible for drainage, irrigation and flood control works.
- (c) Public Works Department (PWD) - responsible for roads.

2.09 The other participating agencies included Perak SEDC for settlement services, Department of Agriculture (DOA), Farmers Organisation Authority (FOA), Malaysian Agricultural Research Development Institute (MARDI) and Bank Pertanian Malaysia (BPM) for agricultural support services and National Padi and Rice Authority (LPN) for padi marketing.

2.10 In an effort at streamlining the functions of the implementing agencies, the government felt that the ministry in charge of the key implementing agency should take the lead in project coordination. Thus, from January 1, 1984, the government decided to shift the responsibility for project coordination and implementation from the MOA to the MLRD to be implemented by Felcra.

E. Project Cost and Financing

2.11 At appraisal, total project cost was estimated at US\$200 million (M\$430 million) of which the foreign exchange costs amounted to about US\$67.0 million (M\$144 million). The Bank was to finance 75% of the foreign exchange costs amounting to US\$50 million (M\$107.5 million) and the government was to finance the balance of the foreign cost and the full local costs of the project amounting to US\$150 million (M\$322 million).

F. Project Reformulation

2.12 The period in which Felcra took over the role of project coordinator coincided with a period of budget restraint in which world crude oil prices plunged to an all time low for the next few years. Consequently, GOM decided to review all projects including the Trans-Perak Project. Project reformulation was proposed and meanwhile GOM undertook a review of the National Rice Policy.

Felcra submitted a reformulation proposal incorporating a number of changes in project concept, implementation schedule, project scope and changes in modus operandi affecting the rice areas. The whole exercise was finalised in February 1986 after GOM decided that the Trans-Perak area should remain as a granary area and the Perak State Government decided the number of settlers to be 4,000. Major changes arising from the reformulation were as follows:-

- a) The new padi area was to be operated as a fully mechanised rice estate using contractors in all operations. This meant that settlers no longer worked on their individual 1.2 ha padi plots but would be employed as casual labourers and paid wages for work done as in the tree crop area. It was decided that heavy equipment such as combine harvesters would not be purchased outright but instead harvesting would be contracted out.
- b) The new township at Changkat Lada was scaled down to a service centre as there would be fewer settler houses and reduced infrastructure and utilities.
- c) Settler number was reduced from 6900 to 4000<sup>1/2</sup>.
- d) The implementation period was extended by 1/2 a year to 7 1/2 years ending December 31, 1988.
- e) Project cost was revised from M\$430 million (US\$200 million) to M\$344 million (US\$143 million). Subsequently the Bank loan amount was also revised downwards by US\$4 million from US\$50 million to US\$46 million.

2.13 About a year after project reformulation, the project was subjected to further review and the project cost was recalculated at M\$252.3 million (US\$103 million) while the Bank loan amount was further reduced by US\$15.35 million and the final loan amount was US\$30.65 million.

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<sup>1/2</sup> Of the 6,900 settlers, 1,700 were already in the project area and the State Government had given priority for settlement to these residents. So in effect, only 5,200 were to have been selected as new settlers. The final figure of 4,000 settlers was based on the peak labour demand calculated at 4,296 units at reformulation.

G. Amendments To Loan/Project Agreements

2.14 In the course of project implementation, some amendments were made to the loan/project agreements. The first amendment to the Loan Agreement was made on April 1, 1983 when the disbursement percentage for Category 2 (civil works other than settlement infrastructure) was changed from 31% to 40%. This was to cater for force account expenditures which were not reimbursable at the time.

2.15 The second amendment occurred on May 13, 1986 when a sum of US\$4.0 million was cancelled from the original loan amount of US\$50.0 million following project reformulation. At the same time there were amendments to Schedule 2 of the Project Agreement as follows:-

<u>Part</u>	<u>Description</u>	<u>Unit</u>	<u>Original</u>	<u>Amended</u>
D	Improvement of existing rice land	ha	3,700 ha	4,370 ha
C	Development of new rice land	ha	6,400 ha	4,500 ha
E	Development of tree crops	ha	8,400 ha	7,600 ha
H	West Coast Highway construction Project main roads	km km	27 km 53 km	24.3 km 52 km
I	Construction of township and improvement of Sg. Dedap village settlement for	No. of settler families	6,900	4,000
K	Construction of processing facilities for oil palm and cocoa	. capacity tons ffb/hr tons dried beans/day	40 5	27 2

Project completion date was extended from June 30, 1988 to December 31, 1988.

2.16 Another amendment on August 11, 1987 further reduced the loan amount by US\$15.35 million to US\$30.65 million.

2.17 The use of Statement of Expenditure (SOE) was allowed following another amendment to the Loan Agreement on March 23, 1987. This was to facilitate and expedite disbursement for small direct purchases and force account expenditures for land development works.

PROJECT COMPLETION REPORT

MALAYSIA

TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)

PART III: PROJECT IMPLEMENTATION

3.01 At project completion, the project was brought to a successful close and overall performance of the project had been quite satisfactory. Although there existed a number of constraints from the beginning for the land development component, the whole area was almost fully planted by project closing with rice yields exceeding the reformulation target of 4.2 mt/ha. In spite of cost increases and implementation delays caused by difficult ground conditions, budget constraints, contractual failures and revision in scope of works, the performance of infrastructure works were generally satisfactory. Construction of drainage and irrigation infrastructure by DID was generally completed on schedule although there were delays in hand-over of the later phases of the new padi areas. The West Coast Highway Section was, despite early implementation delay, satisfactorily completed and the standard of construction was high. All the access roads and village roads have been constructed and part of the Seberang Perak township settlement infrastructure has also been completed. The project management team has moved into the new office complex located in the new township area while 807 settlers had been replaced by 1988. Annex 1 shows the key physical performance indicators and details of implementation are discussed in the following paragraphs.

A Implementation of Project Components

Drainage and Irrigation

3.02 DID was responsible for the construction of all drainage and irrigation infrastructure up to tertiary level (farm level) and the provision of technical support including water management and maintenance of main and secondary canals and drains.

3.03 Implementation of this component has been generally satisfactory and according to schedule with the exception of certain phases in the new padi area. Planning and design of civil works for this component were carried out well before the project commenced but actual physical works commenced in 1981. To facilitate work supervision, a DID project office was established in Teluk Intan in 1982.

3.04 A total of 11 contracts comprising nine Local Competitive Bidding (LCB) and two International Competitive Bidding (ICB) contracts was awarded to implement various works including construction of main, secondary and tertiary canals and drains, farm roads, land levelling, rehabilitation and improvement works to the existing drainage and irrigation infrastructure in the Left Branch Canal (LBC) area. Physical works progressed smoothly in the early stages of the project period with the first block of

146 ha of new padi area being handed-over on September, 1983 and by the end of 1985 the whole of Phases 3, 4 and 5<sup>3</sup> consisting of 1,426 ha had been completed and handed over to Felcra ready for planting. Meanwhile drainage works in the tree crop area (Phases 10 to 15) had also been completed and ready for planting with oil palm and cocoa. Due to delay in calling tender for a few contracts, implementation of Phases 6 and 7 comprising 1,520 ha only commenced in 1984 while Phases 8 and 9 covering 1,550 ha started in 1985. Phases 6 and 7 were completed and handed over to Felcra over a period of two years from September 1985 to June 1987, while Phases 8 and 9 were fully handed over by July 1989. Annex 2 shows the actual hand-over compared to the schedule drawn up at reformulation.

3.05 Construction of the 29km Flood Protection Bund and the internal drainage system in the tree crop area started in mid 1985 and was completed 1 1/2 years later. Drainage and irrigation facilities provided under the project included independent field offtakes, drainage outlet for each 1.2 ha padi lots with farmroad frontage on the drain side. The canal and drain intensity is about 32m per ha in the Right Branch Canal (RBC) area and 17m per ha in LBC area. Water duty provided at pre-saturation is 5.60 l/s/ha with scheduling and 1.75 l/s/ha during normal supply. Drainage module used is half-hour rainfall with five years return period.

3.06 Annex 3 shows the physical performance of the drainage and irrigation component undertaken by DID compared against appraisal estimates.

3.07 The expenditure on concrete lining of part of the secondary and all the tertiary canals proved to be well-spent because those that were earth-lined posed a constant maintenance problem to the project. An additional tidal gate was constructed which was not recommended at appraisal but found to be necessary during implementation to provide satisfactory drainage for both the tree and rice crop area. Problems faced during implementation included bad weather, contractual failures, difficult site conditions requiring some design modifications and also budgetary constraints.

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<sup>3</sup> Phases 1 and 2 which were developed by Felcra are located in the rehabilitated padi area.

### Agricultural Development

3.08 The progress of this component had been unimpressive in the early years as the project was bogged down with countless problems such as contract failure, pest damage, low padi yields, delay in land acquisition and drainage problems. Implementation was delayed by 1 to 2 1/2 years but towards the last two years there was a remarkable turn around as a result of the perseverance and determination of the project management team to make it a success.

3.09 The New Padi Area - At appraisal the new padi area was estimated at 6,400 ha but after final survey was revised downwards to 4,482 ha at reformulation in 1986. The initial land clearing works were undertaken by Felcra through contractors. The whole area was predominantly jungle and five contracts were let according to the phasing of the area, i.e. Phases 3,4,5,6/7, and 8/9. After land clearance, DID took over the area to do the design and construction of the tertiary canals and drains before handing it over to Felcra for padi planting. The construction of farm roads and land-levelling, though Felcra's responsibility, was incorporated into DID's contracts for convenience and because the budget allocation was provided by DID. As each phase was completed, DID handed it over each area to Felcra ready for planting.

3.10 The original plan for the agricultural area was to introduce the 3+3 system whereby each settler family would be allocated 1.2 ha (3 ac) of padi to be farmed individually and 1.2 ha of tree crops area to be managed on an estate basis. However, based on the success of its share system or group farming style of operation in its oil palm and rubber schemes, Felcra decided to apply the same concept to the new padi area as well. In line with the changes made, new rice technology such as direct seeding in place of transplanting and large scale mechanised harvesting were adopted.

3.11 The first phase of 146 ha in Phase 4 was handed over in September 1983, 9 months ahead of schedule. The first planting took place in the main season of 1983. A host of initial teething problems were encountered among which were poor drainage, poor land levelling and water management/distribution, insect damage and low soil pH. Only 124 ha were planted and the yield achieved was half of the appraisal estimate, 0.74 mt per ha compared with the targetted 1.5 mt per ha. As a result of the poor performance, the World Bank supervision mission in 1984 stressed the need for recruitment of expertise and training of field staff to improve management standards, ensure the timely hiring of contractors and facilitate close adherence to the cropping schedule to ensure successful operation, as the production of padi on an estate basis was a highly specialised activity.

3.12 By 1985 all contracts for padi land development works had been let and a total of 1,602 ha made available for planting. As of December 31, 1988, a further 2,242 ha had been made available for planting, bringing the total plantable padi area to 3,844 ha. This represented 85.7% of the reformulated target of 4,482 ha. The balance of 638 hectares were handed over by DID before the start of the 1989 main season.

3.13 In October 1985 the Bank recommended the conversion of the remaining new padi area (which had not been planted) to oil palm in view of the fact that padi was not economically viable. However, this recommendation was rejected because the Trans-Perak area had been gazetted by the government as a rice granary area. It was also a time when the rice self-sufficiency target had been reduced from 85% to 55% and all other non-granary irrigated areas were being considered for possible conversion to other more economically viable crops.

3.14 Rehabilitated Padi Area - At appraisal, about 3,700 ha of existing rice land in Blocks A,B,C and D in the Left Branch Canal (LBC) area were earmarked for improvement, including releveling of about 1000 ha (Felcra managed Phases 1 and 2), improvement/rehabilitation of the irrigation system and upgrading of farm roads. Rehabilitation works on the area were to have started in 1982/83 but were delayed due to land acquisition problems, austerity measures introduced by the government in 1983 and the emergence in Block A of a group encouraging farmers in the area to participate in large scale padi cultivation under the management of a consultancy firm.

3.15 Despite several dialogue sessions, the farmers could not be persuaded to join Felcra and hence in September 1984 it was decided to exclude the rehabilitation of this area from the project. However, improvements to the drainage and irrigation infrastructure were included under the project and it was not until after 1986 that reconstruction works began. Two tenders were called, one for Block A and the other for Blocks B, C and D. The contract for Block A was completed in November 1987 and that for Blocks B, C and D was completed in July 1988.

3.16 Tree Crop Development - The total land area estimated at appraisal was 8,400 ha but was subsequently revised downwards to 7,585 ha at reformulation comprising 6,464 ha of oil palm and 1,121 ha of cocoa. The land which was originally jungle was to be cleared for oil palm and cocoa.

3.17 Felling and clearing works had actually started as early as 1979 in Phases 10 and 10A, before project formulation, but expenditures incurred from October 1980 onwards could be reimbursed as the loan provided for retroactive financing from that date. Land clearing works for the other phases took place

in 1981 (Phase 14), 1983 (Phases 10B, 10C, 13 and 15) and 1986 (Phases 11 and 12). The reason for the delay in the development of Phases 11 and 12 was that the original area was taken over by the State Government for a banana project covering about 200 ha in whose management Felcra was involved and as a result an alternative area had to be found. Another reason was that some areas involved alienated land and since the farm owners wished to develop the land themselves, these areas were left out.

3.18 Planting of oil palm commenced in 1981 and by the end of 1989, a total of 7,110 ha had been cleared of which 6,979 ha had been planted and 5,000 ha brought into production. Remaining plantings will be in 1990. In terms of achievement, the oil palm hectareage is 10% higher than the reformulation estimate.

3.19 Palm losses had been quite high in the initial years largely because of contractual failures, water logging and damage by wild animals. In the early years, wild boar damage was particularly rampant in Phases 10, 10A and 14, while phases 13 and 15 encountered contractual and drainage problems as well as wild elephants damage. As a result, a high level of seedlings supply had to be carried out and was the cause of uneven stands, particularly in Phases 10 and 14.

3.20 Planting of cocoa started in 1981 and by end 1989, a total of 996 ha had been planted. Another 112 ha will be planted in 1990 bringing the total planted area to 1,108 ha, slightly below the reformulation estimate of 1,121 ha. Clonal planting materials and selected hybrids were used solely in the last two years. Some cocoa established earlier were budded with improved clones to ensure high yield potential. By end 1989, about 186 ha of cocoa had come into production. Annex 4 shows the area cleared, planted and in production for each crop compared against appraisal and reformulation targets.

#### Project Main Roads

3.21 About 53km of main roads were to have been built by the PWD within the project area, of which 27km were to be metalled. The main or access roads were tendered in two packages called Access Road Phase I involving 17.6 km and Access Road Phase II involving 34.3km, making up a total of 52 km, one km short of the appraisal target. Only Access Road I was metalled during the project period. A subsequent revision in 1987 included the financing of the construction and metalling of Access Road III, a 9 km stretch of road in the township area formerly classified as village road. However, metalling could not be done during the project period and so financing was included in the Felcra II Project (Loan No. 2917 - MA).

3.22 Access Road I - Commencement of design for the project main roads was targetted for mid 1980 with completion of construction at end 1984. Survey works for Access Road I started in mid-1981, one year behind schedule. The actual design was done departmentally and was completed in mid-1983. Construction commenced in September 1983 and was to have been completed on December 27, 1984 but the contractor was given an extension of time and the works were eventually completed on March 27, 1985.

3.23 During a site visit to the area, the Bank supervision mission was dissatisfied with the poor standard of construction caused by lack of supervision and the contractor not adhering to the work specifications. There was also a spell of unusually bad weather at one point which resulted in delay in construction. Consequently, the Bank mission recommended suspension of disbursement until the situation was rectified. PWD subsequently took the necessary action to ensure adequate supervision, rectified the situation to the Bank's satisfaction and disbursement was finally resumed.

3.24 Access Road II - Design for this road and four concrete bridges started in late 1982 and was completed in October 1984. Construction work started on March 18, 1985 and was to have been completed in March 1987 but was eventually completed 13 months later in April 1988. The delay was mainly due to contractual problems. At project completion, this laterite - finished road was in a satisfactory state after final grading and shoulder shaping had been completed.

3.25 Access Road III - Initially, Access Road III was not financed under the project as it formed part of village infrastructure. But during the June 1988 supervision mission, it was agreed that the road should be considered a true access road as it was the link road between the Sungai Dedap village along the new township at Changkat Lada and the already metalled Access Road I. The Bank agreed to finance the construction and metalling of the 9 km long access road. However, at loan closing only the construction cost was disbursed. Metalling was still to be done when the loan was fully disbursed. Annex 5 shows the length of access roads completed compared against appraisal.

#### West Coast Highway Section

3.26 The West Coast Highway section stretches from the newly constructed Perak River Bridge near Teluk Intan along the southern perimeter of the project area to Kampung Kayan. The work was well executed by a capable contractor and construction supervision was satisfactory. It was scheduled for completion in mid 1985 but was completed in February 1986. The original length of the highway section was to be 27 km but the final length was 24.3 km, shorter by 10%.

3.27 The West Coast Highway section was built across very soft coastal swamp and through virgin jungle. Some of the problems encountered included land subsidence and rainy season causing delay in project work, and changes in design and construction method.

3.28 The highway is important in that it serves as a major link between the Trans-Perak area and the surrounding towns and significantly shortens the route from Kuala Lumpur to Lumut by about 100 km. A new bridge (not financed under the project) over the Perak River was constructed which connects the West Coast Highway section with the major roads in Peninsular Malaysia. Access to the project area is now more convenient following the completion of the bridge.

#### Settler Houses

3.29 Following the reduction in the number of settler families expected to be emplaced in the project area (para 2.10), the number of settler houses was also scaled down as well. The first 350 units were completed in September 1983 and the first 300 participants were emplaced in January 1985.

3.30 Originally the construction of settler houses was to be in three packages following ICB procedures but Felcra requested and the Bank approved in November 1985 tendering in five packages using LCB procedures since experience had shown that tenders of low cost single-storey timber buildings usually failed to attract international bidders and that local bidders were competitive and local materials easily available.

