

**PROJECT COMPLETION REPORT**

**ON THE**

**SECOND PAHANG BARAT INTEGRATED AGRICULTURE**

**DEVELOPMENT PROJECT**  
**(Loan 1238-MAL)**

**IN**

**MALAYSIA**

**May 2001**

## CURRENCY EQUIVALENTS

Currency Unit – Ringgit (RM)

		<b>At Appraisal</b>	<b>At Project Completion</b>
RM1.00	=	\$0.392	\$0.26
\$1.00	=	RM2.555	RM3.80

## ABBREVIATIONS

ADB	–	Asian Development Bank
BME	–	benefit monitoring and evaluation
DID	–	Department of Irrigation and Drainage
DOA	–	Department of Agriculture
EIRR	–	economic internal rate of return
FAMA	–	Federal Agricultural Marketing Authority
FOA	–	Farmers' Organization Authority
GIS	–	geographic information system
IA	–	implementing agency
IADP	–	integrated agriculture development project
MARDI	–	Malaysian Agricultural Research and Development Institute
MOA	–	Ministry of Agriculture
O&M	–	operation and maintenance
PCR	–	project completion report
PMU	–	project management unit

## NOTES

- (i) The fiscal year (FY) of the Government ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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## BASIC DATA

### A. Loan Identification

1.	Country	Malaysia
2.	Loan Number	1238-MAL
3.	Project Title	Second Pahang Barat Integrated Agriculture Development Project
4.	Borrower	Malaysia
5.	Executing Agency	Ministry of Agriculture
6.	Amount of Loan	\$28.5 million
7.	PCR Number	627

### B. Loan Data

1.	Appraisal	
	- Date Started	12 Oct 1992
	- Date Completed	23 Oct 1992
2.	Loan Negotiations	
	- Date Started	25 May 1993
	- Date Completed	27 May 1993
3.	Date of Board Approval	29 Jun 1993
4.	Date of Loan Agreement	13 Aug 1993
5.	Date of Loan Effectiveness	
	- In Loan Agreement	11 Nov 1993
	- Actual	28 Oct 1993
	- No. of Extensions	None
6.	Closing Date	
	- In Loan Agreement	30 Jun 2000
	- Actual	30 Sep 2000
	- No. of Extensions	None
7.	Terms of Loan	
	- Interest Rate	Variable
	- Maturity	25 years
	- Grace Period	6 years
8.	Disbursements	

#### a. Dates

**Initial Disbursement**  
25 Apr 1994

**Final Disbursement**  
20 Sep 2000

**Time Interval**  
6 years, 5 months

**Effective Date**  
28 Oct 1993

**Original Closing Date**  
30 Jun 2000

**Time Interval**  
6 years, 8 months

b. Amounts (\$)

<b>Category</b>	<b>Original Allocation</b>	<b>Amount Disbursed</b>	<b>Amount Reallocated (Cancelled)</b>	<b>Revised Allocation</b>
Civil Works				
01A - Land Development	5,400,000	2,395,534	(3,004,466)	2,395,534
01B - Rural Infrastructure	19,600,000	11,852,390	(7,747,610)	11,852,390
01C - Buildings	800,000	687,259	(112,741)	687,259
Vehicles and Equipment	980,000	971,893	(8,107)	971,893
Training and Extension	400,000	38,950	(361,050)	38,950
Research	600,000	39,854	(560,136)	39,854
Consulting Services	720,000	0	(720,000)	0
<b>Total</b>	<b>28,500,000</b>	<b>15,985,890</b>	<b>(12,514,110)</b>	<b>15,985,890</b>

9. Local Costs Financed : None

### C. Project Data

1. Project Cost (\$ million)

<b>Project Cost</b>	<b>Appraisal Estimate</b>		<b>Actual</b>	
	<b>Amount</b>	<b>Percent</b>	<b>Amount</b>	<b>Percent</b>
Foreign Exchange	39.46	45.7	15.99	34.6
Local Currency	47.05	54.3	30.18	65.4
<b>Total</b>	<b>86.51</b>	<b>100.0</b>	<b>46.17</b>	<b>100.0</b>

2. Financing Plan (\$ million)

<b>Name of Financier</b>	<b>Appraisal Estimate</b>				<b>Actual</b>			
	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total</b>	<b>%</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total</b>	<b>%</b>
ADB	28.50	0.00	28.50	32.9	15.99	0.00	15.99	34.6
Government	10.96	47.05	58.01	67.1	0.00	30.18	30.18	65.4
<b>Total</b>	<b>39.46</b>	<b>47.05</b>	<b>86.51</b>	<b>100.0</b>	<b>15.99</b>	<b>30.18</b>	<b>46.17</b>	<b>100.0</b>
Percent	45.6	54.4	100.0		34.6	65.4	100.0	

ADB = Asian Development Bank

## 3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total
<b>A. Agro-Ecological Planning</b>						
1. Agro-Ecological Planning	160	560	720	131	141	272
2. Pilot Projects						
a. Rubber Land Productivity Improvement	650	650	1,300	0	280	280
b. Idle Paddy Lands Conversion	1,000	1,200	2,200	21	1,735	1,756
<b>Subtotal</b>	<b>1,810</b>	<b>2,410</b>	<b>4,220</b>	<b>152</b>	<b>2,156</b>	<b>2,308</b>
<b>B. Agricultural Land Development and Consolidation</b>						
1. Horticulture	2,700	4,000	6,700	1,549	3,165	4,714
2. Villages Development Scheme	1,050	1,250	2,300	939	1,632	2,571
<b>Subtotal</b>	<b>3,750</b>	<b>5,250</b>	<b>9,000</b>	<b>2,488</b>	<b>4,797</b>	<b>7,285</b>
<b>C. Rural Infrastructure</b>						
1. Farm Roads and Bridges	16,500	13,500	30,000	11,934	13,295	25,229
2. Irrigation and Drainage	1,400	1,100	2,500	58	707	765
3. Flood Protection	1,700	1,300	3,000	0	0	0
4. Land Acquisition Survey	0	1,900	1,900	0	0	0
<b>Subtotal</b>	<b>19,600</b>	<b>17,800</b>	<b>37,400</b>	<b>11,992</b>	<b>14,002</b>	<b>25,994</b>
<b>D. Institutional Strengthening</b>						
1. Training and Extension	400	1,200	1,600	36	834	870
2. Research Activities	600	900	1,500	32	751	783
3. Consulting Services	720	3,280	4,000	0	2,387	2,387
<b>Subtotal</b>	<b>1,720</b>	<b>5,380</b>	<b>7,100</b>	<b>68</b>	<b>3,972</b>	<b>4,040</b>
<b>E. Project Management</b>						
1. Administration	0	4,800	4,800	0	4,724	4,724
2. Buildings and Training Centers	800	600	1,400	619	(53)	566
3. Vehicles and Equipment	820	480	1,300	667	444	1,111
4. Monitoring and Evaluation	0	300	300	0	141	141
<b>Subtotal</b>	<b>1,620</b>	<b>6,180</b>	<b>7,800</b>	<b>1,286</b>	<b>5,256</b>	<b>6,542</b>
<b>Total Base Cost</b>	<b>28,500</b>	<b>37,020</b>	<b>65,520</b>	<b>15,986</b>	<b>30,183</b>	<b>46,169</b>
Physical Contingencies	1,420	1,860	3,280			
Price Escalation	4,540	8,170	12,710			
Interest During Construction	5,000	0	5,000			
<b>Total Project Cost</b>	<b>39,460</b>	<b>47,050</b>	<b>86,510</b>	<b>15,986</b>	<b>30,183</b>	<b>46,169</b>
Percent	45.6	54.4	100.0	34.6	65.4	100.0