3.31 A total of seven LCB contracts covering 2,510 units were let but two contracts involving 600 units failed and were terminated when the contractor failed to commence work. One contract involving 600 units was partially completed. Another contract was reduced from 300 to 180 units. The final actual number constructed at project completion was 1,434 units (Annex 6) of which 1,290 were actually completed and 144 units partially completed. Details of the contracts are shown in Table 1.

#### Project Buildings

3.32 DID constructed its office complex and staff quarters in 1982. A three storey office complex for the project management commenced construction in February 1987 and was completed in October 1988. A total of 174 units of staff quarters was also constructed and completed in June 1987. Other buildings and facilities provided during the project period included a padi store, two chemical stores, garages and workshop for the vehicle pool, kindergarten, community hall, children's playground, football field and a cooperative store. Details are at Annex 7.

TABLE 1: CONSTRUCTION OF SETTLER HOUSES

<u>Contract Package</u>	<u>Date of Completion</u>	<u>No of Units Contracted</u>	<u>Actual No. Constructed</u>	<u>Progress of Work</u>
1	1983	350	350	Completed and occupied since January 1985
2	1987	360	360	Completed on March 5, 1987
3	-	600	244	Contract terminated on December 8, 1988. 100 units completed and 144 units partially completed
4	-	300	-	Contract terminated due to failure of contractor to commence work.
5	1988	300	300	Completed on July 15, 1988.
6	-	300 (180)	180	Contract reduced to 180 units only.
7	-	300	-	Contract terminated due to contract failure.
<b>Total</b>		<u>2,510</u>	<u>1,434</u>	

Processing Facilities

3.33 A palm oil mill with an initial capacity of 40 ton ffb/hour was to have been built in 1986 and a cocoa fermentary/drier with a 5 ton dried beans/day capacity was established by the Federal Agricultural and Marketing Authority (FAMA) in 1986. Due to implementation delay in oil palm development, ffb production was also delayed and hence it was decided to delay the construction of the mill during the project period as the fruits produced could be sent to the nearby Nasaruddin mill for processing. The oil palm mill was subsequently included for financing in the Second Felcra Land Development Project (1988-1990). Design work for the mill was completed and tender was called for civil works in 1989 while tender for proprietary items was called in early 1990.

3.34 A simple cocoa drier of 2 ton/day capacity was built in 1986 instead of a 5 ton/day drier originally planned. The production of cocoa fell below target and as such did not warrant the construction of a drier of bigger capacity. As for padi milling facilities, no padi mill was set up during the project period but steps are being taken by the appropriate authority to ensure the provision of adequate milling facilities under the Sixth Malaysia Plan (1991-1996).

#### Equipment and Vehicles

3.35 At appraisal a whole list of equipment and vehicles was prepared for procurement under the project totalling M\$20.20 million. During the course of implementation, upon the advice of the Bank's rice crop specialist, a review was undertaken on major items meant for use in the rice area and it was decided to exclude such items as combine harvestors, excavators and transplanters which should be rented/leased or the job contracted out rather than purchased outright as the maintenance costs would be too exorbitant for the project to bear. As a result of this change in policy, the vehicle and equipment list was trimmed down to include only four-wheel drive vehicles, tractors, trailers, graders, other light utility vehicles, agricultural equipment, tools and implements. This has proven to be a cost-effective decision. Three units of land-levelling equipment have also been procured to date. Annex 8 shows the list of vehicles and equipment purchased for the project.

#### Township and Settlement Infrastructure

3.36 Although this component forms part of the project package, the works carried out in the township including the construction of settlement infrastructure were not financed by the World Bank loan except the construction of settler houses. The proposed township and the existing village of Sungai Dedap was to accommodate 6,900 settler families, about 5,500 in the township and 1,400 in the village. Each settler family was to receive a timber house complete with water supply, electricity, roads, drains and sewage disposal. In addition, three secondary schools, seven primary schools, a recreation centre, a health centre, and three clinics were to have been provided.

3.37 Changes in Township Plan - The original township plan was designed to accommodate 6,900 settlers, including 1,700 from the RBC areas. At reformulation, rice cultivation was switched from the lot system to mechanised padi estate cultivation which meant that much less labour was required for the project and with the State Government's decision to accommodate only 4,000 participant families it was therefore decided to scale down the township plan to that of a service centre. This caused a delay in carrying out the physical works of other departments in the service centre. The plan also provided for the construction of a project office complex, schools, health centre, clinics, post

office, social centre, mosque, shops and a whole range of urban facilities complete with water supply and electricity supply. The average size of each settler housing lot is 0.05 ha, half of that provided for at appraisal. Annex 9 shows the physical performance of settlement infrastructure.

3.38 Village Roads - Commencement of design of the village roads was targeted for mid 1980 with completion of construction by end 1985. Actual design, however, started two years later in mid 1982 with completion of construction in January 1989. The design for the 19 km Village Road I started in mid 1982 and was completed in September 1983. The road was tendered by LCB procedures. Construction took place in March 1984 and was completed on schedule in July 1985. The second package involved Village Roads IIa, IIc and the Changkat Lada Road covering a total of 52.90 km. The tender was also by LCB procedures with a tender period of two years. Construction commenced in the last quarter of 1984 and was completed in July 1987, one year behind schedule. The delay was attributed to land acquisition problems arising during the construction stage. The third and final package of the village road was the 55 km Village Road IIb and the Sg. Dedap road.

3.39 The change in the location and amendment to the township plan to downgrade it to a service centre led to a redesign of the road plan and caused a delay in carrying out the physical works in the village area. As such implementation of the village roads was also delayed. Moreover, as the area was very flat, suitable sources of earth for the road embankment construction were limited. The only source available in the area, the Changkat Lada hill, was soon depleted. All materials needed for construction had to be brought in through the Bota Kiri - Telok Sena road which was inadequate to carry the cumulative axle weights of the material supply traffic.

3.40 The township area was situated on very low-lying land and as no platforming of the area was done, the village roads were higher than the level of the houses. In the beginning, the drains constructed were limited in depth to avoid slope failure and so as not to encroach upon the designated lot areas. However, with the reduction of the housing lot size and the number of housing lots, the PWD was able, as construction proceeded, to incorporate monsoon drains as well as concrete lined drains into the design. This relieved the problem of flooding of the township area.

3.41 Schools - The Education Department was given the responsibility to establish schools in the project area. A temporary primary school with 8 classrooms was built and opened for the first term in February 1985 with a total enrolment of 309 pupils. Another primary school consisting of 10 classrooms was completed in August 1988 to supplement the existing school.

Construction work on a 16 classroom secondary school at Sungai Dedap was completed and the school opened for enrolment in May 1986. Construction work on two blocks of hostel with dining hall was also completed.

3.42 Health Centres - A rural health centre was built at Sungai Dedap and is in service whilst another health centre (Phase I) has just been completed at the new township area.

3.43 Electricity Supply - NEB was responsible for the supply of electricity to the township centre and the Sungai Dedap settlement. The original schedule had to be revised during reformulation mainly because of a change in the layout and a reduction in area of the new township coupled with the fact that it had to be coordinated with the new schedule of the village road program. This component was divided into several phases to enable efficient task execution and to achieve supply target date.

3.44 The construction of a 33 kv line from the existing Kampong Gajah switching station to the new township sub-station was completed in June 1986. The construction of the 33/11 kv main intake at the new township centre was postponed to a later date because of low load demand. Meanwhile the 33/11 kv distribution main intake at Selat Pulau Kg. Gajah was completed in July 1988. The present electricity supply for the Seberang Perak township centre comes from this main intake.

3.45 Water Supply - The source of water supply for the township is from the Dindings Water Supply scheme at Kg. Teluk Kepayang. Water is pumped through a 25 km concrete-lined and externally bitumen-wrapped steel pipeline to a reinforced concrete reservoir. The township is supplied by gravity from this reservoir through a 500 mm diameter pipeline. All houses and buildings in the township area will be provided with the necessary tappings complete with fittings and stop valves ready for meter connection.

3.46 A total of eight contracts were involved of which five contracts had been completed covering the construction of the storage reservoir, laying the steel mains from the reservoir to the township and laying of reticulation mains. Two other contracts which are in progress involve the laying of steel main from Kg. Teluk Kepayang treatment work to the Changkat Lada reservoir and the supply and installation of pumping plant. As for the last contract, preparation is being made to call tender for the supply of pumping plant. When these two contracts are completed by August 1990, the township will have its own pumping water system from the clear water tank at Kg. Teluk Kepayang treatment works to the storage reservoir.

3.47 Settler Intake - A total of 10,404 candidates were interviewed between 1982 and 1984. Of these the first batch of 300 settlers was taken in on January 14, 1985. The second batch of 507 was emplaced in November 1988 bringing the total emplaced to 807. Although the total number of participants has been decided by the Perak State government to be 4,000, for the time being the number to be emplaced will be based on the actual number that can be fully employed by the project which has been estimated at reformulation to be about 2,000.

#### B. Project Cost

3.48 Total project costs up to 1989 were M\$263.9 million which amounted to 77% of the reformulation estimate and 61% of the appraisal estimate. The annual project costs compared with the reformulation and appraisal estimates are summarised below:-

TABLE 2: ANNUAL PROJECT COSTS (M\$ MILLION)

<u>Year</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Total</u>
Appraisal	36.9	82.3	102.8	88.3	62.7	40.4	14.5	2.1	-	430.0
Reformulation	3.6	8.3	26.2	49.0	53.0	68.6	67.8	67.7	-	344.2
Actual	9.6	10.9	31.8	32.3	39.5	50.5	32.9	33.7	22.7	263.9

The detailed annual costs for each of the components are shown in Annex 10.

3.49 An analysis of expenditures by components shows that the access roads and the West Coast Highway Section exceeded appraisal estimates by almost 100%. The cost of settler houses was only 17% of appraisal estimate and 26% of reformulation estimate as only about 35% of the physical units were constructed. Palm oil mill construction which was estimated to cost M\$11.0 million at appraisal was postponed. The settlement infrastructure cost was also greatly reduced because of reduced sized of the township. Vehicle cost was less than 10% of appraisal estimate due to contracting out of major on-farm works like land preparation and harvesting. As for the consultancy and studies cost, the US\$2.0 million allocated for consultancy services for the preparation of future projects were not utilised. Due to the highly inflationary situation at appraisal, over-provision was made for price contingency.

#### C. Procurement

3.50 Certain procurement procedures stipulated at appraisal had to be reviewed during implementation in order to ensure the smooth implementation of the project. This primarily involved the construction of settler houses and Access Road 11.

3.51 The three packages for settler houses and project buildings were to have been tendered by ICB procedures. In 1985 Felcra proposed to have this sub-component tendered in five packages using LCB procedures based on the justification that low-cost single storey timber buildings failed to attract international bidders as materials were available locally, the nature of work was labour intensive, there was an abundance of competent local contractors and hence prices tendered by local contractors would be very competitive with those tendered by foreign bidders. Moreover, project buildings could not be packaged together with settler houses as the two types of buildings involved different quality of work and prices tendered would be higher if the two were packaged together. Also, the construction of settler houses depended on the intake of settlers and as such three packages would not be adequate. Based on the above justification, the Bank finally agreed to the tender for the settler houses in five packages and also allowed the settler houses and project buildings to be tendered separately. Seven tenders were finally called for the settler houses.

3.52 Access Road II, which was to be tendered by ICB procedures, comprised two sections, one located in the new padi area and the other in the rehabilitated padi area. PWD had proposed to tender the road by LCB in two packages as delay was expected in land acquisition for the section located in the rehabilitated padi area. The World Bank rejected PWD's request and insisted on ICB procedures using the two envelope system. The road was subsequently tendered in one package by ICB procedures.

D. Disbursement

3.53 Full disbursement of the loan was achieved on September 15, 1989 when the last disbursement was made. The breakdown by Category of actual loan amount disbursed compared to the original loan amount and the revised loan amount is presented in Table 3.

Table 3 - Loan Disbursement  
(US\$ million)

Category	Original Loan Amount	Revised Loan Amount	Actual Loan Amount Disbursed
1. Vehicles & equipment	9.50	0.71	0.72
2. Civil works other than settlement infrastructure	34.70	27.44	27.25
3. Consultants' services	4.80	2.50	2.68
4. Unallocated	1.0	-	-
Total loan amount	50.0	30.65	30.65

3.54 Disbursement was slow in the early years due mainly to unfamiliarity with Bank's disbursement procedures as well as the restriction of reimbursable items to only contractual expenditures. However, from 1987 onwards, disbursement was greatly speeded up when the use of SOE procedures was approved by the Bank as a considerable amount of land development expenditures consisted of force account expenditures, direct purchases and casual labour wages.

#### E. Institutional Performance

3.55 Project Management - The project was originally under the responsibility of the Ministry of Agriculture (MOA) which established a project management unit headed by a Project Coordinator to manage and coordinate the project. On January 1, 1984, when Felcra assumed responsibility for the project, it appointed a Project Director to head the Project Office, assisted by three senior officers in charge of agriculture, engineering and administration. The Project Office was temporarily located in Teluk Intan but later shifted to the new office complex at the new township in 1987 when it was completed.

3.56 A Project Steering Committee guided Felcra and the Project management on policy matters and a Technical/Implementation Committee, which was headed by the Felcra Director General, guided the project management on the technical planning and implementation aspects.

3.57 The Project Director held monthly meetings with the implementing agencies to discuss the operational and day-to-day running of the project. Implementing agencies involved were Felcra, DID and PWD while other participating agencies provided the necessary support services.

Chart I shows the organisational structure of the Project.

3.58 Performance of Implementing Agencies - As mentioned earlier, the main implementing agencies were the DID, PWD and FELCRA. Generally, the DID component performed satisfactorily well. The PWD component for roads was also executed satisfactorily except for contractual problems and poor weather conditions which led to delay in project implementation. The Felcra component, primarily for agricultural development, encountered numerous problems in the first half of the project period but the end result was favourable. Relationship and cooperation among the implementing agencies were excellent and on the whole the project was well-coordinated.

3.59 Performance of The Bank - In the early years, relationship between the Bank supervision missions and Felcra were not so smooth as mission members were rather rigid in their supervision and vigorously enforced what was spelt out in the SAR without due considerations for requests made by implementing agencies to review certain conditions to suit changing situations arising from project implementation. It was only later after the same supervision personnel were assigned to the project and they became familiar with local culture and working conditions that a smooth and fruitful working relationship was established. In fact, the Bank's senior rice agronomist who had been assigned to supervise the Project since 1983 had contributed significantly to the project, in particular, the rice component. Through his valuable advice and suggestions, Felcra was able to overcome problems related to large scale mechanised rice cultivation. Therefore, for Bank to contribute positively to project performance, it is important to assign supervision personnel who are specialists in the relevant fields and who are familiar with local culture, environment and working conditions.

3.60 Monitoring and Reporting - Project progress was monitored by the Project Office and monthly reports were submitted to the Agriculture Division (later to the Implementation Division) at Head Office. For reporting to the Bank, quarterly progress reports were prepared and forwarded to the Bank with updated status reports being prepared for each supervision mission.

3.61 Accounts and Audit - Prior to 1984, the Project accounts were prepared by the Project Coordinator's office under the Ministry of Agriculture. Since then Felcra has been submitting Felcra's audited accounts to the World Bank and in addition, since 1987, separate SOE accounts have been prepared, audited and submitted to the Bank following approval of the use of SOE procedures for small and force account expenditures.

F. Compliance With Legal Covenants

3.62 Project performance as regards loan covenants is as follows:-

<u>Covenant</u>	<u>Status/Remarks</u>
a. Borrower shall employ a suitably qualified and experienced Project Coordinator	Complied

<u>Covenant</u>	<u>Status/Remarks</u>
b. Establish and maintain a Steering Committee for the Project composed of the Secretary General of the Ministry of Agriculture and the Ministry of Land and Regional Development, the Perak State Secretary and other officials representing all government agencies having Project responsibilities, to guide the Project Coordinator on policy matters related to the Project.	Complied
c. Furnish to Bank, by December 31, 1981, the criteria for the selection of settlers and the draft agreement with the settlers for Bank's review and comment.	Covenant deleted by mutual agreement between Bank and Felcra
d. Furnish to Bank, by December 31, 1982 a detailed proposal for the monitoring and evaluation of the Project for Bank's review and comment.	Complied
e. Furnish by December 31, 1981, a detailed implementation schedule for the provision of township facilities for the Bank's review and comment.	Complied
f. i) DID to prepare a designer's operations manual covering the works under the Project.	Complied
ii) DOA to prepare, by 31/12/84, an agricultural services operation manual as a guide for field staff and to develop the rice Seed Production Center at Titi Gantong to meet the requirement of the Project.	Complied

PROJECT COMPLETION REPORT

MALAYSIA

TRANS-PERAK AREA DEVELOPMENT PROJECT  
(LOAN 1960-MA)

PART IV: PROJECT IMPACT

4.01 The project has developed 12,700 ha of new land, comprising 4,482 ha for irrigated padi, 7,110 ha for oil palm and 1,108 ha for cocoa, and provided improvements to the drainage and irrigation infrastructure of 4,000 ha of existing rice land (Table 4). About 4,000 settler families would be shareholders of the project, 807 of whom have already been emplaced.

TABLE 4: AGRICULTURAL DEVELOPMENT

<u>Hectarage Developed</u>	<u>At</u>	<u>At</u>	<u>Actual</u>
<u>-----</u>	<u>Appraisal</u>	<u>Reformulation</u>	<u>At PCR</u>
Rehabilitated Padi Area	3,727	4,370	4,035 <sup>4</sup>
New Padi Area	5,215	4,482	4,482
Tree Crop Area	8,438	7,585	8,218
Oil Palm	7,223	6,464	7,110
Cocoa	1,215	1,121	1,108

4.02 At full development, the annual production of padi, oil palm and cocoa would be 73,000, 166,000 and 1,300 mt respectively. These provide substantial foreign exchange earnings and savings. Housing, social amenities and community facilities are provided in the township for the settlers. The settlers' cooperative is already actively engaged in economic activities such as participating in works like land preparation, field maintenance and harvesting in the agricultural area, providing services to transport the project's outputs to the processing centres and operating a petrol kiosk as well as a canteen in the project area. Settler dependents, especially the womenfolk are also encouraged to produce native handicrafts for sale. Other income-generating projects run by the settlers include sheep and cattle rearing, orchard farming (starfruit and guava) and noodle making. All these create employment opportunities for the settlers and their dependents.