## 4. Project Schedule

Milestone	Appraisal Estimate	Actual
Dates of Contracts with Consultants		
Agro-Ecological Planning	}	}
Agricultural Land Development and Consolidation	}	}
Rural Infrastructure	} April 1994	} October 1993 –
Training	}	} December 1999
	}	}
Completion Date of Engineering Designs		
Farm Roads and Bridges	}	December 1999
Irrigation and Drainage	} December 1996	December 1995
Flood Protection	}	None
Civil Works Contracts		
Dates of Awards	}	
First Award	}	December 1993
Last Award	} October 1994 –	October 1999
Completion of Works	} December 1999	
First Award	}	December 1994
Last Award	}	September 2000
Equipment and Supplies		
First Procurement	October 1993	February 1994
Last Procurement	December 1999	December 1999
Start of Operations		
Agro-Ecological Planning	}	}
Agricultural Land Development and Consolidation	}	}
Rural Infrastructure	} October 1993	} January 1994 –
Training	}	} December 1999
	}	}
Other Milestones		
Reallocation/Cancellation of Loan Proceeds		
First		14 Mar 1998
Final		20 Sep 2000

5. Benchmark Survey  
Impact Evaluation1 Jan 1997  
31 Dec 1999

**D. Data on Asian Development Bank Missions**

<b>Name of Mission</b>	<b>Date</b>	<b>No. of Persons</b>	<b>No. of Person-Days</b>	<b>Specialization of Members</b>
Fact-Finding	17-30 Aug 1992	4	52	Senior Project Economist Project Engineer Environment Specialist Financial Analyst
Appraisal	12-23 Oct 1992	5	55	Senior Project Economist Senior Programs Officer Counsel Financial Analyst Administrative Assistant
Inception	9-12 Nov 1993	1	4	Senior Agronomist
Review 1	10-18 Jun 1995	2	18	Senior Agronomist Assistant Project Analyst
Midterm	11-30 Nov 1996	3	60	Senior Agronomist Agricultural Economist Assistant Project Analyst
Review 2	4-10 Sep 1997	2	14	Senior Agronomist Assistant Project Analyst
Review 3	30 Nov-3 Dec 1998	1	4	Rural Development Specialist/Economist
Review 4	11-18 Oct 1999	1	8	Senior Agronomist
Project Completion Review	22 Jan-15 Feb 2001	3	63	Project Specialist Economist Assistant Project Analyst



## I. PROJECT DESCRIPTION

1. In 1982 the Asian Development Bank (ADB) approved a loan of \$27.2 million equivalent to the Government of Malaysia for the first Pahang Barat Integrated Agriculture Development Project (IADP).<sup>1</sup> The objectives were to (i) provide smallholders with an economic base that would encourage their continued participation in agriculture, (ii) improve on-farm employment opportunities for the next generation of the rural population, and (iii) maintain the vitality of the agriculture sector in the Malaysian economy. The project was completed in 1992 and the project performance audit report (PPAR) dated 22 February 1996 concluded that the project was generally successful.

2. Toward the end of implementation of the first IADP, the Project Management Unit (PMU) in November 1991 completed a reconnaissance study for a second Pahang Barat Integrated Agriculture Development Project. Following a small-scale project preparatory technical assistance (SSTA) for the feasibility study<sup>2</sup> and an appraisal mission in October 1992, a loan of \$28.5 million equivalent for the Project was approved on 29 June 1993.

3. The objectives of the Project were to increase incomes of the rural population, improve labor productivity in agriculture, and optimize the use of existing agricultural lands in accordance with land suitability and with socioeconomic and environmental considerations. The objectives were to be achieved by improving the productivity of smallholdings through production of high-value agricultural commodities, consolidating landholdings into larger economic units, and adjusting the quality of rural infrastructure to the needs of commercial agriculture. The project area covers the seven<sup>3</sup> districts of Pahang Barat (West Pahang), encompassing 770,000 hectares (ha) of agricultural lands. The main crops in the project area are rubber and oil palm. The two commodities are grown mainly in Federal Land Development Authority (FELDA) schemes. Other major crops cultivated outside the FELDA schemes are fruit, vegetables, and cocoa. Even outside the FELDA schemes, the main crop is rubber; however, 50 percent of the land for rubber is left idle. Paddy areas in the project area are also idle.

4. The Project replicated only activities that proved successful in the first Pahang Barat IADP. Since fruit development and the pilot schemes of the first project were particularly successful in physical achievement, income generation, and farmer participation, the beneficiary coverage of these activities was expanded under the Project, with enhanced institutional and infrastructure support. The expansion of the rubber and oil palm plantation component of the first IADP was not replicated, as farmer participation and benefits could not be guaranteed with the prevailing cultivation and management methods. The second IADP, however, included experiments with labor-saving production technologies that would reduce labor constraints affecting the rubber industry. Farmers' views were also incorporated much more in project design and land acquisition problems were to be overcome by using land owned by the Government or by beneficiary farmers willing to give some of their own land.

5. The Project covered initially the same administrative districts as in the first IADP, but with project activities undertaken in different villages. There were five components.

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<sup>1</sup> Loan 602-MAL: *Pahang Barat Integrated Agriculture Development Project*, for \$2.7 million, approved on 23 November 1982.

<sup>2</sup> TA 1692-MAL: *Pahang Barat Integrated Agriculture Development Project II*, for \$100,000, approved on 20 August 1992.

<sup>3</sup> These were initially the six districts of Bentong, Jerantut, Lipis, Maran, Raub, and Temerloh. Bera became a separate district during the project implementation period.

- (i) Agro-ecological planning and land use pilot projects: (a) collecting data and applying a computerized geographic information system (GIS) for land evaluation and land use optimization, (b) preparing land suitability and consolidation maps for about 60 villages, (c) testing the feasibility of improving rubber land productivity by labor-saving technologies and intercropping on about 1,000 ha of underutilized rubber areas, and (d) testing the feasibility of converting abandoned paddy lands into fishponds and horticulture gardens on about 1,000 ha.
- (ii) Agricultural land development and consolidation: (a) developing horticulture over about 3,000 ha of agricultural lands, and (b) developing various agricultural schemes in 60 villages.
- (iii) Rural infrastructure: (a) constructing and improving 1,500 kilometers (km) of access and farm roads and 30 bridges, (b) rehabilitating irrigation and drainage facilities, and (c) constructing flood protection facilities for 1,500 ha of low-lying areas.
- (iv) Institutional strengthening: (a) training project staff, farmers, and women, extension services, support for research activities; and (b) consulting services for project implementation.
- (v) Project management support: (a) additional staff for project implementation; (b) office facilities and upgrading the training center for the project management unit (PMU), and provision of vehicles and equipment.

## **II. EVALUATION OF IMPLEMENTATION**

### **A. Project Components**

#### **1. Agro-Ecological Planning and Land Use Pilot Projects**

6. A computerized program based on GIS/LANDS for agricultural planning and a database on soil types and land use for 60 villages (targeted at appraisal) selected for development were completed. For each village, Department of Agriculture (DOA) staff completed a GIS village map and prepared a village agricultural development plan after consulting participant farmers. Each plan was subsequently made operative under the village development schemes subcomponent of the Project.