Apart from economic objective, this settlers' institution has been established for the purpose of ultimately assuming the responsibility for project management when the development loan has been repaid and Felcra withdraws from the project, in line with Felcra's divestment policy.

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<sup>4</sup> For purpose of calculating incremental rice production to determine the economic rate of return in Part V, it is assumed that the whole area of 4,370 ha can be fully cultivated by 1994.

4.03 The project impact on the development of padi, oil palm and cocoa is discussed in detail in the following paragraphs.

A. Padi

Yields and Cropping Intensity

4.04 Rehabilitated Padi Areas - While Felcra has been managing the semi-estatised areas of Phases 1 and 2 located in Block B and part of Block C, the DOA has been providing agricultural extension services to the individual farmers in the rest of the Left Branch Canal areas. Since project commencement until the end of 1989, there have been major changes in farm cultural and agronomic practices such as the introduction of dry ploughing, direct seeding and mechanised harvesting. These changes have helped to improve yields from 2.8 mt/ha to 3.7 mt/ha for the individual farmers in the area and to 4.2 mt/ha in the case of the semi-estatised areas under Felcra. In the future padi yields in the rehabilitated padi areas could be increased to more than 5.0 mt/ha subject to the following conditions:-

- a) Continued application of new rice technology by padi farmers including the use of new and certified padi seeds;
- b) good water management practices supported by a proper field drainage and irrigation system;
- c) indepth technical knowledge in controlling pests, diseases and weeds;
- d) cooperation among the farmers in the use of water and close adherence to crop planting schedules;
- e) land planing for every season;
- f) maximum utilisation of land; and
- g) close liaison with FOA to ensure sufficient and timely supply of agricultural inputs.

4.05 New Padi Areas - Up to 2/87 (wet) season yield levels achieved in the new padi area had only been moderate and had stagnated at about 3.5 mt/ha. Problems commonly encountered included pest damage, land subsidence which resulted in poor land levelling, acidity, poor water control and the use of agronomic practices largely suited to transplanting techniques. However, from 2/88 (wet) season onwards, performance of padi turned around and, by loan closing in December 1989 average padi yields in the new padi areas increased substantially when compared to the targeted yield at appraisal and reformulation (4.2 mt/ha).

The average yields increased to 5.5 mt/ha<sup>/5</sup>, an increase of 31% over the appraisal target. It is anticipated that with further refinements to agronomic practices and intervention of new technology that the yield potential could be in excess of 6.0 mt/ha, especially in the dry season. The following factors have been found to be essential for the achievement of high padi yields:-

- i) Micro-levelling of farm lots thereby facilitating good water depth control;
- ii) improvements to field hygiene and effective control of rodents;
- iii) improvements to weed control with chemicals augmenting agronomic measures;
- iv) implementation of the "semakan padi" or rice-check technique to achieve agronomic objectives which will ensure high yields; and
- v) improvements to methods of seeding, seed-rate, seed-germination and manuring.

4.06 Micro-Levelling - Although initial macro-levelling specified tolerance of  $\pm 5$  cm difference in level, in reality, subsidence of filled areas after application of irrigation water resulted in differences in water depth far in excess of 10 cm. Micro-levelling had to be carried out at farm lot level to bring the tolerance level to  $\pm 5$  cm. This greatly improved seedling establishment and also weed control.

4.07 Field Hygiene and Rodent Control - Excess spoils and oversized bunds were trimmed while weeds along bunds, reserves and boundaries were sprayed out. Keeping bunds, reserve lands and roads to their minimum width denied rats breeding grounds while keeping such areas weed-free ensured that they do not provide a sanctuary for rat movements or intermediate hosts to pests to tide over the fallow period.

4.08 Weed Control - Grasses especially Echinochloa and Leptochloa became the dominant weeds when direct seeding was practised. In addition to effective water depth control, propanil sofit and other herbicides were used to control competition from these grasses. Broad leaves and sedges were easily controlled with 2,4-D Butyl Ester or Londax.

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<sup>/5</sup> The yields mentioned in this para are not based on crop-cutting but on actual weight delivered to LPN mills.

4.09 Rice Check Technique - Under the "semakan-padi" concept, farm managers were required to achieve certain field objectives to ensure target yield was achieved. Beginning one week after sowing, census are carried out periodically to check and ensure that targeted numbers of seedlings, tillers and panicles are achieved. Final yields achievable could now be accurately predicted right after seedling establishment.

4.10 The Use of Motorised Mist Blowers for Sowing, Fertilizing & Chemical Application - Commencing from season 2/83 (wet) dry-sowing with the "sekinchan seeder" was practised until season 1/85 (dry) when hand-sowing of pre-germinated seeds into water was practised. However, beginning season 1/87 (dry) wet-sowing of pre-germinated seeds were carried out using motorised mist-blowers which greatly improved uniformity of seedling establishment. The mist-blowers were also being used for fertilizer and chemical applications which greatly improved evenness of distribution as well as coverage. With improvements made to farm-level and agronomic practices, yields in excess of 6 mt/ha for the coming seasons could be expected. The use of the motorised mist-blower has proven its effectiveness in not only improving yields but also has resulted in considerable savings in labour requirement by about 8 mandays per ha per season (See Annex 16 Table 1), equivalent to a cost saving of about M\$100/ha/season.

4.11 Crop Schedules - Another significant achievement made by the project management had been the close adherence to cropping schedules which had enabled two crops to be planted consistently every year beginning 1986. In addition, 200% cropping intensity was also consistently achieved. The single factor which had enabled close adherence to crop schedule was the farming-out of works such as land preparation, harvesting and land-levelling to private contractors instead of carrying out such works departmentally. As most of the padi planting activities need to be completed in a very short and also time requiring large numbers of machinery at any one time, farming out such works to private contractors proved wise and enabled management and staff to concentrate on other crucial activities. Another important decision made was to abandon the season 2/85 (wet) cultivation when it was realised that by October 1985 the crop would be off-schedule. In fact, only one crop had been planted for 1983 and 1984. By abandoning the 2/85 crop, it was possible to consolidate and start the 1/86 (dry) season on a proper cropping schedule which eventually made double-cropping possible from 1986 onwards.

4.12 Cropping Intensity - Although targeted cropping intensity was 180% to allow for 10% of the land to remain fallow or for releveling every season, it was found that if releveling and any farm improvements were done immediately following harvesting, and advantage was taken of the dry period prevailing, 100% of plantable areas could be cropped every season. Seberang Perak is fortunate to have two short but distinct dry periods of January/February and July/August which enable harvesting and land preparation to be critically scheduled to fall into these dry periods. This makes possible the planting of two crops a year.

4.13 Technological Innovations - In line with Felcra's established type of padi operation, the following innovations which were suited to direct seeding technique were introduced, namely:-

- i) Seed-rate - To ensure adequate plant stand, between 80-100 kg/ha of seeds are currently being used compared to the recommended 40-60 kg/ha. Under the Trans-Perak conditions, it was found that at least 80 kg/ha of seeds are needed for broadcasting so as to ensure the successful establishment of a minimum of 200 seedlings/m<sup>2</sup> one week after sowing. From these 500-600 tillers/m<sup>2</sup> should be achieved and eventually at least 400 panicles/m<sup>2</sup> to be expected and yielding 6-8 mt/ha. Another important consideration was the use of fresh seeds for each season so that only vigorous seedlings with high genetic potential would be grown to achieve high yields. Towards this end, Felcra has set up its own seed-farm to supply its own seed requirement.
- ii) Fertilizer Rate - As the subsidised fertilizers (198 kg of NPK + 40 kg urea) are insufficient to ensure vigorous plant growth, the application of supplementary urea of between 50-100 kg/ha was found to be necessary based on technical requirements.
- iii) Mechanisation - Padi cultivation in Seberang Perak has largely been mechanised or machine-aided. For example, land preparation is now done with tractor-rotary tillers, land levelling with back-bucket pushers and, more recently, with land planers while harvesting is carried out with large combines. Even seed sowing, broadcasting of fertilisers and spraying of pesticides utilise the same motorised mist-blowers. Mechanisation has helped to increase productivity and reduce labour requirement.

#### Seed Production

4.14 At appraisal DOA was made responsible for the supply of padi seeds to the Project and has been supplying seeds from the Titi Gantong seed station. However, due to increased usage of seeds (para 4.13) the station can only supply 40% of the

project's seed requirement and the rest of the supply comes from the Crop Production Branch in Teluk Chengai (Kedah) and Bumbong Lima (Penang). To ensure adequate and uninterrupted seed supply of the right type and quality, another seed station was established at Sungai Dedap by Felcra to supplement DOA's supply. At full production, total seed requirement for the project is estimated at 800 mt/ha per season. Meanwhile, about 70% of the farmers in the rehabilitated padi areas are using certified seeds produced by DOA.

#### Pests and Diseases

4.15 For the estate operations, DOA has also assisted in crop protection, i.e pest surveillance. The padi area had been attacked by diseases and pests such as the brown plant hopper, white-backed plant hopper, and leaf cutter, and there had been rodent attacks every season. These pest occurrences have decreased since the implementation of an integrated pest management and pest surveillance/forecasting programme by the plant protection unit of the DOA. Monthly meetings are held with DOA and MARDI to assess the pest situation, and to enable MARDI to present its survey and research findings.

4.16 In the early days at the planting stages of the tree crop area, wild boars and elephants posed a serious threat to the oil palm seedlings. As a result, crop protection brigades were formed, electric fencing was put up and the Wild Life Department's help sought to drive away the elephants. A considerable sum was expended by Felcra and other concerned agencies to relocate the elephants to the National Park. As a result of the heavy damage, seedling supplies were very high which partly contributed to the high cost of land development, and difference in the age of the palms.

#### Water Management

4.17 Irrigation water is apportioned using the constant head orifice (C.H.O.) and the field offtake (F.O.) control boxes. The quantity of water entering the individual fields can be adjusted using the butterfly flaps of the F.O's. To accommodate the use of modern farm equipment on the padi fields, three major changes were made which differed from that recommended in the DID Designer's Manual:-

- a) the duration for peak water supply has been increased from 7 days to 11 days;
- b) there is no staggering in the tertiary blocks;

- c) presaturation of 25-50 mm of standing water is found to be sufficient for padi planting due to better land levelling. Originally, the water duty provided at pre-saturation was 5.60 l/s/ha but following the changes in agricultural practices, it can now be reduced to 3.85 l/s/ha.

4.18 The depth of water in the field is controlled by the drainage outlet boxes (D.O) and, more importantly, for adjacent fields of different levels, through the strengthening of the dividing bunds. With the purchase of land-levelling equipment, micro-levellings were carried out and these resulted in a more uniform water-depth and plant growth. Where it was possible, the 1.2 ha fields were combined into 2.4 ha fields to facilitate machinery manoeuvring.

4.19 Field drains were dug along the field bunds to facilitate the distribution of water into the field and for rapid removal of surface water. One month after drainage, fields would be dry enough to accommodate harvesters and hence there would be less damage to the field surface. With experience, the field staff should be able to manage the use of irrigation water more efficiently.

#### Operation and Maintenance

4.20 As originally planned, the Perak State DID is responsible for the operation and maintenance of the main and secondary canals and drains and the flood embankment. However, the main drain in Phase 12 of the tree crop area has been handed over to Felcra for operation and maintenance. The tertiary drains and canals as well as farm roads are the responsibility of Felcra and their operation and maintenance are treated as part of land development/crop production costs. The PWD is responsible for the maintenance of the West Coast Highway Section, the project main roads and the village roads. An annual sum of M\$1,500 per km is required for the periodic maintenance of gravel roads while M\$15,000 is required for the maintenance of metalled roads. The maintenance of the township roads and drains is the responsibility of the PWD. However, as no local administrative machinery has been established and while waiting for the enactment of local by-laws and legislations to enable the various state agencies to play their respective roles, for the time being Felcra is carrying out the operation and maintenance of the service centre.

#### Padi Production

4.21 Rehabilitated Padi Areas - Individual farmers in the Left Branch Canal area have benefitted from the improvements done by DID to the drainage and irrigation facilities in the area.

During the 1/89 (dry) season, a total of 3,515 ha were planted while in the 2/89 (wet) season another 205 ha which were managed by Felcra were brought into cultivation bringing the total area in production for 1989 to 7,235 ha (for 2 seasons). This is 92% of the reformulation target of 7,870 ha and 78% of the appraisal target of 9,300 ha.

4.22 Total production attained for the two seasons amounted to 24,255 mt, representing an achievement of 75% of the reformulation target of 32,180 mt and 65% of the appraisal target of 37,100 mt. The shortfall in cropped hectareage was due to abandonment of part of Block A as a result of the failure of a consulting company engaged by the Block A farmers' cooperative to operate the area. The average yield attained in the 1/89 (dry) season was 3.36 mt/ha. Compared to the appraisal and reformulation target of 4.2 mt/ha, this represents an 80% achievement. For the 2/89 (wet) season the average yield obtained was slightly lower at 3.34 mt/ha which is 12% lower than the appraisal target of 3.8 mt/ha. However, the highest yield attained by individual farmers in the area was 3.7 mt/ha in Block C during the 2/89 (wet) season. Meanwhile farmers in Felcra-managed Phase 2 recorded 4.2 mt/ha during the 1/89 (dry) season.

4.23 The actual production and yield attained in comparison to the appraisal and reformulation targets are summarised in Table 5 while the detailed production and yield attained by each block for the last two seasons are shown in Annex 12 Table 1. The increase in yield and production were made possible by the improvements made to the drainage and irrigation infrastructure, use of farm mechanisation for land preparation, sowing and harvesting, better water management, and the use of high yielding seed varieties.

4.24 New Padi Areas - Initial yield increases were encouraging but had stagnated at about 3.0 - 3.5 mt/ha up to 1/88 (dry) season. Performance however, turned around from the 2/88 (wet) season onwards. During the 1/89 (dry) season, the average yield attained was 5.37 mt/ha with a total production of 20,594 mt. This compares favourably with the appraisal estimate of 4.2 mt/ha and 19,700 mt. production representing an achievement of 128% and 104.5% respectively. The slight improvement in production despite the much higher increase in yield was attributed to a lower planted area of 3838 ha compared with the appraisal estimate of 4,700 ha. Although the total area handed over by DID was 4482 ha, the plantable area at present is 4,353 ha as there are still some areas that are too low lying and cannot be cultivated. It is not impossible to anticipate that

TABLE 5: PADI CROPPED AREA, YIELDS AND PRODUCTION

	Cropped Area (ha)			Yield (mt/ha)			Production (mt)		
	Appraisal	Reformu- lation	Actual at PCR	Appraisal	Reformu- lation	Actual at PCR	Appraisal	Reformu- lation	Actual at PCR
<b>Left Branch Canal</b>									
<b>System (Individual)</b>									
Wet season	4,900	4,370	3,720	3.8	4.0	3.34	18,600	17,480	12,443
Dry season	4,400	3,500	3,515	4.2	4.2	3.36	18,500	14,700	11,812
Sub-total	9,300	7,870	7,235				37,100	32,180	24,255
Cropping Intensity (%)	190	180							
<b>Right Branch Canal</b>									
<b>System (Estate)</b>									
Wet season	5,200	3,585	4,353	3.8	4.2	4.75 /a	19,800	15,000	20,695
Dry season	4,700	3,585	3,838	4.2	4.2	5.37 /a	19,700	15,000	20,594
Sub-total	9,900	7,170	8,191				39,500	30,000	41,289
Cropping Intensity (%)	190	160	200 /b						
<b>TOTAL</b>	<b>19,200</b>	<b>15,040</b>	<b>15,426</b>				<b>76,600</b>	<b>62,180</b>	<b>65,544</b>

/a These are actual wet yields in 1989. The dry yield equivalent is 3.7 mt/ha for the wet season and 4.1 mt/ha for the dry season as shown in Annex 12 Table 3.

/b Wet season area is larger than dry season area due to new area being included under the wet season.

Cropped

with further improvement made to the drainage, the whole area could be cultivated at some future date<sup>6</sup>.

4.25 The 2/89 (wet) season average yield was 4.75 mt/ha with a total padi production of 20,695 mt. The area planted increased to 4353 ha with a cropping intensity of 200%, 10 percentage points higher than the appraisal projection of 190% and 40 percentage points higher than the reformulation projection of 160%. The changes in cropping area, yields and production are summarised in Table 5 while the gross production and average yield for each season since 1983 are presented in Annex 12 Table 2. The projected yield profile based on dry weight is shown in Annex 12 Table 3. Annex 12 Table 4 and 5 show the actual (1983-1989) and estimated (1990-2010) production based on dry weight of the new padi areas and the incremental production of the rehabilitated padi area from 1983 until the year 2010.

B. Oil Palm

4.26 Details of annual oil palm plantings, production and yields are presented in Annex 13 Table 1 and are summarised in Table 6.

4.27 The actual performance of oil palm production from 1983 to 1988 fell short of appraisal estimates due to poor initial development caused mainly by severe pest damage and flooding leading to a high degree of supplying.

Table 6: Oil Palm Yields and Production

Year	Area (Ha)	Total FFB Production (mt)	Average Yield (mt/ha)
<u>1983/4</u>			
Appraisal (1983)	680	3,300	4.9
Actual (1984)	166	466	2.8
<u>1988</u>			
Appraisal	6,450	94,200	14.6
Actual	3,176	16,000	5.0
<u>Peak Production</u>			
Appraisal (1992)	7,220	155,000	21.5
Projected (1997)	7,110	166,000	23.3
<u>2000</u>			
Appraisal	7,220	131,400	18.7
Projected	7,110	158,000	22.2

<sup>6</sup> For purpose of economic analysis in Part V, it is assumed that the whole area of 4,482 ha will be brought under cultivation by 1994.