7. The pilot project for improving the productivity of existing rubber tree plantations covered 1,135 ha. The target area at appraisal was 1,000 ha, but this target was raised to 1,200 ha during the 1997 Review Mission, reflecting the high level of farmers' interest and the lower-than-anticipated development costs (Appendix 1). Under the rubber lands pilot project, snake fruit (salak) was intercropped with existing young and mature rubber trees over about 740 ha. In addition, a trial used the chemical ethephon (a latex stimulant) on 200 ha of rubber trees to allow less frequent tapping. Ethephon is meant to prevent the latex from coagulating between tappings, thus improving the flow of latex and reducing tapping frequency to once in two or three days rather than the earlier three times daily. A variety of fruit trees were planted as hedge in 200 ha of rubber plantation. All three methods of enhancing the productivity of rubber lands were successful, although snake fruit intercropping was inhibited to some degree by the root

structures of rubber trees, compared with snake fruit intercropping in fruit tree orchards. This pilot project had 1,389 farmer participants.

8. The pilot project to convert idle paddy land exceeded its target area. A total area of 2,345 ha was redeveloped, against the targeted 1,000 ha at appraisal and a 1997 revised target of 1,700 ha. The pilot project comprised 1,738 ha in crops and 607 ha in fish estates (1,100 ha and 600 ha targeted in 1997, respectively). The cropped areas produce short-term crops such as bananas, corn, and other vegetables. A total of 22 fish estates were developed to produce fish for harvesting by the farmer participants. On weekends and public holidays, 7 of the 22 are open to the public for a fee, which is collected on behalf of the farmer participants.

## **2. Agricultural Land Development and Consolidation**

9. This component had two subcomponents. First, a total area of 2,597 ha was developed as nucleus orchards in blocks with a minimum size of 20 ha owned and managed by a group of farmers. The appraisal target of 3,000 ha was revised down to 2,500 ha in 1997 due to the difficulties experienced in finding sufficiently large contiguous areas of suitable land, the higher-than-anticipated development costs, and the cheaper costs of converting increased areas of abandoned paddy land. The main crops are durian and dokong. Citrus, cempedak, mango, mangosteen, and jackfruit were also planted. Intercropping with cash crops such as maize, sweet potatoes, and bananas in the orchards in early years provides some initial income to defray ongoing development costs before the trees bear fruit as well as shade to protect the young fruit trees. Around 600 ha of these orchards was irrigated as part of the Project, while in some instances farmers themselves installed irrigation.

10. The second subcomponent - utilizing the village development plans prepared under the agro-ecological planning subcomponent - developed a total of 3,003 ha for fruit trees (1,199 ha), cash crops including vegetables (1,365 ha), aquaculture (117 ha), and livestock (322 ha). This compares with a target of 3,000 ha at appraisal. Aquaculture involved the construction of new fishponds or the rehabilitation of idle fishponds and introduction of caged fishing especially in the Pahang River. Livestock development was limited to the establishment of a small amount of new grazing area and some experimental integration of livestock with cropping because farmer participants were generally unwilling to expose themselves to the perceived associated risks. The envisaged significant development of dairy farming as part of the village development schemes did not occur because farmers perceived the returns from dairy farming as too uncertain.

## **3. Rural Infrastructure**

11. Under this component, 1,700 km of rural roads (versus 1,500 km targeted at appraisal) and 44 bridges (versus 30 bridges targeted at appraisal) were constructed and/or upgraded. The improved rural roads made use of laterite, quarry waste, gravel, and crusher-run. At appraisal, irrigation and drainage facilities for 2,000 ha were also envisaged to be rehabilitated and flood protection works constructed to mitigate flooding on 1,500 ha in low-lying areas. Construction/upgrading of rural roads did not require any land acquisition and was generally implemented satisfactorily. Some changes in design and, in some cases, in road alignment were necessary due to difficulties in obtaining farmers' consent on the use of their land. However, the delays were only minor necessitating land acquisition surveys on new locations, which were undertaken during the later part of the Project. It was anticipated that flood mitigation works, including drainage, embankments and dikes, totaling 64 km, would be required. In 1997, however, the Ministry of Agriculture (MOA) informed ADB that it wished to

reduce these targets to 500 ha for irrigation and drainage and 420 ha for flood mitigation. Also, it was found that constructing a fishpond was a more economic option than expensive drainage works. In the case of flood mitigation, the PMU doubted the effectiveness of the works proposed at time of appraisal. By project completion, the Department of Irrigation and Drainage (DID) had undertaken 450 ha of irrigation and drainage, while DOA had undertaken additional amounts<sup>4</sup> under other project subcomponents. Before the PMU decided to halt the flood mitigation works, protection for 420 ha had been completed. In the case of irrigation and drainage, the wide coverage was due to the extent of these activities being undertaken in an integrated manner with other subcomponents of the Project (i.e., paddy land conversion, horticulture, and village development scheme subcomponents). The changes did not compromise the objectives of the Project.

#### **4. Institutional Strengthening**

12. This component focused on training, extension, and research. The Project funded additional equipment for the DOA agricultural training center at Raub. Project-funded training courses included DOA staff training and farmer training through resources provided to the Farmers' Organization Authority (FOA). In total, 700 DOA staff members were trained via 11 training courses and 28,095 farmers received training through 642 training sessions. In addition, the Malaysian Agricultural Research and Development Institute (MARDI) received funding to introduce new techniques in postharvest technology to farmers (18 courses on food processing were conducted for women farmer groups [KPW]) (Appendix 2). Consequently, the farmers accepted involvement in non-traditional crops, and the KPW increased the range, quantity, and quality of their products.

13. MARDI was funded to conduct research on crop variety evaluation, transfer of technology for selected crops, and commercial testing of potential crops. In addition, Federal Agricultural Marketing Authority (FAMA) was financed to conduct market research for the crops produced as a result of the Project. FAMA also undertook various promotional activities to assist with produce marketing, and its marketing outlets were strengthened and expanded for product sales in the project area.

#### **5. Project Management Support**

14. The Project was managed by the same PMU established and responsible for the first IADP. The Project provided two new district agricultural offices (at Raub and Bera), a new DID office in Raub, and one staff quarters building in Raub; new vehicles, small agricultural machinery, and office equipment (Appendix 3); and also funded the staff salaries and other annual operation and maintenance (O&M) costs of the PMU.

15. The Project was to fund consulting services for project implementation; 36 person-months of international and 968 of domestic consultants. But, to reduce costs and utilize expertise available in the Government, the Government in 1997 requested that international consultants not be engaged. ADB agreed to this request after evaluating the capability of domestic experts and reviewing their outputs. Sufficiently competent in-house expertise was available and the Government assigned qualified experts from its departments (DOA, Department of Fisheries [DOF], Department of Veterinary Services [DVS]) and agencies (MARDI, FAMA) that provided these services (Appendix 3). The amount of \$720,000 was subsequently cancelled from the loan.

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<sup>4</sup> Estimated by PMU staff at 161 ha (1999 Aide Memoire).

## **B. Implementation Arrangements**

16. MOA served as the Executing Agency, responsible for overall supervision and execution of the Project. The various project components were carried out under the direct responsibility of seven implementing agencies (IAs): DOA, DID, DOF, DVS, MARDI, FAMA, and FOA. The IAs performed their tasks in a timely and competent manner.

17. The PMU established for the first IADP continued in that role for the Project and was responsible for day-to-day management and implementation, particularly the coordination of inputs from the various specialist agencies at both federal and state levels. The PMU organized the training of the farmer groups and rural women and managed activities related to land development, crop establishment, agroprocessing, and marketing. The PMU was headed by the project director who reported to the project steering committee (PSC). A particular feature of project implementation was the close working relationship between the PMU and the DOA of Pahang State government. This allowed the use of the district-level agricultural field officers permanently located close to the project activities. It also impacted positively on future sustainability once the Project was handed over to the state government.