Despite the poor performance in the early years, the yield profile adopted for the economic analysis of the oil palm component (see Annex 13 Table 2) has a higher peak compared with the appraisal estimate because individual block's performance in the area has demonstrated that the area is capable of achieving a higher yield than that projected at appraisal. In fact, the average yield by year 6 of production had shot up to 21.3 mt/ha compared to the appraisal estimate of 19 mt/ha. Furthermore, a report prepared by a private consultant on the area stated that at peak production, the yield could easily exceed 25 mt/ha. Annex 13 Table 2 shows the actual yield profile from Year 1 to Year 6 by year of harvest and the projected yield profile. Annual oil palm production is expected to peak at 170,000 mt of ffb in 1996 compared with the appraisal estimate of 155,000 mt in 1992 as indicated in Table 6. From then on it will decline gradually due to aging of palms. The 30 ton ffb/hour palm oil mill about to commence construction will be adequate to serve the entire production from the oil palm estate and the capacity can be extended to 60 tons ffb/hour when the need arises.

### C. Cocoa

4.28 Cocoa planting began in 1981 with 45 ha. and by the end of 1989 about 190 ha had been established. Shade trees (*Gliricidia*) have been established in all cocoa areas. By 1992 the total cocoa area planted will be 1,108 ha instead of 1210 ha projected at appraisal. Some of the established cocoa has been over-budded with improved clones to ensure high yield potential while the new areas are being planted with selected hybrid and clonal cocoa.

4.29 Harvesting began in 1984 with a total production of 7 mt and, at the end of 1989, 186 ha had come into production producing 107 mt. Full production will be reached as projected in 1992 but production is expected to be only 522 mt, well below the appraisal projection of 1,330 mt because of the smaller area and late planting of cocoa. Peak production will be achieved in 1999 with 1,380 mt and a yield of 1.28 mt/ha. A 2 mt/day dried beans cocoa drier has been built in the project area to dry the cocoa beans. The dried beans are sold in batches by open tender to ensure that the best prices are offered to Felcra. Annex 14 Table 1 and 2 shows the cocoa production and yield profile used for projection.

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PART V: FINANCIAL AND ECONOMIC ANALYSES

5.01 The derivation of rice, palm oil and cocoa prices are presented in Annex 15. The projected financial ex-mill prices for palm oil, palm kernel and cocoa are based on the Bank's January 1990 commodity price forecasts in constant 1985 dollars, adjusted to 1989 constant dollars using the Bank's Manufacturing Unit Value (MUV) Index. Generally, these prices are much lower than that projected at appraisal and at reformulation. The economic prices of each crop were derived by adjusting for taxes, duties and subsidies as well as applying conversion factors (as shown in Annex 15 Table 4) on the financial base estimates. As for the prices for rice and cocoa, they were derived with a 10% discount for grade differential. A milling ratio of 65% was assumed for rice and the financial price was based on the local Government controlled price which averaged \$495 per mt plus a price subsidy of \$165 per mt.

5.02 For purposes of economic analysis, the costs for drainage, irrigation and land development contracts have been specifically allocated to the new padi, rehabilitated padi and tree crops. Costs for access roads, buildings, equipment and vehicles, consultancy for roads, and administration and engineering were allocated to each crop based on planted hectareage and/or frequency of usage as follows:-

<u>Costs</u>	<u>Padi</u>	<u>Oil</u>	<u>Cocoa</u>	<u>Social</u>
	<u>(%)</u>	<u>Palm</u>	<u>(%)</u>	<u>Cost</u>
		<u>(%)</u>		<u>(%)</u>
a. Access Road I	25	21	4	50
b. Access Road II	100	-	-	-
c. Equipment and Vehicles	50	42	8	-
		(For padi related vehicles and equipment, all allocated to padi).		
d. Buildings	50	42	8	-
e. Administration and Engineering	50	42	8	-
f. Consultancy		As in Access Roads I and II for costs related to them.		

Conversion factors were also applied on capital costs, production costs (see Annex 16), operation and maintenance costs, and for actual costs incurred from 1981 to 1988, these were inflated to 1989 constant terms by using the Consumer Price Index as indicated in Annex 15 Table 5. In arriving at the economic rate of return for the agricultural component (Annex 18), the costs and benefits of all the three crops were included. Both new and rehabilitated padi were included in the economic analysis and as for rehabilitated padi, only incremental costs and benefits were taken into consideration.

5.03 As Felcra's land development and production accounts are kept by scheme or phase and not by crop, the actual development costs for the tree crops have been allocated at 80% for oil palm and 20% for cocoa. Development cost for new padi was directly traceable. Costs for drainage and irrigation maintenance and other DID expenses were estimated at \$1.0 million per annum. Felcra costs for administration and maintenance were based on \$2.00 million per annum. Maintenance costs for vehicles and equipment directly attributed to agricultural operations were not allocated as it was assumed that these costs were accounted for by the rentals charged to the development and operational costs of each phase as and when they were being used. The rentals credited to the Vehicle Pool System are used to finance the pool's expenses such as drivers' salaries, vehicle maintenance and replacement. Farm level crop benefits and costs were calculated based on the whole project. The estimated crop production cost per hectare for each crop is presented in Annex 16.

5.04 In Annex 16 Table 1, the rehabilitated padi crop production budget for the 'With Project' cost is lower than the 'Without Project' cost due mainly to the tremendous savings in labour cost as a result of changing technology and increased mechanisation such as the use of the motorised mist blower for direct seeding, fertiliser and chemical application and the increased usage of chemicals replacing manual labour for weeding and bund maintenance. Labour savings in water management is the result of increased canal density which allows water to be tapped directly from the canal whereas in the past water had to flow from one plot to another. With direct seeding, the fields need not be flooded right from land preparation but instead water is let into the fields progressively in accordance with plant height.

## **B. Settlers' Incomes**

5.05 Settlers derive incomes mainly from two sources, namely, wages from working on the project and dividends from the surplus derived from the sale of project outputs net of all costs. Additional family income will be in the form of participation in economic projects such as sale of handicrafts, milk from dairy farming (feedlot), sheep, fruits and vegetables raised in the houselots or poultry rearing in the backyard (See para 4.02).

The average annual wages received by the settlers since 1988 and the advance payments made to them during festive seasons are shown in Table 7. However, the advances were debited to the Profit and Loss Accounts and treated as an expense.

**TABLE 7: AVERAGE ANNUAL INCOMES PER SETTLER  
(M\$)**

	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
Annual Wages	3,576	4,213	5,154	5,220	5,618
Advances	-	300	568	300	600
Total	3,576	4,513	5,722	5,520	6,218
Average Monthly Income Per Settler	298	376 (351)	476 (430)	460 (435)	518 (468)

(Figures in parentheses exclude advances)

5.06 For the derivation of settlers' annual incomes, the financial cash flow for all the phases aggregated together is presented in Annex 17. For the purpose of calculating income from wages, it is assumed that about 2,000 settlers, the maximum number required to work on the agricultural area, derive wages from the project but the dividends are distributed to all 4,000 participants. The project will be able to distribute its first annual dividend to the settler from an estimated surplus of \$2.93 million in 1991. It is assumed that any surplus made after all deductions, including loan repayment and accumulated losses, will be distributed as dividends. At full development after 1994, the total scheme income from labour would exceed M\$8.0 million or an average of M\$4,280 per settler per year. (Based on about 300 mandays per settler per annum and a daily wage rate of \$12). Annual income per settler after loan repayment and after all government charges are calculated at about \$5,618 in 1989 increasing to a maximum of \$10,094 in 1998 and then stabilising at about \$9,500. Total settler income from both wages and the shareholding will therefore exceed the poverty line income of M\$4,200 per annum.

C. Economic Rate of Return

5.07 At appraisal the economic rate of return (ERR), for the agriculture component was estimated at 18% while at reformulation in 1985 the ERR was revised to 9%. A recalculation of the ERR in 1989 constant terms with revised estimates of yields for padi and oil palm shows that the ERR is now 10%. The Net Present Value (NPV) discounted at 10% is M\$2.4 million.

The ERR for the agriculture component is calculated from the economic costs and benefit flows presented in Annex 18 while the result and the ERR by crop, compared with appraisal and reformulation estimates are summarised in Table 8 below.

Table 8: ECONOMIC RATE OF RETURN

	Apprai- sal	Reformu- lation	At PCR	1980 Appraisal Commodity Price Projections Adjusted to Constant Terms	
				At Reformu- lation	At PCR
<u>Internal Rate of Return (%)</u>					
Agriculture	18	9	10	19	31
Rice	20	7	6	23	36
Oil Palm	18	n.a	13	n.a	28
Cocoa	12	n.a	4	n.a	13
Tree Crop	17	10	12	15	26

5.08 Using the 1980 appraisal commodity price projections adjusted to 1989 constant terms yield a much higher ERR of 31%. This shows that the comparatively lower ERR at loan completion is due to the lower world commodity prices. The other reasons for the lower rate of return are due to project implementation delays as reflected in the long stream of negative cash flows and higher cost of development.

5.09 The ERR for the West Coast Highway could not be calculated as no traffic counts survey has been carried out to determine the benefits of the Highway. However, from visual observations and interviews with F&D and Project Office staff, it was obvious that the construction of the Highway and the new bridge in the project area was a boon to the economic and social development of the project area, surrounding townships and rural areas.

D. Cost Recovery

5.10 Government capital outlays for the project total \$263.9 million. The land development costs for the new padi and tree crop areas totalling M\$75.7 million would be recovered from repayment by settlers over 15 years after 10 years of grace period. The interest charged varies; loans signed before 1981 were charged at 6 1/2% p.a. and repayable over 9 years after 6 years of grace period in which interest was capitalised. These loans have since been rescheduled and repayment is now over 15 years with interest reduced to 4% p.a. The interest on loans signed from 1981 to 1984 were waived but in 1985 it was reinstated at 4% p.a.

5.11 Settlers housing cost for the project which amounts to M\$5.6 million is also repayable at 4% p.a. but over 13 years after two years of grace period. A religious tithe, Zakat, is imposed by the State Government at the rate of 10% of the gross value of padi production. The total amount expected to be recovered from zakat over the lifespan of the project (from 1981-2010) in constant 1989 terms is about M\$45.2 million. At the moment land tax and water charge are not levied on the project but provision has been made in the settlers cash flow in Annex 17 to deduct a nominal charge of \$5 per ha per season for the padi area and a land tax (consolidated annual charge or C.A.C.) of \$30 per ha per annum. In fact, for the land tax, provision has been made by Felcra in the settlers loan accounts for payment to the State Government. An estimated M\$9.3 million would be recovered from water charge and land tax.

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PART VI: LESSONS LEARNED AND CONCLUSION

6.01 The implementation of the Trans-Perak Area Development Project (in which Felcra began as a component implementing agency and later a lead agency) posed a great challenge to Felcra. For the first time Felcra was thrust with the responsibility to undertake such a big and complex project involving three crops including a padi component, township development and coordination with other agencies. Up to then the largest single Felcra projects were the youth settlement schemes of about 2,000 hectares in size and monocrop in nature. The experiences drawn from the implementation of this project and the valuable lessons learned have given Felcra management and staff more confidence and strength in embarking on new ventures and future challenges.

a. Project Coordination and Management

6.02 In implementing a development project that consists of a number of components, it is essential to appoint a capable and strong coordinator to the project to ensure smooth project implementation. The Trans-Perak project made little progress in the early stages of implementation but after 1984 with the emplacement of a more technically oriented and experienced management team the project progressed much more smoothly and achieved considerable headway in its implementation. To ensure effective coordination, other implementing and participating agencies providing the relevant support services to the project should report to and be made directly responsible to the Project Coordinator. The budget allocation of these agencies which are meant for the Project should be provided for and allocated directly to the Project Coordinator's Office and not be placed under the respective agencies' overall budget so as to avoid possible redirection of these funds to finance other projects, especially in the event of a budget cut faced by these agencies.

b. Applicability of Estate System to Padi Cultivation

6.03 The Project has proven that the estate style of management so successfully associated with tree crops is also applicable to other crops such as padi. In the beginning there were scepticisms from certain quarters as to the workability of the estatised padi system and indeed the project did not perform too well until after the last few years but since then it has proven the critics wrong with the above average padi yields obtained since the 1/89 season and savings in labour requirement.

For the successful implementation of large scale mechanised padi estate, the following factors must prevail:-

- i) Strict adherence to cropping schedules.
- ii) Land-planing every season.
- iii) Good and efficient water management.
- iv) Effective weed, pest and disease control.
- v) Timely application of the optimum quantity of fertilisers.
- vi) Efficient and effective control and supervision of field operations and privatising of mechanised farm works to avoid high holding costs caused by idling of machinery and high maintenance costs.

c. Technical Training and Exposure to Technological Development

6.04 Implementing agencies should be responsive and receptive to technological developments taking place not only from within the country but also from other countries as well. The exposure given to some of Felcra's technical staff has shown that the yield performance of padi could be greatly enhanced with the adoption of appropriate technology. Learning from the experiences of others which have a proven track record of successes in a particular area of operation could open the doors to greater opportunities for excellent performance.

d. Capability of Staff Assigned to Specialised Project

6.05 The success of a project depends considerably on the experience and capability of the staff assigned to it. For a project of this magnitude and nature where the ground working environment was harsh and hostile, it is imperative that only capable, experienced and well-trained staff with the relevant years of related experience be assigned to the project. Additionally, the staff should be committed and motivated to contribute to project performance.

e. Infrastructure Precedes Agriculture Development

6.06 The Trans-Perak experience has also shown that infrastructure development must precede agriculture development in an area development project. Large scale development of swampy tracts of virgin jungle land must be provided with the basic infrastructure like roads to facilitate ease of access and

drainage and irrigation facilities, before any form of agriculture development could take place. Otherwise the cost of agricultural development would be too costly and render the economic rate of return to the project unviable. With agricultural development as an economic base, village development could then proceed to enable large scale settlement of new settlers in the project area.

f. SOE Procedures

6.07 As with Felcra I Project (Loan 2013-MA), SOE procedures were only introduced towards the later part of the project period. If it had been identified at project formulation that small direct payments, force account works and small contracts were a common feature of land development, the use of SOE procedures would have been allowed by the Bank and would have accelerated disbursement right from the start of the project.

CONCLUSION

6.08 Project objectives of improving incomes and alleviating poverty have been achieved as reflected in the improved incomes obtained by the settlers which were beyond the poverty income level. Padi yields attained are higher than that projected at appraisal and the project has consistently attained doublecropping of padi since 1986. The project as a whole is economically viable as reflected by its ERR of 10%. In addition the project has also demonstrated that large scale mechanised rice cultivation managed on an estate basis can be successfully implemented in this country. Apart from economic benefits, the unquantifiable social benefits and spill-over effects from such a development project can also be enormous. All the settlers are gainfully employed on the project and through the settlers' institution, the cooperative, participate actively in the day-to-day operations of the project. In line with Felcra's divestment policy, they are also being groomed to eventually take over the management of the project.

6.09 The whole area is almost fully planted and the tree crops are growing well and giving good yields. With good effective management the padi crop should be able to continue to improve in yields. Presently, there are no major problems being faced by the project and it is anticipated that the project should be able to sustain itself in the future.

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KEY PERFORMANCE INDICATORS

Indicator	Unit	Goal			Achievements as	
		Appraisal 1981	Reformulation 1986	Actual 1989	% of Appraisal Target	% of Reformulation Target
Main and secondary canal - improvement	km	122	122	34.0	27.9	27.9
- construction	km	79	79	94.0	119.0	119.0
Tertiary canal construction	km	-	-	148.0	0.0	-
Main and secondary drains - improvement	km	73	73	58	79.5	79.5
- construction	km	12	12	192.0	1,600.0	1,600.0
Tertiary canals	km	-	-	135.0	0.0	-
New Rice	ha	5,215	4,482	4,482.0	85.9	100.0
Rehabilitated Rice	ha	3,727	4,370	3,720.0	99.8	85.1
Oil Palm	ha	7,223	6,464	7,110.0	98.4	110.0
Cocoa	ha	1,215	1,121	1,108.0	91.2	98.8
Flood embankment	km	29	29	29.0	100.0	100.0
Project main roads	km	53	60.6	54.6	103.0	90.1
West Coast Highway	km	27	24.3	24.3	90.0	100.0
Settler houses	No.	6,900	4,000	1,434.0	20.8	35.9
Palm oil mills	No.	1	1	-	0.0	0.0
	mt ffb/hr	40	40	-	0.0	0.0
Cocoa fermentary	No.	1	1	1.0	100.0	100.0
	mt dried beans/day	5	5	2.0	40.0	40.0
<b>Right Branch Canal</b>						
Padi yield - wet season	mt/ha	3.8	4.2	4.7 (3.7)	123.7 (97.4)	111.9 (97.4)
- dry season	mt/ha	4.2	4.2	5.4 (4.1)	128.6 (97.6)	128.6 (97.6)
Cropping intensity	%	190	160	200	105.3	125.0
<b>Left Branch Canal</b>						
Padi yield - wet season	mt/ha	3.8	4.0	3.3	86.8	82.5
- dry season	mt/ha	4.2	4.2	3.4	81.0	81.0
Cropping intensity	%	190	180	165	86.8	91.7

N.B: Figures in parenthesis indicates dry weight.  
LPM deducts 22% for moisture and dirt content.

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HAND-OVER SCHEDULE FROM DID TO FELCRA

Phase	HAND-OVER					
	Area (Ha)	DATE		DATE (Ha)		Plantable At PCR
		Planned	Actual	Planned	Actual	
<b>NEW RICE AREA</b>						
3	500	Feb 85	Feb 85	117	124.8	
		Apr 85	Sep 85	383	370.7	
				500	495.5	495.5
4	376	Jul 1984	Sep 83	134	134.0	
			Jul 1984	242	229.0	
				376	363.0	363.0
5	550	Jul 1984	Jul 1984	289	89.0	
		Feb 1985	Feb 1985	198	198.0	
		May 1985	Sep 1985	63	260.0	
				550	547.0	535.0
6 & 7	1,517	Jun 1985	Sep 1985	202	197.0	
		Apr 1986	Jul 1986	405	333.1	
		Jul 1986	Jul 1986	405	176.1	
		Dec 1986	Aug 1986	202	119.2	
		Jul 1987	Jun 1987	303	697.0	
				1,517	1,522.4	1,430.5
8 & 9	1,539	Apr 1986	Jun 1987	202	245.2	
		Jul 1986	Jul 1987	405	412.9	
		Dec 1986	Feb 1988	100	190.7	
		Jul 1987	Jul 1988	710	238.0	
		Dec 1987	Jul 1989	122	467.5	
				1,539	1,554.3	1,529.0
<b>GRAND TOTAL</b>				<b>4,482</b>	<b>4,482.2</b>	<b>4,353.0</b>

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DRAINAGE AND IRRIGATION -  
PHYSICAL PERFORMANCE OF WORKS

Item	Unit	Appraisal Target	Existing Before 1981	Cumulative Progress										Overall Project at PCR
				1981	1982	1983	1984	1985	1986	1987	1988	1989		
<b>A. Irrigation Works</b>														
Main and secondary canal improvement	km	122	65.5	0	0	20.3	24.0	34.0	45.3	55.3	62.4	62.4	127.90	
New main and secondary canal construction	km	79 )												
Tertiary canal construction	km	125 )	59.4	0	0	4.0	12.0	41.0	60.9	103.5	123.5	143.1	202.44	
Sub-total		326	124.9	0	0	24.3	36	75	106.2	158.8	185.9	205.5	330.34	
<b>B. Drainage Works</b>														
Main and secondary drain improvement	km	73 )	155.4	0	0	15.6	42.4	66.5	80.0	94.5	94.5	94.5	249.91	
New main and secondary drain construction	km	97 )												
Tertiary drain construction	km	200	63.7	0	0	4.0	16.0	40.5	50.5	83.8	111.3	131.3	195.03	
Sub-total		370	219.1	0	0	19.6	58.4	107	130.5	178.3	205.8	225.8	444.94	
<b>C. Structures</b>														
Bridges	No.	10	0	0	0	3	4	8	9	10	10	10	10	
Constant Head Orifice	No.	n.a	48	0	0	10	30	70	108	168	205	205	253	
Drainage End Control	No.	n.a	37	0	0	10	67	89	161	196	221	221	258	
Irrigation End Control	No.	n.a	10	0	0	2	5	19	27	42	42	42	52	
Checks	No.	n.a	0	0	0	10	18	51	81	118	118	118	118	
Tidal Control Gate	No.	2	4	0	0	1	1	2	3	3	3	3	7	
Control Drop	No.	n.a	11	0	0	1	5	11	14	15	15	15	26	
Field Offtake	No.	3,020	0	0	60	181	598	1,083	1,462	2,514	3,141	3,141	3,141	
Drainage Outlet	No.	2,570	0	0	60	181	659	1,120	1,511	2,477	2,957	2,957	2,957	
Guillotine Offtake 1'-0"	No.	n.a	0	0	0	0	0	1	1	1	1	1	1	
Drainage Control	No.	40	0	0	0	0	3	8	23	23	23	23	23	
Intake/Bifurcation	No.	n.a	2	0	0	0	0	0	0	0	0	0	0	
Sub-total			112	0	120	399	1,390	2,462	3,400	5,567	6,736	6,736	6,846	
<b>D. Farm Roads</b>														
Secondary farm roads	km	-	6.5	0	0	10.0	20.0	30.0	53.5	96.8	104.7	104.7	111.2	
Tertiary farm roads	km	-	17.9	0	0	20.0	69.1	105.9	202.3	255.6	322.8	324.0	341.9	
Sub-total			24.4	0	0	30	89.1	135.9	255.8	352.4	427.46	428.67	453.1	
<b>E. Flood Protection Bund</b>														
	km	29		27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

-----  
AREA CLEARED, PLANTED AND IN PRODUCTION  
AS AT 31/12/89  
-----

(Hectares)

Phase	Appraisal (Ha)	Reformulation (Ha)	Area Cleared (Ha)	Area Planted (Ha)	Area In Production (Ha)
<b>NEW RICE</b>					
3	580	500	496	496	496
4	410	376	363	363	363
5	930	550	547	535	535
6 & 7	1,700	1,517	1,522	1,430	1,430
8 & 9	1,510	1,539	1,554	1,529	1,529
<b>Total</b>	<b>5,130</b>	<b>4,482</b>	<b>4,482</b>	<b>4,353</b>	<b>4,353</b>
<b>TREE CROP</b>					
<b>Oil Palm</b>					
10	580	531	511	511	324
10A	455	319 )			
10B	-	95 )	504	504	464
10C	-	122 )			
11	770	510	374	374	152
12	1,270	1,160	1,589	1,539	800
13	1,490	1,402	1,788	1,707	1,707
14	1,520	830	693	693	511
15	1,100	1,495	1,651	1,651	1,651
<b>Total</b>	<b>7,185</b>	<b>6,464</b>	<b>7,110</b>	<b>6,979</b>	<b>5,609</b>
<b>Cocoa</b>					
10	100	101	88	88	88
10A	100	101	142	90	30
11	240	160	165	-	-
12	200	180	380	320	-
13	200	208	-	-	-
14	180	121	200	200	68
15	180	250	133	133	-
<b>Total</b>	<b>1,200</b>	<b>1,121</b>	<b>1,108</b>	<b>831</b>	<b>186</b>
<b>GRAND TOTAL</b>	<b>13,515</b>	<b>12,067</b>	<b>12,700</b>	<b>12,163</b>	<b>10,148</b>

MALAYSIA  
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ROADS COMPLETED

(km)

	Appraisal	Reformulation	Actual	START DATE		COMPLETION DATE		
				Planned	Actual	Planned	Revised	Actual
<b>A. ACCESS ROADS</b>								
1. Access Roads I (incl. metalling)	18	17.6	17.6	1980	April 1981	Dec 1984	Aug 1987	Mar 1985
2. Access Roads II	35	43.0	34.3	1981	May 1982	Dec 1986	May 1988	June 1989
<b>TOTAL</b>	<b>53</b>	<b>60.6</b>	<b>51.9</b>					
<b>B. VILLAGE ROADS</b>								
1. Village Road I	19	18.8	18.8	Mid 81	April 1982	1984	Jan 1985	Jul 1986
2. Village Road 2A, 2C & Changkat Lada	53	52.9	52.9	Mid 81	Nov 1982	1984	Jan 1985	Aug 1986
3. Village Road 2B and Sq. Dedap Road	55	55	55	1981	April 1985	1987	Feb 1988	Mar 1989
<b>TOTAL</b>	<b>127</b>	<b>126.7</b>	<b>126.7</b>					
<b>C. WEST COAST HIGHWAY</b>	<b>27</b>	<b>27</b>	<b>24.3</b>	<b>1980</b>	<b>Nov 1982</b>	<b>May 1985</b>	<b>May 1985</b>	<b>Feb 1986</b>

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

---

CONSTRUCTION OF SETTLER HOUSES

---

Year	SETTLER HOUSES		Actual No. Completed
	Original Target	Reformulation Target	
1981			
1982			
1983		350	350
1984		-	-
1985		-	-
1986		1,117	-
1987		1266	360
1988		1267	300
1989			424 *
Total	6,900	4,000	1,434

\* 144 units partially completed under original contract which had failed.  
Tender is being called to complete these units in 1990.

settlers

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT  
-----

BUILDINGS COMPLETED  
-----

Types of Buildings	Appraisal Estimate			Reformulation			Actual		
	Felcra	DID	Others	Felcra	DID	Others	Felcra	DID	Others
Project office buildings	5	LS	5	1	LS	2	1	1	-
Laboratory	-	-	1	-	-	1	1	-	-
Workshop	1	-	3	-	-	-	1	-	-
Garage	-	-	2	-	-	-	1	-	-
Store	1	LS	3	1	LS	2	4	1	1 /a
Peat station building	-	-	1	-	-	1	-	-	-
Grain drying ban	-	-	1	-	-	1	-	-	-
Drying yards	-	-	3	-	-	1	-	-	-
Ramps	-	-	LS	-	-	LS	-	-	-
Staff quarters	536	122	25	260	30	5	174	47	13 /b
Social centre	1	-	-				1		
<b>TOTAL</b>	<b>544</b>	<b>122</b>	<b>44</b>	<b>262</b>	<b>30</b>	<b>13</b>	<b>183</b>	<b>49</b>	<b>14</b>

/a LPN store  
/b 10 for teachers  
3 for JKR

Building

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

VEHICLES AND EQUIPMENT LIST

Type of Vehicles/Equipment	No. at Appraisal	Actual No. Procured			TOTAL
		Felcra	DID	Others	
Combine harvester	21	-	-	-	0
Tractor 4WD, 100hp	-	1	-	-	1
Tractor 4WD, 70-80hp	129	23	-	-	23
Excavator	3	-	-	-	0
Backhoe	2	-	-	-	0
Ditcher	10	3	-	-	3
Forklift Truck 3 ton	1	-	-	-	0
Saloon Car	-	1	-	-	1
Motor Grader	2	-	-	-	0
Mid Mounted Grader	-	4	-	-	4
Vibratory Roller	1	-	-	-	0
Rear Grader	-	2	-	-	2
Tanker	20	6	-	-	6
Lorry/Tipper	48	2	-	3	5
Mobile Plant Protection Unit	1	-	-	-	0
Pick-up Van LMB	3	-	-	-	0
Field Vehicles, LMB	3	5	-	1	6
Field Vehicles, SWB	28	16	-	3	19
Trailer	181	17	-	-	17
Transplanter	2	-	-	-	0
Bucket	-	18	-	-	18
Motorcycle 125 c.c	-	-	-	5	5
Land Planer	-	3	-	-	3
Rotovator	-	7	-	-	7
Harrow	-	4	-	-	4
Plough	-	6	-	-	6
Seederator	-	2	-	-	2
Sprayer	-	6	-	-	6
Rotoslasher	-	2	-	-	2

vehicles

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT  
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SETTLEMENT INFRASTRUCTURE - PHYSICAL PERFORMANCE  
-----

	Appraisal	Reformulation	Actual	Remarks
Settler Houses	6,410	4,000	1,434	See Annex 6
Roads and drains	LS	96	55	See Annex 5
Electricity	LS	LS	LS	
Water Supply	LS	LS	LS	
Primary Schools	7	7	2	(Both temporary)
Secondary Schools	3	3	3	(2 temporary)
Recreation Centre	1	1	-	
Health Facilities	1	1	2	
Clinics	3	3	-	
Sewerage	LS	LS	-	

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settinfr

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Annex 10

Table 1

ANNUAL PROJECT COSTS

	Actual Costs (M\$'000)										Actual Total Cost	Reformu- lation Cost (M\$'Mill)	Appraisal Cost (M\$'Mill)	Actual as % Reformu- lation Costs	Actual as % of Apprai- sal Costs
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990					
<b>A. NEW PADI AREA</b>															
1 Drainage and Irrigation	-	2,477	3,305	3,467	4,707	4,809	4,529	1,613	2,494	27,401	27.06	18.6	101	107	
2 Land Development	2,272	2,069	487	28	-	421	1,719	2,527	54	9,577	12.79	9.7	75	99	
3 Survey and Investigation	71	27	-	-	-	-	-	-	-	98	0.10	0.5	100	20	
Sub-total (A)	2,343	4,573	3,792	3,495	4,707	5,230	6,248	4,140	2,548	37,076	39.95	28.8	93	129	
<b>B. REHABILITATED PADI AREA</b>															
1 Drainage and Irrigation	-	-	-	-	2,218	2,559	2,661	168	-	7,606	9.84	5.1	77	149	
2 Survey and Investigation	175	-	-	-	-	-	-	-	-	175	0.10	0.5	170	34	
3 Relevelling/Rehabilitation	859	-	-	-	-	-	-	-	-	859	-	5.5	0	15	
4 Land Acquisition	-	-	24	-	300	78	-	24	21	447	1.08	0.8	42	55	
Sub-total (B)	1,034	-	24	-	2,518	2,637	2,661	192	21	9,087	11.02	11.9	82	76	
<b>C. TREE CROPP AREA</b>															
1 Drainage and Flood Protection	99	393	350	198	1,202	1,512	337	-	-	4,091	1.87	49.8	219	8	
2 Land Development	3,554	3,114	5,361	4,101	6,695	12,068	9,719	13,241	8,290	66,143	55.28	7.1	120	932	
3 Survey and Investigation	190	80	-	-	-	-	-	-	-	270	0.27	0.5	100	54	
Sub-total (C)	3,843	3,587	5,711	4,299	7,897	13,580	10,056	13,241	8,290	70,504	57.42	57.4	123	123	
D. Access Roads (incl. metalling)*	-	-	1,064	1,766	4,520	6,007	2,048	1,923	2,388	19,716	27.52	9.4	72	210	
E. West Coast Highway	-	-	14,677	17,532	10,770	4,931	-	-	-	47,910	47.60	24.8	101	193	
F. Settler Houses	-	-	1,614	-	-	1,101	640	1,654	602	5,619	21.23	32.0	26	18	
G. Buildings	-	731	1,138	477	248	2,563	519	821	632	7,129	13.78	25.4	52	28	
H. Processing Facilities	-	-	-	-	-	209	-	-	18	227	18.20	12.2	1	2	
I. Settlement Infrastructure	-	-	-	1,767	6,105	10,754	6,512	6,796	3,241	35,175	56.40	80.4	62	44	
J. Equipment and Vehicles	61	124	1,160	82	141	110	183	97	-	1,958	8.95	20.2	22	10	
K. Consultancy and Studies	-	1,356	1,747	890	693	424	-	941	779	6,830	3.63	10.3	188	66	
L. Administration and Engineering	2,307	500	880	1,983	1,985	2,988	3,974	3,933	4,153	22,703	9.82	5.8	190	321	
M. Contingencies	-	-	-	-	-	-	-	-	-	-	28.70	111.4	-	-	
Sub-total (D-M)	2,368	2,711	22,280	24,497	24,462	29,087	13,884	16,165	11,813	147,267	235.83	331.9	62	44	
GRAND TOTAL	9,588	10,871	31,607	32,291	39,584	50,534	32,849	33,738	22,672	263,934	344.22	430.0	77	61	

\* Does not include access road J costs which have been included in Settlement Infrastructure.

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

DID - ANNUAL PROJECT COSTS

(RM)

Component	1981	1982	1983	1984	1985	1986	1987	1988	1989	TOTAL
<b>a) New Padi Area</b>										
i) Irrigation Works	-	2,476,560	3,304,853	3,467,234	4,707,153	4,809,300	4,528,600	1,613,263	2,494,334	27,401,297
ii) Drainage & Irrigation	-	-	-	-	-	-	-	-	-	-
iii) Survey & Investigation	70,550	27,260	-	-	-	-	-	-	-	97,810
SUB-TOTAL	70,550	2,503,820	3,304,853	3,467,234	4,707,153	4,809,300	4,528,600	1,613,263	2,494,334	27,499,107
<b>b) Rehabilitated Padi Area</b>										
i) Irrigation Works	-	-	-	-	2,218,481	2,559,000	2,661,433	167,492	-	7,606,406
ii) Drainage & Irrigation	-	-	-	-	-	-	-	-	-	-
iii) Land Acquisition	-	-	24,458	-	299,667	77,722	-	24,033	21,003	446,883
iv) Survey & Investigation	174,765	-	-	-	-	-	-	-	-	174,765
SUB-TOTAL	174,765	-	-	-	2,518,148	2,636,722	2,661,433	191,525	-	8,228,054
<b>c) Tree Crop Area</b>										
i) Drainage & Flood Protection	98,700	393,137	349,538	197,850	1,201,550	1,512,000	337,228	-	-	4,090,003
ii) Survey & Investigation	190,600	79,600	-	-	-	-	-	-	-	270,200
SUB-TOTAL	289,300	-	-	-	1,201,550	1,512,000	337,228	-	-	4,360,203
d) Buildings	-	1,30,570	1,137,200	452,100	18,016	-	-	-	-	2,337,886
e) Equipment & Vehicles	60,728	124,535	69,921	-	-	-	-	-	-	255,184
<b>TOTAL</b>	<b>595,343</b>	<b>3,358,925</b>	<b>4,511,974</b>	<b>3,919,334</b>	<b>8,444,867</b>	<b>8,958,022</b>	<b>7,527,261</b>	<b>1,804,788</b>	<b>2,494,334</b>	<b>42,680,434</b>

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Annex 10

Table 3

PMD - ANNUAL ROAD COSTS

(M\$)

Component	1982	1983	1984	1985	1986	1987	1988	1989	TOTAL
1. West Coast Highway	-	14,677,400.00	17,531,741.56	10,770,000.00	4,930,898.81	-	-	-	47,910,040.37
2. Access Road I	-	1,064,115.50	1,518,593.59	1,781,690.91	1,214,068.84	-	-	-	5,578,468.84
3. Access Road 2	-	-	247,200.00	2,738,500.00	3,389,000.00	945,300.00	1,522,000.00	2,387,664.00	11,229,664.00
4. Access Road 3	-	-	317,495.00	363,980.00	2,570,643.00	-	-	-	3,252,118.00
5. Metalling of Access Road 1	-	-	-	-	1,404,302.97	1,102,204.00	401,145.23	-	2,907,652.20
<b>TOTAL</b>		<b>1,064,115.50</b>	<b>2,083,288.59</b>	<b>4,884,170.91</b>	<b>8,578,014.81</b>	<b>2,047,504.00</b>	<b>1,923,145.23</b>	<b>2,387,664.00</b>	<b>22,967,903.04</b>

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TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