18. The PSC coordinated, monitored, reviewed, and evaluated the progress of project implementation and initial operation of the various subcomponents as they were completed. It also provided the link between the IAs and the Pahang State government. The PSC consisted of representatives of the seven IAs and the state government. At the end of the six-year implementation period, the PMU with federal Government staff continued to operate the Project and undertook some minor capital works utilizing only funds from the Government of Malaysia. Since the beginning of 2001, the Project has become the responsibility of Pahang State government.

## **A. Project Costs and Financing**

### **B.**

19. At appraisal, the total project cost was estimated at \$86.51 million equivalent, including taxes and duties. The foreign exchange component was estimated to be \$39.46 million (45.6 percent of the total project cost) and the local currency component \$47.05 million (54.4 percent of the total project cost). These cost estimates included physical and price contingencies of \$15.99 million and interest during construction (IDC) of \$5 million. The ADB loan was \$28.50 million.

20. The actual costs amounted to \$46.17 million, comprising \$15.99 million in foreign exchange or 34.6 percent of the total project cost, and \$30.18 million equivalent in local currency or 65.4 percent of the total project cost (Appendix 4). ADB's financing amounted to \$15.99 million, representing 100 percent of the foreign currency cost, or 34.6 percent of the total project cost. The amount of \$12.51 million (44 percent) was cancelled from the ADB loan.

21. Most of the components and subcomponents cost less in dollar equivalent terms than anticipated at appraisal. The village development scheme subcomponent was slightly more expensive than anticipated. A principal reason for the lower-than-expected costs was the devaluation of the Malaysian currency over the project implementation period. The exchange rate at appraisal was RM2.55 to the US dollar compared with RM3.8 later in the Project. However, savings were made over and above the effects of the exchange rate change. Unit costs for the rubber land productivity improvement and paddy land conversion subcomponents

were lower than anticipated, which more than compensated for the increased area developed; the targeted area for orchard estates was reduced; unit costs for the roads and bridges subcomponent were lower than anticipated; irrigation and drainage and flood protection subcomponents were reduced in scope and to some extent incorporated in other subcomponents; no land acquisition costs were incurred since the civil works were on Government-owned land or participating farmers made their land available at no cost; and institutional strengthening costs were reduced by utilizing in-house Government experts rather than engaging consultants.

#### **D. Project Schedule**

22. As anticipated, the Project was completed over six years - January 1994 to December 1999 - with the loan closing date, as in the Loan Agreement, 30 June 2000. No extensions to the loan closing date were required (Appendix 5).

#### **E. Engagement of Consultants, and Procurement of Goods and Services**

23. The Government requested and ADB agreed that no international consultants be engaged (para. 15). Only two domestic engineering consultant firms were engaged for the detailed design and supervision of construction of farm roads and associated work. The domestic consultant firms were selected and engaged by the Government using its standard procedures acceptable to ADB (Appendix 3).

24. Civil works for the Project were procured satisfactorily through local competitive bidding (LCB) among prequalified local contractors in accordance with procedures acceptable to ADB. Interested foreign bidders were allowed to participate in the LCB but none did so. Vehicles, equipment, and supplies were procured using the Government Central Contract (GCC) procedures acceptable to ADB. Civil works (Appendix 6), and vehicles and equipment (Appendix 6) amounted to \$1.66 million equivalent. Advance action at the start of project implementation was allowed for procurement of agricultural materials and equipment and small civil works contracts.

#### **F. Performance of Consultants, Contractors, and Suppliers**

25. The performance of the consultants, contractors, and suppliers was generally satisfactory, and no major problems were encountered during project implementation. Extensions agreed to on several contracts were due to delay in obtaining farmers' consent, unfavorable weather conditions, and cash flow constraints during the financial crisis of 1997 and 1998. However, such delays were minor and did not disrupt project scheduling.

#### **G. Conditions and Covenants**

26. Generally, the Government and MOA complied with the loan covenants. The loan covenant pertaining to the submission of the comprehensive training program was delayed by three years (Appendix 7). The loan covenant requiring the Government to undertake a Benefit Monitoring and Evaluation (BME) review study still has to be complied with.

#### **H. Disbursements**

27. The Project became effective on 28 October 1993 and the first disbursement under the loan was on 25 April 1994. Disbursements as at midterm were considered low due to non-use of

the allocation for consulting services, and the use of Government funds instead of the loan allocation for research, training, and extension. Retroactive financing of about \$0.89 million involved organization expenditures, training, supply contracts, and small civil works and was done in accordance with the provision of the Loan Agreement (Schedule 3, paragraph 8).

28. At loan closing, \$15.99 million had been disbursed. The undisbursed balance of \$12.51 million was cancelled as a consequence of lower project costs (para. 27). The total borrowed amount represents 42 percent of the loan (excluding the \$720,000 for international consultants that was cancelled in 1998). The use of loan funds, by category, is presented in Appendix 8.

## **I. Environmental and Social Impact**

29. The Project has not had any significant negative environmental impacts. Land clearing activities were relatively modest and, in the later stages, were curtailed because it was cheaper to convert idle paddy land to orchard estates. There have been no reports of land erosion problems resulting from the Project. The development of fishing estates was frequently accompanied by aesthetic improvements and the provision of recreational opportunities. Aware of the need to limit chemical use in farming operations, the PMU staff, DOA field officers, and participating farmers implemented integrated pest management programs in the project area.

## **J. Performance of the Borrower, Executing Agency, and Implementing Agencies**

30. The Borrower, MOA, and the IAs performed satisfactorily during implementation. The Borrower provided adequate funds to support the Project as envisaged at appraisal. The PMU provided excellent office facilities, transportation, and other support to the various IAs so that all performed their allotted tasks satisfactorily. The PMU coordinated the inputs of the various IAs and was the link between the Project and the relevant state government agencies. The handover of the Project to the state government of Pahang Barat at the end of 2000 was smooth and early indications are that the state government is committed to providing sufficient resources to ensure the Project's sustainability. Sustainability is linked to a deliberate policy of involving the state government departments, especially DOA, in "ownership of the Project" during implementation. Given the very large geographic area over which the subprojects were spread, this policy was essential and had the added benefit of providing some continuity and certainty with respect to the Project's ongoing operation and sustainability.

## **K. Performance of the Asian Development Bank**

31. ADB performed satisfactorily during implementation. ADB carried out seven review missions including the Project Inception Mission in November 1993 and the Project Completion Report (PCR) Mission in February 2001. In November 1996, the Review Mission undertook a midterm review of the Project and also followed up on the recommendations of the first IADP Project Performance Audit Report (PPAR) for the Government. At appraisal and in review missions, ADB accepted the need to adopt a participatory approach to final project design and implementation, which means that crop selection and project interventions were not finalized until farmer participants had been identified and had had an input in the decision making. ADB also adopted a positive approach during project implementation, allowing the reallocation of funds between project subcomponents and promptly agreeing to revise physical targets in response to PMU's convincing reasons for changes.

## **L. Review of Benefit Monitoring and Evaluation**

32. Socioeconomic information on the intended project beneficiaries was collected during the preparatory study for the Project and the PMU collected supplementary information at the start of the Project. Both sets of data helped in the initial targeting of potential farmer participants. Subsequent BME was and remains the responsibility of the Resource Development Division (RRD) of MOA. To ensure timely execution of BME activities, a specific item was included in the project budget. The funds utilized amounted to \$0.14 million (local cost financing). From the end of November 1997 to January 1998 RRD undertook a benchmark socioeconomic survey of the 60 villages, that will benefit from the village development schemes subcomponent. A report on this survey was published in May 1999.<sup>5</sup> The survey provides some useful benchmark data for the village development schemes subcomponent and includes some respondents not covered by the Project. However, the survey is limited because it does not address the benchmark socioeconomic conditions of farmers benefiting from other components of the Project. The Loan Agreement (Schedule 6, Clause 20) BME review requires within two years after loan closing, i.e., by end-June 2002. The Government of Malaysia was requested to submit the terms of reference for this study as soon as possible.

## **III. EVALUATION OF INITIAL PERFORMANCE AND BENEFITS**

### **A. Financial Performance<sup>6</sup>**

33. Four of the project subcomponents have directly resulted in increasing the incomes of farm families. Because the full benefits from the new fruit tree plantings will not materialize until the trees reach full maturity, the impacts on incomes will continue to increase throughout the analysis period. The average incremental financial benefits from the total Project are estimated to be RM666 (\$175) per annum in 2000, RM2,321 (\$611) per annum in 2010, and RM3,647 (\$960) per annum in 2018. These average net returns value farmer participants' labor at the current agricultural worker hire rate of RM20 per person-day. Including the returns to farmers' own labor increases average annual income from the Project by RM1,507 (\$397), RM3,374 (\$888), and RM4,887 (\$1,286) in 2000, 2010, and 2018 respectively.<sup>7</sup> This implies corresponding average daily returns to labor of RM36 (\$9) in 2000, RM64 (\$17) in 2010, and RM79 (\$21) in 2018. The total returns to farmer participants' labor from each of the four subcomponents in 2000, 2010, and 2018 are in Table 1.

<sup>5</sup> Department of Agriculture. May 1999. *Benchmark Survey of Sixty Village Agricultural Schemes in Pahang Barat Integrated Agricultural Development Project*.

<sup>6</sup> All monetary amounts are in year 2000 prices.

<sup>7</sup> This compares with appraisal report estimates for the incremental net farm revenue at full development of RM7,000-RM13,000. However, this is substantially influenced by the inclusion of a significant and profitable livestock subcomponent, which did not come about. Excluding this from the appraisal report estimate for increased net farm revenues at full development gives a figure of RM3,500 or RM4,490 in 2000 prices. This is comparable with the RM4,887 estimated here for the average incremental farm income at full development.



**Table 1: Additional Income Per Farm Family**  
(RM per annum)

Item	2000	2010	2018
Rubber Land Productivity Improvement	1,000	2,126	2,126
Paddy Land Conversion	4,112	4,112	4,112
Orchard Estates	(18)	5,042	9,852
Village Development Schemes	1,347	2,648	3,569

## **B. Economic Performance**

### **1. Economic Internal Rate of Return**

34. An economic internal rate of return (EIRR) of 11.6 percent was estimated for the completed total Project, based on performance to date and expected future benefits. This compares with an expected EIRR of 16.92 percent at appraisal, even though project capital costs were lower than expected at appraisal. This is because

- (i) the appraisal report's economic analysis includes a significant and profitable dairy cattle development as part of the Project, but this did not occur because the farmers were unwilling to accept the perceived risks involved;
- (ii) the time for land development and fruit trees to reach full maturity was/will be longer than assumed in the appraisal's economic analysis; and
- (iii) the updated economic analysis in this PCR adopts more conservative yield assumptions for short-term crops and vegetables.

35. However, the appraisal report emphasized that its economic analysis was only intended to be broadly indicative of the overall viability of the Project, rather than to be tightly prescriptive as to future farming activities under the Project. It was always intended that the mix of activities and crop selection would be made once the agro-ecological planning work had been done and farmers had had an opportunity to participate in the process.

36. The EIRRs estimated for the four subcomponent are 10.5 percent for rubber land productivity improvement, 31.1 percent for paddy land conversion, 6.9 percent for orchard estates, and 13.9 percent for village development schemes. These are lower than the appraisal estimates because of the reasons already stated (para. 34) but also because the analysis here includes a pro rata apportionment of infrastructure, institutional strengthening, and project management costs for each subcomponent. This apportioning was not done at appraisal but is done in this analysis because these other costs were incurred to achieve the subcomponent outputs (Appendix 9).

### **2. Sensitivity Analysis**

37. Lowering anticipated yields by 10 percent reduced the EIRR of the Project to 9.1 percent. An assumed 10 percent reduction in product prices reduced the EIRR to 9 percent, slightly more than the effect of a 10 percent reduction in yield since reduced yields also reduce

harvesting costs. In the base case analysis, 40 percent of the roads and bridges subcomponent's costs were omitted because offsetting non-quantified social benefits from this subcomponent were assumed. The same assumption was made at appraisal. Including all of this subcomponent's costs reduced the EIRR to 9.4 percent. The EIRR for the Project was not particularly sensitive to increases in future O&M costs. Doubling the estimated future budget requirement for these costs from RM5 million to RM10 million per annum only lowered the EIRR by 0.2 percent to 11.4 percent. Extending the Project's analysis period by five years raised the EIRR to 12.2 percent, while including the benefits from farmer-initiated intercropping in fruit orchards developed under the Project raised the EIRR to 12.6 percent (Appendix 9).

## **C. Attainment of Benefits**

### **1. Initial Project Operation**

38. The project components were generally completed to a level equal to, or greater than, the various targets set at appraisal. Land consolidation occurred through the development of the orchard and fish estates. The new cropping opportunities created by the Project enabled farmer participants to supplement their incomes from other activities such as rubber tapping, oil palm harvesting, and off-farm employment. Some participants became full-time farmers. Agroprocessing opportunities were expanded, especially among women in the project area. Land productivity and labor productivity increased. The initial financial and economic impacts were positive and will increase over time as the fruit trees in orchards established by the Project reach full maturity.

### **2. Expected Benefits**

#### **a. Quantified Benefits<sup>8</sup>**

39. The Project is estimated to have led to the production of an additional 57,388 metric tons (t) of farm produce in 2000, valued at RM31.2 million (\$8.0 million). In 2018, incremental agricultural production is expected to have increased to 85,900 t, valued at RM78.4 million (\$20.6 million). The number of new full-time equivalent jobs created by the Project (2,401 in 2000, 3,005 in 2010, and 3,540 in 2018) is relatively modest compared with the estimated 14,847 participating farm families in these four project subcomponents. This implies that the incremental financial benefits can be achieved without any significant reduction in rubber tapping and other agricultural and nonagricultural employment. Therefore the Project will achieve its objectives of improving labor and land productivity (Appendix 10).

#### **b. Nonquantified Benefits**

40. Several project benefits were not included in the quantified economic and financial analysis of the Project. The first is the GIS capability that the Project established in DOA, which can be used to assist in further agricultural development of additional areas within Pahang State and can be expanded for application elsewhere in Malaysia. The second is result of 11 experiments the Project conducted to test new crop varieties such as citrus and water rose apple, to intercrop snake fruit in rubber tree plantations, and to allow less frequent rubber tapping techniques. The results will have useful applications beyond the immediate project area. Third, the farm roads and bridges established or rehabilitated as part of the Project will bring social as well as economic benefits to the rural populations they serve (although an adjustment

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<sup>8</sup> All monetary amounts are in 2000 prices.

to project costs is made in the base case economic analysis to account for this in Appendix 9). Fourth, the various project interventions have in a number of instances facilitated farmers' new initiatives other than those directly provided by the Project. In particular, a number of farmer participants established cash crops intercropped in the project orchards while waiting for the fruit trees to mature. Fifth, the Project appears likely to have a strong demonstration effect as nonparticipant farmers in the project area will be able to duplicate the project development options, even without the same level of Government financial assistance as was available under the Project.