FELCRA - ANNUAL PROJECT COSTS

(M\$)

Component	1981	1982	1983	1984	1985	1986	1987	1988	1989	TOTAL
a) New Padi Area Land Development	2,272,120.51	2,069,427.90	487,136.22	27,619.77	-	421,174.00	1,719,227.00	2,527,344.00	53,963.00	9,578,012.40
b) Tree Crop Area Land Development	3,554,014.35	3,114,352.37	5,361,613.93	4,100,684.32	6,694,899.33	12,068,061.24	9,719,138.10	13,240,873.49	8,289,896.48	66,143,533.61
c) Rehabilitated Padi Area	858,712.00	-	-	-	-	-	-	-	-	858,712.00
d) Settler Houses	-	-	1,614,006.01	-	-	1,101,255.55	649,344.00	1,653,806.00	602,451.00	5,619,862.56
e) Building	-	-	450.00	25,039.61	229,858.72	2,563,344.80	519,364.54	821,000.00	631,730.50	4,790,788.17
f) Processing Facilities	-	-	-	-	-	208,929.00	-	-	10,227.19	227,156.19
g) Equipment & Vehicles	-	-	1,089,654.16	82,275.50	140,745.35	109,569.14	183,075.50	97,321.40	-	1,702,641.05
<b>TOTAL</b>	<b>6,684,846.86</b>	<b>5,183,780.27</b>	<b>8,552,860.32</b>	<b>4,235,619.20</b>	<b>7,065,503.40</b>	<b>16,472,333.73</b>	<b>12,789,149.14</b>	<b>18,340,344.89</b>	<b>9,596,268.17</b>	<b>88,920,705.98</b>

felcra

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Annex 10

Table 5

SETTLEMENT INFRASTRUCTURE COSTS

(RM)

ACTIVITY	1982	1983	1984	1985	1986	1987	1988	1989	TOTAL
1. SCHOOLS	-	-	166,000	150,000	108,790	84,456	113,316	23,368	645,930
2. HEALTH FACILITIES	-	-	-	-	-	109,494	96,503	-	285,997
3. WATER SUPPLY	-	-	-	978,861	2,309,668	2,034,568	659,662	2,912,473	8,895,232
4. ELECTRICITY SUPPLY	-	-	-	460,648	93,873	-	2,423,118	12,435	2,990,074
5. VILLAGE ROADS †	-	-	1,601,500	4,515,407	7,798,832	4,055,452	3,503,000	293,035	21,767,226
6. LAND ACQUISITION	-	-	-	-	442,477	148,000	-	-	590,477
<b>TOTAL</b>	-	-	<b>1,767,500</b>	<b>6,104,916</b>	<b>10,753,640</b>	<b>6,511,970</b>	<b>6,795,599</b>	<b>3,241,311</b>	<b>35,174,936</b>

† Includes Access Road 3 cost.

SETILE

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

REIMBURSEMENT

(US\$)

Y E A R

AGENCY	CATEGORY	1981	1982	1983	1984	1985	1986	1987	1988	1989	TOTAL
DID	1	-	-	-	-	-	-	-	-	50,589.92	50,589.92
	2	-	202,208.27	668,956.66	874,988.78	986,021.89	1,149,630.91	1,701,007.56	471,590.76	71,596.54	6,126,001.37
	3	-	143,141.86	88,200.78	-	-	-	-	-	-	231,342.64
	Sub-total	-	345,350.13	757,157.44	874,988.78	986,021.89	1,149,630.91	1,701,007.56	471,590.76	122,186.46	6,407,933.93
PWD	1	-	-	5,439.77	-	-	-	-	-	-	5,439.77
	2	-	-	2,009,439.06	2,172,928.24	681,305.03	2,945,172.38	1,679,745.97	494,244.83	903,345.77	10,806,181.28
	3	-	-	613,529.59	234,501.24	366,724.93	-	-	206,338.03	740,521.72	2,161,615.51
	Sub-total	-	-	2,628,408.42	2,407,429.48	968,029.96	2,945,172.38	1,679,745.97	700,582.86	1,643,867.49	12,973,236.56
FELCRA	1	-	-	-	-	148,857.22	-	170,745.74	34,486.58	305,896.00	659,985.54
	2	-	-	873,563.13	610,223.98	443,433.59	242,703.00	2,965,526.49	3,117,779.38	2,866,099.24	10,319,328.81
	3	-	-	-	-	-	-	-	-	289,515.16	289,515.16
	Sub-total	-	-	873,563.13	610,223.98	592,290.81	242,703.00	3,136,272.23	5,813,776.36	13,930,339.91	11,268,829.51
ALL AGENCIES	1	-	-	5,439.77	-	148,857.22	-	170,745.74	34,486.58	356,485.92	716,015.23
	2	-	202,208.27	3,551,958.85	3,658,141.00	2,030,760.51	4,337,506.29	6,346,280.02	4,083,614.97	3,041,041.55	27,251,511.46
	3	-	143,141.86	701,730.37	234,501.24	366,724.93	-	-	206,338.03	1,030,036.88	2,682,473.31
GRAND TOTAL	-	345,350.13	4,259,128.99	3,892,642.24	2,546,342.66	4,337,506.29	6,517,025.76	4,324,439.58	4,427,564.35	38,650,000.00	

DISBURSE

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

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PADDY PRODUCTION IN THE REHABILITATED PADI AREAS  
FOR THE 1/89 AND 2/89 SEASONS

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BLOCK	Season 1/89 (Dry Season)			Season 2/89 (Wet Season)			Total 1989	
	Planted Area (ha)	Production (mt)	Av. Yield (mt/ha)	Planted Area (ha)	Production (mt)	Av. Yield (mt/ha)	Planted Area (ha)	Production (mt)
A	639	1,757	2.75	639	1,815	2.84	1,278	3,572
B - (Felcra Ph. 1)	629	2,567	4.08	629	2,094	3.33	1,258	4,661
C - (individuals)	883	3,029	3.43	883	3,285	3.72	1,766	6,314
C - (Felcra Ph. 2)	420	1,762	4.20	429	1,561	3.64	849	3,323
(Felcra Ph. 16)	-	-	-	196	658	3.36	196	658
D	944	2,697	2.86	944	3,030	3.21	1,888	5,727
TOTAL	3,515	11,812	3.36	3,720	12,443	3.34	7,235	24,255

Paddy

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-----  
PADI PRODUCTION IN THE NEW PADI AREAS  
-----

Season	Area Planted	Gross Production	Average Yield
-----	-----	-----	-----
	(ha)	(mt)	mt/ha)
1983 - Wet	134.3	98.87	0.74
1984 - Wet	376.5	787.27	2.10
1985 - Dry	734.4	1,989.56	2.70
1986 - Dry	1,391.1	3,614.80	2.60
1986 - Wet	2,134.1	6,158.99	2.90
1987 - Dry	2,095.0	6,413.87	3.06
1987 - Wet	3,385.0	10,214.58	3.02
1988 - Dry	3,562.0	8,497.02	2.39
1988 - Wet	3,825.0	14,435.39	3.78
1989 - Dry	3,837.7	20,594.34	5.37
1989 - Wet	4,353.0	20,694.67	4.75

-----

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Projected Yield Profile

Padi

Year	Dry Season	Wet Season
1983	-	0.58
1984	-	1.64
1985	2.11	-
1986	2.03	2.26
1987	2.39	2.36
1988	1.86	2.95
1989	4.19	3.71
1990	4.30	3.75
1991	4.40	3.85
1992	4.50	4.0
1993	4.60	4.1
1994	4.65	4.2
1995	4.70	4.2

Note: 1983-1989 figures are derived from actual gross yields less 22% for LPN deduction

paditab3

MALAYSIA  
TRANS PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Annex 12

Table 4

(Page 1)

ANNUAL PADI PRODUCTION

(mt)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>A. New Padi Area</b>															
<b>Dry Season</b>															
Cropped Area (ha)		-	734.4	1,391.1	2,095.0	3,562.0	3,837.7	4,353.0	4,353.0	4,353.0	4,353.0	4,482.0	4,482.0	4,482.0	4,482.0
Average yield (mt/ha)	-	-	2.11	2.03	2.39	1.86	4.19	4.30	4.40	4.50	4.60	4.65	4.70	4.70	4.70
Production (mt)	-	-	1,550	2,824	5,007	6,625	16,080	18,718	19,153	19,589	20,024	20,841	21,065	21,065	21,065
<b>Wet Season</b>															
Cropped Area (ha)	134.3	376.5	-	2,134.1	3,385.0	3,825.0	4,353.0	4,353.0	4,353.0	4,353.0	4,353.0	4,482.0	4,482.0	4,482.0	4,482.0
Average Yield (mt/ha)	0.58	1.64	-	2.26	2.36	2.95	3.71	3.75	3.85	4.0	4.1	4.2	4.2	4.2	4.2
Production (mt)	78	617	0	4,823	7,989	11,284	16,150	16,324	16,759	17,412	17,847	18,824	18,824	18,824	18,824
TOTAL PRODUCTION (mt)	78	617	1,550	7,647	12,996	17,909	32,230	35,042	35,912	37,001	37,871	39,666	39,890	39,890	39,890
<b>B. Rehabilitated Area</b>															
Incremental Production (mt) /1	-	-	-	-	6,975	2,295	11,415	12,462	14,880	16,173	18,080	19,760	19,760	19,760	19,760
TOTAL REHAB & NEW PADDY AREA	78	617	1,550	7,647	19,971	20,204	43,645	47,504	50,792	53,174	56,751	59,426	59,650	59,650	59,650

/1 Please refer to Annex 12 Table 5

Benefit:

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>A. New Padi Area</b>													
<b>Dry Season</b>													
Cropped Area (ha)	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0
Average Yield (mt/ha)	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
Production (mt)	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065	21,065
<b>Wet Season</b>													
Cropped Area (ha)	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0	4,482.0
Average Yield (mt/ha)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Production (mt)	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824	18,824
TOTAL PRODUCTION (mt)	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890
<b>B. Rehabilitated Area</b>													
Incremental Production (mt) /1	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760
TOTAL REHAB & NEW PADDY AREA	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650	59,650

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Table 5

REHABILITATED PADI AREA - INCREMENTAL PRODUCTION

	1987	1988	1989	1990	1991	1992	1993	1994-2010
<b>Withou'. Project</b>								
<b>Cropped Area (ha)</b>								
dry season	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
wet season	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Total	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200
<b>Yield (mt/ha)</b>								
dry season	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
wet season	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
<b>Production (mt)</b>								
dry season	3,840	3,840	3,840	3,840	3,840	3,840	3,840	3,840
wet season	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
Total	12,840	12,840	12,840	12,840	12,840	12,840	12,840	12,840
<b>With Project</b>								
<b>Cropped Area (ha)</b>								
dry season	3,280	2,875	3,515	3,515	3,600	3,600	3,600	3,600
wet season	3,280	2,875	3,720	3,720	3,900	4,035	4,150	4,370
Total	6,560	5,750	7,235	7,235	7,500	7,635	7,750	7,970
<b>Yield (mt/ha)</b>								
dry season	3.1	2.6	3.4	3.6	3.8	4.0	4.2	4.2
wet season	2.9	2.7	3.3	3.4	3.6	3.8	4.0	4.0
<b>Production (mt)</b>								
dry season	10,200	7,335	11,812	12,654	13,680	13,680	15,120	15,120
wet season	9,615	7,800	12,443	12,648	14,040	15,333	16,600	17,480
Total	19,815	15,135	24,255	25,302	27,720	29,013	31,720	32,600
<b>Incremental Production</b>	<b>6,975</b>	<b>2,295</b>	<b>11,415</b>	<b>12,462</b>	<b>14,880</b>	<b>16,173</b>	<b>18,880</b>	<b>19,760</b>

invest

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TRANS-PELAL AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Annex 13  
Table 1  
(Page 1)

Annual Oil Pale Plantings, Production and Yield

Planting Year Planted (ha)	Year of Harvest	Actual Production (t)							Projected Production (t)						
		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1980/81	1984	166						3,818	3,984	3,984	3,901	3,818	3,735	3,652	3,569
1981/82	1985	107						2,301	2,461	2,568	2,568	2,515	2,461	2,408	2,354
1982/83	1986	246						4,182	5,289	5,658	5,904	5,904	5,781	5,658	5,515
1983/84	1987	453						5,889	7,701	9,740	10,419	10,872	10,872	10,646	10,419
1985	1988	2,204						17,632	28,652	37,468	47,386	50,692	52,896	52,896	51,794
1986	1989	2,433						12,165	19,464	31,629	41,361	52,310	55,959	58,392	58,392
1987	1990	1,090						3,270	5,450	8,720	14,170	18,530	23,435	25,070	26,160
1988	1991	182							546	910	1,456	2,366	3,094	3,913	4,186
1989	1992	78								294	490	784	1,274	1,666	2,107
1990	1993	131									393	655	1,048	1,703	2,227
Grand Total		7,110						466	2,392	4,989	10,007	15,959	47,848	49,257	73,547
Average annual yield (t/ha)		2.81	9.49	9.61	10.30	5.02	8.53	7.35	10.69	14.47	18.01	20.88	22.58	23.35	23.45
Average annual yield (t/ha)		166	273	519	972	3,176	5,409	6,699	6,881	6,979	7,110	7,110	7,110	7,110	7,110

N.B: Figures from 1984-1987 are actual production.  
op/field

Annual Oil Palm Plantings, Production and Yield

Planting Year	Area Planted (Ha)	Year Of Harvest	Projected Production (mt)												
			1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1980/81	166	1984	3,486	3,405	3,320	3,237	3,154	3,071	2,988	2,905	2,822	2,739	2,656	2,656	2,656
1981/82	107	1985	2,301	2,247	2,194	2,140	2,087	2,033	1,980	1,926	1,873	1,819	1,766	1,712	1,712
1982/83	246	1986	5,412	5,289	5,166	5,043	4,920	4,797	4,674	4,551	4,428	4,305	4,182	4,059	3,936
1983/84	453	1987	10,193	9,966	9,740	9,513	9,287	9,060	8,834	8,607	8,381	8,154	7,928	7,701	7,475
1985	2,204	1988	50,692	49,590	48,488	47,386	46,284	45,182	44,080	42,978	41,876	40,774	39,672	38,570	37,468
1986	2,433	1989	57,176	55,959	54,743	53,526	52,310	51,093	49,877	48,660	47,444	46,227	45,011	43,794	42,578
1987	1,090	1990	26,160	25,615	25,070	24,525	23,980	23,435	22,890	22,345	21,800	21,255	20,710	20,165	19,620
1988	182	1991	4,368	4,368	4,277	4,186	4,095	4,004	3,913	3,822	3,731	3,640	3,549	3,458	3,367
1989	98	1992	2,254	2,352	2,352	2,303	2,254	2,205	2,156	2,107	2,058	2,009	1,960	1,911	1,862
1990	131	1993	2,817	3,013	3,144	3,144	3,079	3,013	2,948	2,882	2,817	2,751	2,686	2,620	2,555
Grand total	7,110		164,857	161,802	158,493	155,003	151,448	147,893	144,338	140,783	137,228	133,673	130,118	126,646	123,228
Hectareage Planted (ha)			7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Average annual yield (mt/ha)			23.19	22.76	22.29	21.80	21.30	20.80	20.30	19.80	19.30	18.80	18.30	17.81	17.33

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Projected Yield Profile

OIL PALM

Year From Planting	Year of Production	Projected Yield (mt/ha)	Actual Yield By Year of Production
1	-		
2	-		
3	1	3.0	2.9
4	2	5.0	4.9
5	3	8.0	7.8
6	4	13.0	13.2
7	5	17.0	12.2
8	6	21.5	21.3
9	7	23.0	
10	8	24.0	
11	9	24.0	
12	10	23.5	
13	11	23.0	
14	12	22.5	
15	13	22.0	
16	14	21.5	
17	15	21.0	
18	16	20.5	
19	17	20.0	
20	18	19.5	
21	19	19.0	
22	20	18.5	
23	21	18.0	
24	22	17.5	
25	23	17.0	
26	24	16.5	
27-30	25-28	16.0	

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Annex 14

Table 1

(Page 1)

Annual Cocoa Plantings, Production and Yields

Planting Year	Area Planted (Ha)	Year Of Harvest	Actual Production (mt)							Projected Production (mt)						
			1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1981	45	1984							53.10	55.35	58.05	58.05	55.35	53.10	50.40	47.70
1983	43	1986							38.70	45.58	50.74	52.89	55.47	55.47	52.89	50.74
1984	30	1988							16.80	21.90	27.00	31.80	35.40	36.90	38.70	38.70
1985	68	1989							23.12	38.08	49.64	61.2	72.08	80.24	83.64	87.72
1986/88	321	1990							54.57	109.14	179.76	234.33	288.9	340.26	378.78	394.83
1988/89	324	1991							0	55.08	110.16	181.44	236.52	291.6	343.44	382.32
1990	277	1992									47.09	94.18	155.12	202.21	249.30	293.62
Grand To	1,108		7.15	16.06	37.40	29.68	24.67	107.04	186.29	325.13	522.44	713.89	898.84	1,059.78	1,197.15	1,295.63
Area In production (ha)			45	45	88	88	118	186	507	831	1,108	1,108	1,108	1,108	1,108	1,108
Yield (mt/ha)			0.16	0.36	0.43	0.34	0.21	0.58	0.37	0.39	0.47	0.64	0.81	0.96	1.08	1.17

N.B: Figures from 1984-1989 are actual production.