### **3. Impact on Beneficiaries<sup>9</sup>**

41. The latest (1997) available information<sup>10</sup> on poverty levels within Pahang State shows households below the poverty line reduced from 10 percent in 1990 to 4.4 percent in 1997, where the poverty level is defined as income below RM405 per month for an average family of five the percentage of hard-core poverty (i.e., households having an average monthly income of less than RM202.5 per month) fell from 2.1 percent in 1990 to 0.8 percent in 1997. In the seven districts of Pahang Barat however, the incidence of poverty is greater and baseline socioeconomic data, collected in late 1997/early 1998 before significant project impacts, indicated average family incomes only 35 percent above the poverty line for residents in the 60 villages in the village development schemes subcomponent. The Project has already improved the incomes of farm families in rural areas of Pahang Barat. This impact will intensify with the maturing of fruit trees planted as part of the Project.

42. The direct financial impacts of the project components on rural households in different locations have been (and in the future will be) diverse and varied in intensity. Average estimated impacts mask the varied impacts brought about by different interventions in different locations and the variations in size of farmers' landholding. However, it is estimated that the average financial gain in 2000 from the Project was RM1,507 (\$397) per farm family per annum (inclusive of the returns to farm family labor) and will rise to RM3,374 (\$888) per annum by 2010 and RM4,887 (\$1,286) by 2018. This compares with average without - Project family income of RM6,544 (\$1,722) in the area and an appraisal estimate of RM4,490 (\$1180) increase in farm incomes.<sup>11</sup> The Project has brought social improvements - improved access to health, educational, recreational, and commercial facilities (via the roads and bridges subcomponent) - and has had positive impacts on women by establishing and training a number of women's farmer groups for small-scale postharvest agroprocessing activities (Appendix 10).

43. Finally, it should be noted that a key purpose of the Project was to assist farm families in the poorest rural villages. This means that, to some extent, the Project compromised maximizing the economic and financial returns from the Project to achieve equity-based goals.

## **IV. CONCLUSIONS AND RECOMMENDATIONS**

### **A. Conclusions**

44. The Project was generally implemented as conceived at appraisal, meeting its objectives to increase the incomes of the rural population, improve labor productivity, and optimize the

<sup>9</sup> All monetary amounts are in 2000 prices.

<sup>10</sup> *Pahang State Development Office Budget Paper, 2000.*

<sup>11</sup> Once the income from the dairy cattle subcomponent - which the appraisal report anticipated, but which did not occur - is deducted.

utilization of agricultural land. ADB, MOA, and the IAs adopted a flexible approach in selecting actual agricultural development assistance measures for specific locations within the overall framework of the Project as appraised. This was essential to ensure acceptance and participation by the targeted farmer groups as well as respond to lessons learned during project implementation. Among the criteria for rating the Project are relevance, efficacy, efficiency, sustainability, institutional development, and other impacts. The assessment<sup>12</sup> is presented in the table on page 13.

45. **Relevance.** Project objectives remained relevant throughout project implementation. The Project was consistent with the development strategies of the Developing Member Countries (DMC) and ADB. Appropriate changes in the midterm review and other reviews made the Project more relevant.

46. **Efficacy.** The physical targets set at appraisal were generally achieved or exceeded. The Project brought social improvements including improved access to health, educational, recreational, and commercial facilities and has had a positive impact on women through the women's farmer groups established for small-scale postharvest agro-processing activities. The Project has already improved the incomes of farm families in rural areas of Pahang Barat; the improvement will intensify with the maturing of fruit trees.

47. **Efficiency.** The Project was implemented as scheduled and no extension of the loan closing date was required. There was a close working relationship between the PMU and Pahang State's DOA, allowing the use of district-level agricultural field officers permanently located near the project activities. The Project benefited from advance action to procure goods and small civil works. Counterpart funds to support the Project were adequately. The EIRR was recalculated at 11.6 percent.

48. **Sustainability.** The Project was handed over to the government of Pahang State at the end of 2000. Appendix 11 gives the O&M organization chart. An O&M budget of RM5 million per annum for the Project was established for 2001 and this, together with the cooperative "ownership" and management between the federal-Government-staffed PMU and the state government departments during Project implementation, should ensure the Project's future sustainability.

49. **Institutional Development and Other Impacts.** A computerized program based on GIS/LANDS for agricultural planning and a database on soil types and land use were established. They can be used to assist further agricultural development of additional areas within Pahang and can be expanded for other areas in Malaysia. No significant negative environmental impacts were observed. There were no reports of land erosion problems. Development of fishing estates was frequently accompanied by aesthetic improvements and the provision of recreational opportunities. DOA field officers and farmer participants aware of the need to limit chemical use in farming operations, implemented integrated pest management techniques. The Project is expected to significantly contribute to poverty reduction in Pahang Barat. Within Pahang State, poverty levels were reduced in households below the poverty line from 10 percent in 1990 to 4.4 percent in 1997. The percentage of hard-core poverty fell from 2.1 percent in 1990 to 0.8 percent in 1997.

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<sup>12</sup> *Guideline for the Preparation of Project Performance Audit Reports*, September 2000.

50. **Overall Project Rating.** On the basis of criteria in paras. 45-49, the Project was rated successful (Table 2).

**Table 2: Assessment of Initial Project Performance**

<b>Criterion (a)</b>	<b>Weight (%) (b)</b>	<b>Assessment (c)</b>	<b>Rating Value (d)</b>	<b>Weighted Rating<sup>a</sup> (b x d)</b>
Relevance	20	Highly relevant	3	0.60
Efficacy	25	Efficacious	2	0.50
Efficiency	20	Efficient	2	0.40
Sustainability	20	Likely	2	0.40
Institutional Development and Other Impacts	15	Substantial	3	0.45
<b>Overall Rating</b>		<b>Successful</b>		<b>2.35</b>

<sup>a</sup> Highly successful: overall weighted average (OWA) > 2.5; successful:  $2.5 \geq \text{OWA} > 1.6$ ; less than successful:  $1.6 \geq \text{OWA} > 0.6$ ; unsuccessful:  $\text{OWA} \leq 0.6$ .

## **B. Lessons Learned**

51. Implementing an IADP with a large number of subprojects over a wide geographic area<sup>13</sup> is possible, but requires a well-resourced PMU able to mobilize and coordinate relevant IA staff. In addition, planning, implementing, and creating a sense of “ownership” for such a project in cooperation with the state government are essential. Such cooperation allows the use of state government staff permanently located close to the project activities during implementation and enhances sustainability after the Project is handed over to the state government.

52. Successful farmer participation in IADPs, such as this Project, is a function of the strength of the farmers’ group at the village level. This, in turn, is a function of the leadership of that group. For example, the PCR Mission noted that strong participation in the Project was evident where the services of a retired Government official from the military or education sector were available to the farmers’ group.

53. A GIS database is a useful tool in preparing agricultural development plans for rural areas. However, it must be used in conjunction with analysis and information on the economic viability of different development options. Acceptability to farmer participants and economic sustainability of development alternatives cannot be ignored.

54. Where, as in this Project, nontraditional crops or agricultural practices are being introduced, it is essential to first implement training programs and institutional strengthening before actual crop establishment. These activities are likely to require only modest physical development targets in the early years of project implementation.

55. The conversion of idle paddy land is a cheaper and more efficient option than establishing new crops on land, that has not been previously cultivated.<sup>14</sup>

<sup>13</sup> It is estimated that project activities were undertaken at more than 150 discrete geographic locations, spread throughout seven districts in Pahang, the largest state in Malaysia.

<sup>14</sup> Excluding rural infrastructure costs, idle paddy land conversion costs averaged \$75 per ha, compared with an average cost of \$175 per ha for orchard estates.

## **C. Recommendations**

### **1. Project-Related**

56. The Government should ensure that the results of the various pilot projects and experiments conducted under the Project are disseminated for use in agricultural development elsewhere in Malaysia. Among the innovations are snake fruit intercrop in rubber plantations, aquaculture alternatives, and the ranking of different varieties of fruit and vegetable options. The results of the trials using ethephon to allow less frequent rubber tree tapping should be communicated to the Rubber Industry Smallholders Development Authority (RISDA).

57. The state government of Pahang should ensure sufficient resources are available to underpin the sustainability of the Project. Because the Project has involved the establishment of nontraditional crops within the project area, the project participants will need ongoing advice from DOA extension services staff. Also, it is imperative that project farm roads and other infrastructure are adequately maintained. The economic and financial returns from the Project are significant, but will be at risk if ongoing support is not forthcoming.

58. The Loan Agreement (Schedule 6, Clause 20) requires a BME review study to be conducted within two years after loan closing, i.e., by end June 2002. MOA should immediately submit the proposed terms of reference for this review study. This study should cover the impact of all components of the Project and not be limited to just the impacts of the village development schemes subcomponent.

59. It is recommended that the Project Performance Audit Report (PPAR) for the Project be undertaken some time during 2003, but it is essential that the results of the BME review study are available before then.

### **2. General**

60. As with this project, ADB should ensure sufficient flexibility in project design and its responses during project implementation so that proper beneficiary participation can occur and lessons learned during implementation can guide the final project outcomes. Projects should also be designed so that they are consistent with the macro policy framework of the government to ensure the borrower's full participation and commitment.

61. Every effort should be made to encourage borrowers to maintain staff stability in executing agencies (EAs) and IAs to maintain continuity during project implementation, and to benefit from staff in these agencies who have become familiar with ADB procedures. This also applies to the ADB staff involved.

**APPENDIXES**

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**ACHIEVEMENTS OF PROJECT COMPONENTS**  
(as of 31 December 1999<sup>a</sup>)

Description	Unit	Appraisal	Revised Target (1997)	Actual	% of Revised Target
A. Ecological Planning and Pilot Projects					
1. Agro-Ecological Planning					
a. Land Use Optimization Plan for Project Area	no.	1		1	100.0
b. Land Use Suitability and Consolidation Maps	no.	60		60	100.0
2. Pilot Projects					
a. Rubber Land Productivity Improvement	ha	1,000	1,200	1,135	94.6
b. Idle Paddy Land Conversion	ha	1,000	1,700	2,345	138.9
B. Agricultural Land Development and Consolidation					
1. Horticulture	ha	3,000	2,500	2,597	103.9
2. Village Development Scheme	ha	3,000	3,000	3,003	100.1
C. Rural Infrastructure					
1. Construction/Improvement of Roads and Bridges					
a. Roads	km	1,500	1,500	1,700	113.3
b. Bridges	no.	30	30	44	146.7
2. Irrigation and Drainage	ha	2,000	500	450	90.0
3. Flood Protection (Area Protected)	ha	1,500	420	420	100.0
D. Institutional Strengthening-Training <sup>b</sup>					
1. Administrative and Field Staff	no.	30	600	700	116.7
2. Farmer Participants	no.	5,000	5,000	28,095	561.9
E. Project Management Support					
1. Upgrading of DOA Training Center	no.	1	1	1	100.0
2. New DOA District Agricultural Officer	no.	2	2	2	100.0
3. New DID District Office	no.	1	1	1	100.0
4. New DID Staff Quarters	no.	1	1	1	100.0

DID = Department of Irrigation and Drainage, DOA = Department of Agriculture, ha = hectare, km = kilometer.

<sup>a</sup>The Government financed activities in 2000.

<sup>b</sup>Malaysian Agricultural Research and Development Institute (MARDI) provided training and research. A total of 11 and 642 training courses were offered for project staff and farmers, respectively.

Source: Project staff



## LIST OF COURSES FOR IADP PAHANG BARAT

No.	Date	Activities	Place	No. of Participants
1.	24-27/3/98	Sauces Production	MARDI Serdang	23
2.	14-17/4/98	Syrup Presserved Fruit	MARDI Johor Bahru	10
3.	19-22/5/98	Snack Food Production	MARDI Johor Bahru	25
4.	27/5/98	Quality Improvement In Snack Food	DOA Kuala Lipis	100
5.	16-18/6/98	Fermented Fruit Production	MARDI Pasir Putih	25
6.	11-13/8/98	Production Packaging	MARDI Serdang	25
7.	18/8/98	Quality Improvement in Halwa Production	DOA Jerantut	80
8.	Sep-98	Quality Improvement of Fermented Fruit	DOA Bentong	80
9.	1-3/12/98	Agrobase Processing Seminar	DOA Raub	200
10.	5/4/99	Commissioning and Testing Syrup Preserved Fruit Oven for KPW Jerantut	DOA Jerantut	15
11.	23/4/99	MARDI's Food Processing Centers Technical Committee Visit to KPW Semerting and Chemomoi	Pelangai (Bentong)	5
12.	28/4/99	Special Briefing on Onion and Shallot Planting Technologies	IADP Temerloh	22
13.	28-9/4/99	Transfer of Soya Bean Product Technologies. (Demonstration)	KPW Semerting, Pelangai	15
14.	4-5/5/99	Special Course on Degreening of Citrus	MARDI Serdang	25
15.	15/6/99	Candy Fruit Demonstrations	DOA Jerantut	80
16.	20-21/9/99	Short Course on Onion and Shallot Planting	Jerantut and Maran	90
17.	27/10/99	Technology Transfer Talk to DOA Farmers-Investment Opportunity in Agriculture	Temerloh (Kg. Awah)	137
18.	13/11/99	Potential Investment in Herbal Industry in Pahang Barat	PPK Sanggang	20
<b>Total</b>				<b>977</b>

## VEHICLES AND EQUIPMENT PROCURED

Contract No.	Qty	Description	Cost (RM)	\$ Equivalent <sup>a</sup>
0002	1	Scale	3,700	1,424
	1	Broadcasting equipment	3,999	1,539
	1	Surgical postmortem equipment	5,880	2,263
	8	Knapsack power sprayer	6,080	2,340
	2	Curtain fittings	9,540	3,672
	1	EVA plastic film	9,770	3,760
	1	Netlon net	9,792	3,769
	2	Power tiller with rotary	12,700	4,888
	1	Tracon compass	17,400	6,697
	3	Portable high pressure power sprayer	23,968	9,225
	3	4-wheel-drive vehicle	124,463	47,904
	LS	Computer, projectors, UPS, etc.	89,437	34,423
		<b>Subtotal</b>	<b>316,729</b>	<b>121,904</b>
0137	1	Spare parts for backhoe machine	14,067	5,511
	1	Computer	25,716	10,076
	1	Polly pipe, straight coupler and clamp saddle	25,945	10,165
	3	Power tiller	27,420	10,743
	1	Blast freezer	39,500	15,476
	1	Saloon car (Proton Saga)	42,272	16,562
	1	Cocoa drier machine for FOA	49,350	19,336
	1	Lorry (5.5 tons)	52,277	20,482
	1	Bus	105,052	41,160
	5	Lorry (3.5 tons)	229,252	89,822
	LS	Various office equipment & machines	181,809	71,234
		<b>Subtotal</b>	<b>792,660</b>	<b>310,567</b>
0139	5	Chain saw	7,225	2,942
	1	Bush cutter machine	9,360	3,811
	1	Scanner	10,100	4,112
	2	Power tiller with rotary	15,100	6,148
	1	Panel van, diesel	33,475	13,630
	1	Mitsubishi Pajero	90,859	36,995
	3	Toyota Land Cruiser	220,213	89,663
	LS	Various office equipment & machines	17,498	7,125
		<b>Subtotal</b>	<b>403,830</b>	<b>164,426</b>
0142	1	Power tiller	27,480	11,083
	1	Knapsack power sprayer	9,000	3,630
	1	Water pump	30,880	12,454
	1	Portable high-pressure power sprayer	6,890	2,779
	1	Yellow noodle processing machine	47,100	18,996
	1	Freezer	1,050	423
	3	Altimeter	4,350	1,754
		<b>Subtotal</b>	<b>126,750</b>	<b>51,119</b>