Cocoa

Planting Year	Area Planted (Ha)	Year Of Harvest	Projected Production (mt)												
			1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1981	45	1984	45.00	42.30	39.60	36.90	34.20	31.50	28.80	26.10	23.40	20.70	18.00	18.00	18.00
1983	43	1986	48.16	45.58	43.00	40.42	37.84	35.26	32.68	30.10	27.52	24.94	22.36	19.78	17.20
1984	30	1988	36.90	35.40	33.60	31.80	30.00	28.20	26.40	24.60	22.80	21.00	19.20	17.40	15.60
1985	68	1989	87.72	83.64	80.24	76.16	72.08	68	63.92	59.84	55.76	51.68	47.6	43.52	39.44
1986/88	321	1990	414.09	414.09	394.83	378.78	359.52	340.26	321	301.74	282.48	263.22	243.96	224.7	205.44
1988/89	324	1991	398.52	417.96	417.96	398.52	382.32	362.88	343.44	324	304.56	285.12	265.68	246.24	226.8
1990	277	1992	326.86	340.71	357.33	357.33	340.71	326.86	310.24	293.62	277.00	260.38	243.76	227.14	210.52
Grand Total	1,108		1,357.25	1,379.68	1,366.56	1,319.91	1,256.67	1,192.96	1,126.48	1,060.00	993.52	927.04	860.56	796.78	733.00
Area In production (ha)			1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108
Yield (mt/ha)			1.22	1.25	1.23	1.19	1.13	1.08	1.02	0.96	0.90	0.84	0.78	0.72	0.66

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Projected yield Profile

COCOA

(mt/ha)

Year From Planting	Year From Production	Projected Yield (mt/ha)	Actual Yield By Year of Production
1	-		
2	-		
3	1	0.17	0.20
4	2	0.34	0.33
5	3	0.56	0.43
6	4	0.73	0.34
7	5	0.90	0.21
8	6	1.06	0.87
9	7	1.18	
10	8	1.23	
11	9	1.29	
12	10	1.29	
13	11	1.23	
14	12	1.18	
15	13	1.12	
16	14	1.06	
17	15	1.00	
18	16	0.94	
19	17	0.88	
20	18	0.82	
21	19	0.76	
22	20	0.70	
23	21	0.64	
24	22	0.58	
25	23	0.52	
26	24	0.46	
27-30	25-28	0.40	

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Annex 15

Table 1

(Page 1)

ECONOMIC RICE PRICE STRUCTURE

Padi	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<b>In US\$/ton</b>																
Export price, SI broken, /1																
F.O.B. Bangkok	633	389	378	351	297	246	246	300	321	271	249	223	231	231	231	228
Grade differential (less 10%)	570	350	340	316	267	221	221	270	289	244	224	201	208	208	208	205
Ocean freight & insurance	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
C.I.F. price, Port Klang	600	380	370	346	297	251	251	300	319	274	254	231	238	238	238	235
<b>In RM/ton</b>																
Foreign Exchange Rate	2.3	2.3	2.3	2.3	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
C.I.F. Port Klang	1,379	874	851	796	773	654	679	810	861	740	686	623	642	642	642	635
Port handling	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Transport cost, Port Klang to Ipoh	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Wholesale price, Ipoh	1,413	908	885	830	807	688	713	844	895	774	720	657	676	676	676	669
Less transport, project area to Ipoh	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Ex mill rice price project area	1,397	892	869	814	791	672	697	828	879	758	704	641	660	660	660	653
Padi equivalent	908	580	565	529	514	437	453	538	571	492	458	417	429	429	429	424
Milling cost /2	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Ex-mill padi price /3	851	523	508	472	457	380	396	485	514	435	401	360	372	372	372	367

/1 ICRD's January 1990 Commodity Prices and price projections in constant 1985 dollars adjusted to constant 1989 dollars using MUV index.

/2 Adjusted from financial price using the standard conversion factor of 0.88.

/3 Determined by adjusting financial base estimate using standard conversion factors in Annex 15 Table 4.

Padi	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>In US\$/ton</b>														
Export price, 5% broken,/l														
F.O.B. Bangkok	228	228	228	228	228	228	228	228	228	228	228	228	228	228
Grade differential (less 10%)	205	205	205	205	205	205	205	205	205	205	205	205	205	205
Ocean freight & insurance	30	30	30	30	30	30	30	30	30	30	30	30	30	30
C.I.F. price, Port Klang	235	235	235	235	235	235	235	235	235	235	235	235	235	235
<b>In M\$/ton</b>														
Foreign Exchange Rate	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
C.I.F. Port Klang	635	635	635	635	635	635	635	635	635	635	635	635	635	635
Port handling	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Transport cost, Port Klang to Ipoh	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Wholesale price, Ipoh	669	669	669	669	669	669	669	669	669	669	669	669	669	669
Less transport, project area to Ipoh	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Ex-mill rice price project area	653	653	653	653	653	653	653	653	653	653	653	653	653	653
Padi equivalent	424	424	424	424	424	424	424	424	424	424	424	424	424	424
Milling cost /2	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Ex-mill padi price /3	367	367	367	367	367	367	367	367	367	367	367	367	367	367

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Annex 15

Table 2

(Page 1)

PALM OIL PRICE STRUCTURE

Palm Oil	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
<b>In US\$/ton</b>															
Asian, 5% bulk, C.I.F. N.W. Europe /1	749.92	591.68	683.87	1,014.11	689.38	501.34	366.02	436.19	350.88	337.12	357.76	378.4	438.94	438.94	438.94
Ocean freight & insurance /2	65.50	60.12	63.25	74.48	63.44	50.25	52.44	54.83	51.93	51.46	52.16	52.87	54.92	54.92	54.92
F.O.B. Port Klang	684.42	531.56	620.62	939.63	625.94	251.09	313.58	381.36	298.95	285.66	305.60	325.53	384.02	384.02	384.02
<b>In M\$/ton</b>															
Foreign Exchange Rate	2.3	2.3	2.3	2.3	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
F.O.B. Port Klang	1,574.17	1,222.59	1,427.43	2,161.15	1,627.44	652.83	846.67	1,029.67	807.17	771.28	825.12	878.93	1,036.85	1,036.85	1,036.85
Export Duty	393.54	134.48	157.02	540.29	406.86	0.00	42.33	113.26	40.36	38.56	41.26	43.95	114.05	114.05	114.05
Port charges & transport	(F) 32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
	(E) 23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52
Ex-mill price project area	(F) 1,148.62	1,056.10	1,238.41	1,588.86	1,188.58	620.83	772.33	884.41	734.81	700.72	751.86	802.98	890.80	890.80	890.80
	(E) 1,550.65	1,199.07	1,403.91	2,137.63	1,603.92	629.31	823.15	1,006.15	783.65	747.76	801.60	855.41	1,013.33	1,013.33	1,013.33
<b>Palm kernel</b>															
<b>In US\$/ton</b>															
Nigerian, C.I.F. U.K.	415.55	352.26	498.11	734.78	400.42	166.50	194.02	265.57	250.43	238.05	247.68	255.94	282.08	282.08	282.08
Ocean freight & insurance	54.13	51.98	56.94	64.98	53.61	45.66	46.60	49.03	48.51	48.09	48.42	48.70	49.59	49.59	49.59
F.O.B. Port Klang	361.42	300.28	441.17	669.80	346.81	120.84	147.42	216.54	201.92	189.96	199.26	207.24	232.49	232.49	232.49
<b>In M\$/ton</b>															
F.O.B. Port Klang	(F) 831.27	690.65	1,014.70	1,540.53	901.69	314.18	398.04	584.66	545.17	512.88	538.00	559.54	627.72	627.72	627.72
Export Duty	(F) 249.38	103.60	152.21	462.16	270.51	0.00	31.84	87.70	43.61	41.03	43.04	44.76	94.16	94.16	94.16
Port charges & transport	(F) 46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00
	(E) 33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81
Ex-mill price project area	(F) 535.89	541.05	816.50	1,032.37	585.19	268.18	320.20	450.96	455.56	425.85	448.96	468.78	487.56	487.56	487.56
	(E) 727.46	656.74	930.89	1,506.72	867.98	280.37	364.23	550.85	511.36	479.07	504.19	525.73	593.91	593.91	593.91
<b>Fresh fruit bunch (M\$/ton)</b>															
20% of oil & 4.5% of kernel	(F) 253.84	235.57	284.42	364.23	264.05	136.23	168.88	197.17	167.46	159.31	170.58	181.69	200.10	200.10	200.10
	(E) 546.01	269.37	324.92	495.33	359.84	138.48	181.02	226.02	179.74	171.11	183.01	194.74	229.39	229.39	229.39
Processing cost	(F) 30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
	(E) 26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40
Ex-mill price project area	(F) 223.84	205.57	254.42	334.23	234.05	106.23	138.88	167.17	137.46	129.31	140.58	151.69	170.10	170.10	170.10
	(E) 319.61	242.97	298.52	468.93	333.44	112.08	154.62	199.62	153.34	144.71	156.61	168.34	202.99	202.99	202.99

/1 IBRD's Jan 1990 Commodity Prices & price projections in constant 1985.

Dollars adjusted to constant 1989 dollars using MUV index.

/2 Comprises freight (including bunker) - US\$40.00, financial charges - 2.75% insurance - 0.40% and normal arrival loss - 0.25%.

insurance - 0.40% and normal arrival loss - 0.25%

(F) Financial cost/price

(E) Economic cost/price, determined by applying conversion factors

in Annex 15 Table 4 on the financial estimates.

recompale

Palm Oil		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
-----																
In US\$/ton																
-----																
Asian, S&Z bulk, C.I.F. M.W. Europe /1		403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17	403.17
Ocean freight & insurance /2		53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71	53.71
F.O.B. Port Klang		349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46	349.46
-----																
In M\$/ton																
-----																
Foreign Exchange Rate		2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
F.O.B. Port Klang		943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54	943.54
Export Duty		47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18	47.18
Port charges & transport	(F)	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
	(E)	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52	23.52
Ex-mill price protect area	(F)	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36	864.36
	(E)	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02	920.02
-----																
Palm kernel																
-----																
In M\$/ton																
-----																
Nigerian, C.I.F. U.K.		243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55	243.55
Ocean freight & insurance		48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28	48.28
F.O.B. Port Klang		195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27	195.27
-----																
In M\$/ton																
-----																
F.O.B. Port Klang	(F)	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23	527.23
Export Duty	(F)	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18	42.18
Port charges & transport	(F)	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00	46.00
	(E)	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81	33.81
Ex-mill price protect area	(F)	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05	439.05
	(E)	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42	493.42
-----																
Fresh Fruit Bunch (M\$/ton)																
-----																
20% of oil & 4.5% of kernel	(F)	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63	192.63
	(E)	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21	206.21
Processing cost	(F)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
	(E)	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40	26.40
Ex-mill price protect area	(F)	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63	162.63
	(E)	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81	179.81
-----																

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**COCOA PRICE STRUCTURE**

Cocoa (Dry Bean)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993-95	1996-2000
<b>In US\$/ton</b>														
Daily average price, New York/London /a	2,738	2,312	2,903	3,330	3,096	2,422	2,133	1,582	1,238	949	949	977	1,046	1,555
Quality differential (less 10%)	274	231	290	333	310	242	213	158	124	95	95	98	105	156
Ocean freight & insurance	68	68	68	68	68	68	68	68	68	68	68	68	68	68
F.O.B Port Klang	2,396	2,013	2,545	2,929	2,718	2,112	1,852	1,356	1,046	786	786	811	873	1,331
<b>In RM/ton</b>														
Foreign Exchange Rate	2.3	2.3	2.3	2.3	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
F.O.B Port Klang	5,511	4,630	5,854	6,737	7,067	5,491	5,000	3,661	2,824	2,122	2,122	2,190	2,357	3,594
Port handling & transport /b	(F) 50	50	50	50	50	50	50	50	50	50	50	50	50	50
	(E) 37	37	37	37	37	37	37	37	37	37	37	37	37	37
Ex mill price	(F) 5,461	4,580	5,804	6,687	7,017	5,441	4,950	3,611	2,774	2,072	2,072	2,140	2,307	3,544
	(E) 5,474	4,593	5,817	6,700	7,030	5,454	4,964	3,624	2,787	2,085	2,085	2,153	2,320	3,557
Processing cost	(F) 350	350	350	350	350	350	350	350	350	350	350	350	350	350
	(E) 308	308	308	308	308	308	308	308	308	308	308	308	308	308
Processing margin /c	(F) 546	458	580	669	702	544	495	371	311	311	311	311	311	311
	(E) 371	311	395	455	477	370	337	371	311	311	311	311	311	311
Ex mill price	(F) 4,565	3,772	4,873	5,668	5,965	4,547	4,105	3,624	2,787	2,085	2,085	2,153	2,320	3,557
	(E) 4,795	3,974	5,114	5,957	6,245	4,776	4,319	3,624	2,787	2,085	2,085	2,153	2,320	3,557

/a IBRD's January 1990 Commodity Prices and price projections in constant 1985 dollars adjusted to constant 1989 dollars using MUV index.

/b Port handling is \$25/mt and transport is also \$25/mt

/c 10% of output price.

(F) Financial cost/price

(E) Economic cost/price, determined by applying conversion factors in Annex 15 Table 4 on the financial estimates.

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Conversion Factors  
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Labour	0.88
Land Clearing	0.82
Agricultural Inputs	0.91
Transport Equipment and Parts	0.85
Capital Equipment	0.86
Transport	0.79
Port Handling	0.68
Construction (general)	0.84
Road Construction	0.82
Harvesting	0.78
Fertilizers	0.89
Chemicals	0.88
Government Administration	0.82
Operations During Economic Life of Estate	0.75
All Goods and Services (Standard Conversion Factor - SCF)	0.88

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Source: National Parameters for Project Appraisal in  
Malaysia, M.D. Veitch, January 1986.

factors

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Annex 15

Table 5

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Consumer Price Index  
for Peninsular Malaysia

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(1980 = 100)

1981	109.7
1982	116.7
1983	120.3
1984	125.1
1985	125.5
1986	126.4
1987	127.8
1988	131.3
1989	136.3

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Source: Economic Report, Ministry of Finance Malaysia  
1983/4, 1985/6 and 1989/90.

Price

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Annex 16

Table 1

Crop Production Budget - Rehabilitated Padi

(M\$ per hectare)

Items	With Project		Without Project	
	Finan.	Econ./1	Finan.	Econ. /1
Contract Operations				
Land Preparation	125	103	130	106
Harvesting	148	115	126	98
Transport	104	82	90	71
Sub-total	377	300	346	275
Labour		Mandays /2		
Water Management		2.0 (8.0)		
Bund Maintenance		0.5 (5.0)		
Seeding (motor blower)		0.5 (0.5)		
Fertilizer Application		1.0 (1.5)		
Pest Control		1.0 (2.0)		
Weeding		1.0 (3.0)		
Sub-total		6.0 (20.0)x\$12/mdy	72	63
Inputs	Unit	Application Rate /2	Unit Cost	
Seeds	kg/ha	80 (50)	0.95	76
NPK Mixture	kg/ha	189 (200) Subsidy	0.62	-
Urea I/II	kg/ha	99 (100) Subsidy	0.46	-
NPK Compound	kg/ha	50 (-)	0.55	28
Paraquat	l/ha	3 (3)	6.20	19
2,4-D Amine	l/ha	1.5 (-)	7.00	11
Furacou 26	kg/ha	- (20)	2.25	-
Sevin 85	l/ha	- (1)	9	-
Propanil	l/ha	5 (-)	13.00	65
Carbofuran	kg/ha	20 (-)	1.87	37
Zinc Phosphide	kg/ha	0.3 (0.2)	8.24	2
Sub-total			238	364
TOTAL			687	727

/1 Conversion factors applied as follows: land preparation - 0.82, harvesting - 0.78, transport - 0.79, labour - 0.88, agriculture inputs - 0.91).

/2 Figures in parentheses show the 'without project' labour requirement and input application rates, taken from Reformulation Report, Annex 3 Table 3.

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Crop Production Budget - Mechanised Padi

(Cost per hectare)

Items

Items	M\$/ha	
Contract Operations		
Land Preparation	190	
Land Levelling	60	
Water & Bund Management	110	
seeding	30	
Fertilizing	42	
Weed Control	90	
Pest Control	88	
Harvesting	185	
Transport & Handling	190	
Sub-total	985	(739)

Inputs	Application Rate	Unit Cost		
Seeds	80 kg/ha	0.95	95	
Limestone Dust	2 tons/2 season	50.00	50	
NPK Mixture	198 kg/ha	Subsidy	-	(112)
Urea I/II	99 kg/ha	Subsidy	-	(41)
Urea Supplement	50 kg/ha	0.48	24	
NPK Compound Supplement	50 kg/ha	0.70	35	
Paraquat	2.0 lit/ha	6.22	12	
2,4-D Amine	2.0 lit/ha	6.40	13	
Thiobencarb	33 kg/ha	2.20	73	
Londax	0.4 kg/ha	125	50	
Carbofuran	20 kg/ha	1.87	37	
Zinc Phosphide	0.5 kg/ha	8.24	4	
Drat	0.2 lit/ha	41.00	8	
Sub-total			401	(518)
TOTAL			1,386	(1,257)

N.B: Economic cost in parenthesis.  
(Conversion factors applied as follows:-  
contract operations - 0.75, inputs - 0.91).

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Crop Production Budget - Oil Palm

(M\$/ha)

	Years								
	4	5	6	7	8	9-10	11-15	16-20	20-25
<b>Operating Costs</b>									
<b>Material Inputs (M\$)</b>									
Fertilisers	220	250	280	300	330	330	300	250	200
Chemicals	70	50	50	50	40	40	30	20	15
Tools	20	20	20	20	20	20	20	20	20
Transportation of ffb	45	85	135	220	290	350	390	340	305
Sub-total	355	405	485	590	680	740	740	630	540
	( 311 )	( 351 )	( 417 )	( 502 )	( 576 )	( 623 )	( 619 )	( 526 )	( 450 )
<b>Labor Inputs (man-days/ha)</b>									
Maintenance	40	35	35	35	30	25	20	15	15
Harvesting	5	15	20	20	25	35	35	30	30
Sub-total (mandays/ha)	45	50	55	55	55	60	55	45	45
Wages at \$12.00/ady	540	600	660	660	660	720	660	540	540
	( 475 )	( 528 )	( 581 )	( 581 )	( 581 )	( 634 )	( 581 )	( 475 )	( 475 )
<b>Total Operating Costs</b>	<b>895</b>	<b>1,005</b>	<b>1,145</b>	<b>1,250</b>	<b>1,340</b>	<b>1,460</b>	<b>1,400</b>	<b>1,170</b>	<b>1,080</b>
	( 786 )	( 879 )	( 998 )	(1,083 )	(1,157 )	(1,257 )	(1,200 )	(1,001 )	( 925 )

N.B: Economic cost in parentheses (derived by applying conversion factors of 0.89 for fertilizers, 0.88 for chemicals, 0.90 for tools, 0.79 for transportation and 0.88 for labour).

cropbgt

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Table 4

Crop Production Budget - Cocoa

(M\$/ha)

	Years								
	4	5	6	7	8	9-10	11-15	16-20	21-25
<b>Operating Costs</b>									
<b>Material Inputs (M\$)</b>									
Fertilisers	640	640	640	640	640	640	640	640	640
Chemicals	250	250	200	200	150	150	120	120	120
Transportation of cocoa beans	5	5	10	10	15	15	20	20	20
Sub-total	895	895	850	850	805	805	780	780	780
	( 793 )	( 793 )	( 753 )	( 753 )	( 713 )	( 713 )	( 691 )	( 691 )	( 691 )
<b>Labor Inputs</b>									
(man-days/ha)	55	55	55	55	60	60	60	60	60
Wages at \$12.00/mdy	660	660	660	660	720	720	720	720	720
	( 581 )	( 581 )	( 581 )	( 581 )	( 634 )	( 634 )	( 634 )	( 634 )	( 634 )
Total Operating Costs	1,555	1,555	1,510	1,510	1,525	1,525	1,500	1,500	1,500
	(1,374 )	(1,374 )	(1,334 )	(1,334 )	(1,347 )	(1,347 )	(1,325 )	(1,325 )	(1,325 )

N.B: Economic cost in parentheses (derived by applying conversion factors of 0.89 for fertilizers, 0.88 for chemicals, 0.79 for transportation and 0.88 for labour).

bgtcocoa

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Annex 17

(Page 1)

Settlers Cash Flow

(\$'000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>1. REVENUE</b>															
1.1 Padi															
Total Production (mt)						35,042	35,912	37,901	37,871	39,666	39,890	39,890	39,890	39,890	39,890
Sales Value at \$460/mt	1,399	1,801	6,573	9,607	15,711	23,128	23,702	24,421	24,995	26,180	26,327	26,327	26,327	26,327	26,327
1.2 FFB															
FFB Production (mt)						49,257	75,547	100,971	128,048	148,445	160,555	166,003	166,743	164,857	161,802
Sales Value (M\$)	374	500	1,211	2,637	6,192	5,615	9,519	14,641	20,872	24,197	25,047	25,896	26,012	25,712	25,241
1.3 Cocoa															
Total Production (mt)						186	325	522	714	899	1,060	1,197	1,296	1,357	1,380
Sales Value (M\$)						280	490	819	1,227	1,545	1,822	3,390	3,670	3,843	3,908
<b>TOTAL REVENUE</b>	<b>1,773</b>	<b>2,301</b>	<b>7,784</b>	<b>12,244</b>	<b>21,903</b>	<b>29,023</b>	<b>33,711</b>	<b>39,881</b>	<b>47,094</b>	<b>51,922</b>	<b>53,196</b>	<b>55,613</b>	<b>56,009</b>	<b>55,888</b>	<b>55,476</b>
<b>2. Expenses</b>															
2.1 Production Cost															
Materials	878	3,641	5,097	5,714	14,770	14,080	14,300	14,520	15,300	15,585	15,363	15,342	15,373	15,359	15,326
Labour	1,073	1,264	1,546	4,213	4,534	4,930	6,128	7,115	7,518	7,681	8,464	8,558	8,575	8,575	8,575
2.2 Zakat (10% of padi sales value)	140	180	657	961	1,571	2,313	2,370	2,442	2,500	2,618	2,633	2,633	2,633	2,633	2,633
2.3 Water charges and land tax			106	186	106	420	420	420	420	425	425	425	425	425	425
2.4 Advances		90	170	242	484										
2.5 Sub-total	2,091	5,175	7,576	11,316	21,465	21,743	23,218	24,497	25,738	26,309	26,885	26,958	27,006	26,992	26,959
<b>3. Cash Flow Before Financial Expenses</b>	<b>(318)</b>	<b>(2,874)</b>	<b>208</b>	<b>928</b>	<b>438</b>	<b>7,280</b>	<b>10,493</b>	<b>15,384</b>	<b>21,357</b>	<b>25,613</b>	<b>26,311</b>	<b>28,655</b>	<b>29,003</b>	<b>28,896</b>	<b>28,517</b>
<b>4. Less: Loan repayment</b>															
4.1 Land Development	363	838	733	1,566	1,304	2,341	2,341	3,103	3,103	3,103	3,103	5,399	5,399	5,399	5,399
4.2 Settler housing	432	432	701	701	701	701	701	701	701	701	701	701	701	269	269
4.3 Sub-total	795	1,270	804	2,267	2,005	3,042	3,042	3,804	3,804	3,804	3,804	6,100	6,100	5,668	5,668
<b>5. Net income after loan repayment</b>	<b>(1,113)</b>	<b>(4,144)</b>	<b>(596)</b>	<b>(1,339)</b>	<b>(1,567)</b>	<b>4,238</b>	<b>7,451</b>	<b>11,580</b>	<b>17,553</b>	<b>21,809</b>	<b>22,507</b>	<b>22,555</b>	<b>22,903</b>	<b>23,228</b>	<b>22,849</b>
<b>6. Balance c/f</b>	<b>-</b>	<b>(1,113)</b>	<b>(5,257)</b>	<b>(5,853)</b>	<b>(7,192)</b>	<b>(8,759)</b>	<b>4,521</b>	<b>-</b>							
<b>7. Distribution of dividends</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,930</b>	<b>11,580</b>	<b>17,553</b>	<b>21,809</b>	<b>22,507</b>	<b>22,555</b>	<b>22,903</b>	<b>23,228</b>	<b>22,849</b>
<b>9. Per Settler Annual Income (M\$)</b>															
9.1 Dividends							732	2,895	4,388	5,452	5,627	5,639	5,726	5,807	5,712
9.2 Waqaf	3,576	4,213	5,154	5,220	5,618	6,109	7,593	4,743	3,759	3,841	4,232	4,279	4,287	4,287	4,287
9.3 Total	3,576	4,213	5,154	5,220	5,618	6,109	8,325	7,638	8,147	9,293	9,859	9,918	10,013	10,094	9,999

N.B: 1. Figures from 1985-1989 are based on actual data.

2. Sales values for FFB from 1985-1989 include cocoa value.

3. Settler labour requirement is assumed to be - 300 from 1985-1987;

807 from 1988-1991; 1500 for 1992 and assumed to be 2000 from 1993 onwards.

4. Dividends are distributed over 4,000 shareholders.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>1. REVENUE</b>											
1.1 Padi											
Total Production (mt)	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890	39,890
Sales Value at \$660/mt.	26,327	26,327	26,327	26,327	26,327	26,327	26,327	26,327	26,327	26,327	26,327
1.2 FFB											
FFB Production (mt)	158,493	155,003	151,448	147,893	144,338	140,783	137,228	133,673	130,118	123,990	118,860
Sales Value (M\$)	24,725	24,180	23,626	23,071	21,893	21,962	21,408	20,853	20,298	19,342	18,542
1.3 Cocoa											
Total Production (mt)	1,367	1,320	1,257	1,193	1,126	1,060	994	927	861	797	733
Sales Value (M\$)	3,871	3,738	3,560	3,379	3,189	3,002	2,815	2,625	2,438	2,257	2,076
<b>TOTAL REVENUE</b>	<b>54,923</b>	<b>54,245</b>	<b>53,513</b>	<b>52,777</b>	<b>51,409</b>	<b>51,291</b>	<b>50,550</b>	<b>49,805</b>	<b>49,063</b>	<b>47,926</b>	<b>46,945</b>
<b>2. Expenses</b>											
2.1 Production Cost - Materials	15,100	14,842	14,729	14,682	14,644	14,444	14,237	14,144	14,129	14,121	14,109
- Labour	8,575	8,575	8,575	8,575	8,575	8,575	8,575	8,575	8,575	8,575	8,575
2.2 Zakat (10% of padi sales value)	2,633	2,633	2,633	2,633	2,633	2,633	2,633	2,633	2,633	2,633	2,633
2.3 Water charges and land tax	425	425	425	425	425	425	425	425	425	425	425
2.4 Advances											
2.5 Sub-total	26,733	26,475	26,362	26,315	26,277	26,077	25,870	25,777	25,762	25,754	25,742
<b>3. Cash Flow Before Financial Expenses</b>	<b>28,190</b>	<b>27,770</b>	<b>27,151</b>	<b>26,462</b>	<b>25,132</b>	<b>25,214</b>	<b>24,680</b>	<b>24,028</b>	<b>23,301</b>	<b>22,172</b>	<b>21,203</b>
<b>4. Less: loan repayment</b>											
4.1 Land Development	5,399	5,399	5,399	5,399	5,399	3,829	3,829	2,154	2,154	2,154	1,383
4.2 Settler housing											
4.3 Sub-total	5,399	5,399	5,399	5,399	5,399	3,829	3,829	2,154	2,154	2,154	1,383
<b>5. Net income after loan repayment</b>	<b>22,791</b>	<b>22,371</b>	<b>21,752</b>	<b>21,063</b>	<b>19,733</b>	<b>21,385</b>	<b>20,851</b>	<b>21,874</b>	<b>21,147</b>	<b>20,018</b>	<b>19,820</b>
<b>6. Balance c/f</b>											
<b>7. Distribution of dividends</b>	<b>22,791</b>	<b>22,371</b>	<b>21,752</b>	<b>21,063</b>	<b>19,733</b>	<b>21,385</b>	<b>20,851</b>	<b>21,874</b>	<b>21,147</b>	<b>20,018</b>	<b>19,820</b>
<b>9. Per Settler Annual Income (M\$)</b>											
9.1 Dividends	5,698	5,593	5,438	5,266	4,933	5,346	5,213	5,469	5,287	5,005	4,955
9.2 Wages	4,287	4,287	4,287	4,287	4,287	4,287	4,287	4,287	4,287	4,287	4,287
9.3 Total	9,985	9,880	9,725	9,553	9,220	9,633	9,500	9,756	9,574	9,292	9,242

MALAYSIA  
TRANS-PERAK AREA DEVELOPMENT PROJECT  
PROJECT COMPLETION REPORT

Economic Costs And Benefits: Agricultural Component

(M\$'000)

Year	Cost			Benefits				Net Benefit
	Capital /a	O & M /b	Total	Padi	Oil Palm	Cocoa	Total	
1981	7,465	2,365	9,830	-	-	-	-	(9,830)
1982	8,930	482	9,412	-	-	-	-	(9,412)
1983	11,527	885	12,412	40	-	-	40	(12,372)
1984	8,115	2,101	10,216	291	219	39	549	(9,667)
1985	16,692	1,395	18,087	709	864	100	1,673	(16,414)
1986	25,276	6,661	31,937	2,903	559	178	3,640	(28,297)
1987	18,388	10,590	28,978	7,907	1,547	128	9,582	(19,396)
1988	17,177	12,036	29,213	9,722	3,186	89	12,997	(16,216)
1989	11,643	19,636	31,279	22,450	7,337	298	30,085	(1,194)
1990	1,313	22,865	24,178	20,683	7,128	388	28,199	4,021
1991	1,991	24,307	26,298	20,350	11,518	678	32,546	6,248
1992	697	25,430	26,127	19,120	16,997	1,125	37,242	11,115
1993	378	26,527	26,905	21,124	25,993	1,656	48,773	21,868
1994		27,393	27,383	22,119	30,133	2,086	54,338	26,955
1995		27,412	27,412	22,203	32,592	2,459	57,254	29,842
1996		27,308	27,308	21,920	29,849	4,258	56,027	28,719
1997		27,289	27,289	21,920	29,982	4,608	56,510	29,221
1998		27,218	27,218	21,920	29,643	4,828	56,391	29,173
1999		27,140	27,140	21,920	29,093	4,907	55,920	28,780
2000		26,684	26,684	21,920	28,498	4,861	55,279	28,595
2001		26,189	26,189	21,920	27,871	4,695	54,486	28,297
2002		25,973	25,973	21,920	27,232	4,470	53,622	27,649
2003		25,911	25,911	21,920	26,552	4,243	52,755	26,844
2004		25,866	25,866	21,920	25,953	4,007	51,880	26,014
2005		25,671	25,671	21,920	25,314	3,770	51,004	25,333
2006		25,466	25,466	21,920	24,675	3,534	50,129	24,663
2007		25,382	25,382	21,920	24,035	3,297	49,252	23,870
2008		25,368	25,368	21,920	23,396	3,061	48,377	23,009
2009		25,361	25,361	21,920	22,294	2,834	47,048	21,687
2010	(32,398) /c	25,351	(7,047)	21,920	21,372	2,607	45,899	52,946

IRR = 10.24%

NPV at 10 % = M\$ 2,375

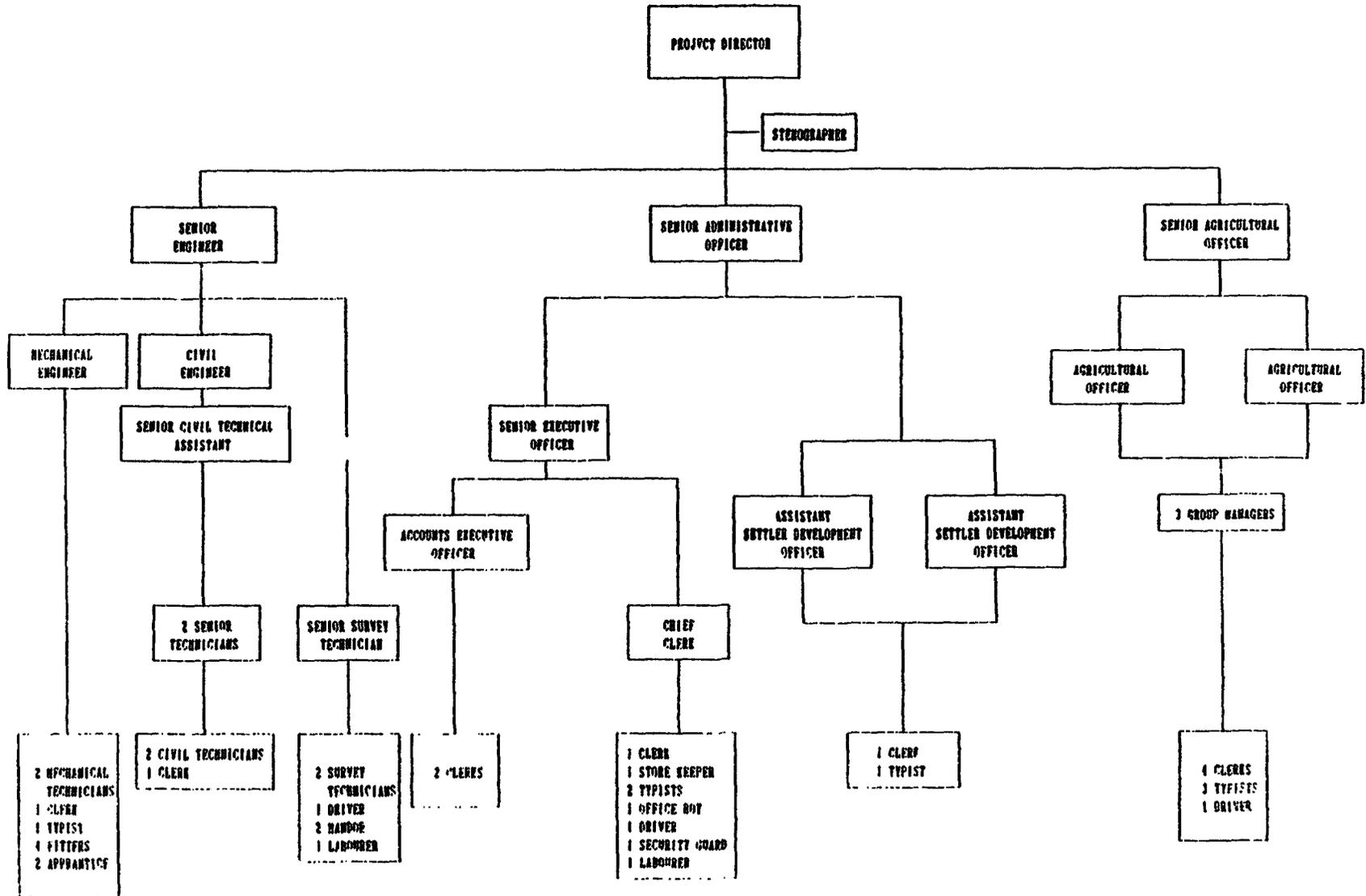
/a Excluding cost of housing, settlement infrastructure, and West Coast Highway.

/b Includes administration and engineering costs.

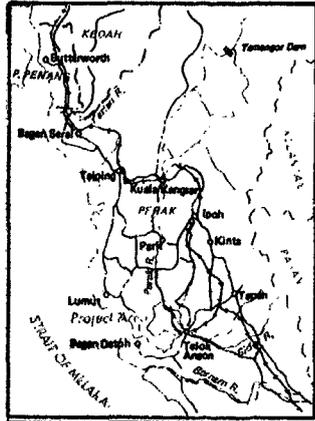
/c A salvage value equal to 25% of original capital cost is assumed.

TRANS-PENAE AREA DEVELOPMENT PROJECT  
PROJECT OFFICE ORGANISATION CHART  
1289

CHART 1



# MALAYSIA TRANS-PERAK AREA DEVELOPMENT PROJECT



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-  Non-FELCRA Areas
-  Rehabilitated Padi Area
-  New Padi Area
-  Tree Crop Area
-  Main Roads
-  Access Roads
-  New Flood Embankment
-  Old Flood Embankments