Contract No.	Qty	Description	Cost (RM)	\$ Equivalent <sup>a</sup>
0160 <sup>b</sup>	LS	Supply/installation/maintenance of 1 unit MB.ERCC to existing HP 9000/72	22,040	8,819
	LS	Arc View 2, 2 units PC ArcInfo for DOS/Window	70,247	28,109
	LS	Supply of software system	49,305	19,730
	LS	GIS ArcInfo Version 7	56,608	22,651
	LS	Workstation model A1090 A HP Model 715/61	102,768	41,122
	LS	Hewlett Packard A 1092 A Model 712/100	100,065	40,040
		<b>Subtotal</b>	<b>401,033</b>	<b>160,471</b>
0162	1	Long boat	4,900	1,961
	1	Disc plow	14,100	5,642
	1	Heavy-duty pump	21,653	8,664
	1	Risograph super copy printer	23,500	9,403
	4	Howard heavy-duty rotovator	31,480	12,597
	4	Photostat machines	39,945	15,984
	5	Texas instruments	69,000	27,610
	3	Lorry	203,790	81,545
		<b>Subtotal</b>	<b>408,368</b>	<b>163,406</b>
		<b>TOTAL</b>	<b>2,449,370</b>	<b>971,893</b>

<sup>a</sup> Exchange rate at value on date of disbursement.

<sup>b</sup> Procurement under Agro-Ecological Planning.

### CONSULTING SERVICES

Expertise Required at Appraisal	Person-months	Remarks
A. Agro-ecological Planning-International 1. Land Use Planning Specialist 2. GIS 3. Agroclimatologist	6 3 3	Upon the request of the Government, consultants were not engaged. The Government provided qualified and experienced DOA officials to provide consulting services.
B. Agricultural Land Development and Consolidation 1. International a. Fruit Tree Agronomist b. Agricultural Economist	12 12	
2. Domestic - Institutional Specialist/Agricultural Sociologist	20	
C. Rural Infrastructure-Domestic Consulting firm to render assistance to DID in completing construction of about 1,500 km of access farm roads in project area within 5 years	936	
D. Training-Domestic 1. Training Specialist	12	MARDI provided various training programs

DID = Department of Irrigation and Drainage, DOA = Department of Agriculture,

GIS = geographic information system, MARDI = Malaysian Agricultural Research and Development Institute

**PROJECT COST AND FINANCING<sup>a</sup>**  
(\$'000)

**I. Project Cost**

Component	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total
A. Agro-Ecological Planning						
1. Agro-Ecological Planning	160	560	720	131	141	272
2. Pilot Projects						
a. Rubber Land Productivity Improvement	650	650	1,300	0	280	280
b. Idle Paddy Land Conversion	1,000	1,200	2,200	21	1,735	1,756
<b>Subtotal</b>	<b>1,810</b>	<b>2,410</b>	<b>4,220</b>	<b>152</b>	<b>2,156</b>	<b>2,308</b>
B. Agricultural Land Development and Consolidation						
1. Horticulture	2,700	4,000	6,700	1,549	3,165	4,714
2. Village Development Scheme	1,050	1,250	2,300	939	1,632	2,571
<b>Subtotal</b>	<b>3,750</b>	<b>5,250</b>	<b>9,000</b>	<b>2,488</b>	<b>4,797</b>	<b>7,285</b>
C. Rural Infrastructure						
1. Farm Roads and Bridges	16,500	13,500	30,000	11,934	13,295	25,229
2. Irrigation and Drainage	1,400	1,100	2,500	58	707	765
3. Flood Protection	1,700	1,300	3,000	0	0	0
4. Land Acquisition Survey	0	1,900	1,900	0	0	0
<b>Subtotal</b>	<b>19,600</b>	<b>17,800</b>	<b>37,400</b>	<b>11,992</b>	<b>14,002</b>	<b>25,994</b>
D. Institutional Strengthening						
1. Training and Extension	400	1,200	1,600	36	834	870
2. Research Activities	600	900	1,500	32	751	783
3. Consulting Services	720	3,280	4,000	0	2,387	2,387
<b>Subtotal</b>	<b>1,720</b>	<b>5,380</b>	<b>7,100</b>	<b>68</b>	<b>3,972</b>	<b>4,040</b>
E. Project Management						
1. Administration	0	4,800	4,800	0	4,724	4,724
2. Buildings and Training Centers	800	600	1,400	619	(53)	566
3. Vehicles and Equipment	820	480	1,300	667	444	1,111
4. Monitoring and Evaluation	0	300	300	0	141	141
<b>Subtotal</b>	<b>1,620</b>	<b>6,180</b>	<b>7,800</b>	<b>1,286</b>	<b>5,256</b>	<b>6,542</b>
<b>Total Base Cost</b>	<b>28,500</b>	<b>37,020</b>	<b>65,520</b>	<b>15,986</b>	<b>30,183</b>	<b>46,169</b>
Physical Contingencies	1,420	1,860	3,280			
Price Escalation	4,540	8,170	12,710			
Interest During Construction	5,000	0	5,000			
<b>Total Project Cost</b>	<b>39,460</b>	<b>47,050</b>	<b>86,510</b>	<b>15,986</b>	<b>30,183</b>	<b>46,169</b>
<b>Percent</b>	<b>45.6</b>	<b>54.4</b>	<b>100.0</b>	<b>34.6</b>	<b>65.4</b>	<b>100.0</b>

	Per Appraisal				Actual			
	Foreign Exchange	Local Currency	Total	% of Financing	Foreign Exchange	Local Currency	Total	% of Financing
<b>II. Financing Plan</b>								
Asian Development Bank	28.50	0.00	28.50	32.9	15.99	0.00	15.99	34.6
Government	10.96	47.05	58.01	67.1	0.00	30.18	30.18	65.4
<b>Total</b>	<b>39.46</b>	<b>47.05</b>	<b>86.51</b>	<b>100.0</b>	<b>15.99</b>	<b>30.18</b>	<b>46.17</b>	<b>100.0</b>
<b>Percent</b>	<b>45.6</b>	<b>54.4</b>	<b>100.0</b>		<b>34.6</b>	<b>65.4</b>	<b>100.0</b>	

<sup>a</sup>Exchange rate used: \$1.00 = RM3.07175 (weighted average rate of disbursements under the ADB loan).

## IMPLEMENTATION SCHEDULE

Activities	1993	1994	1995	1996	1997	1998	1999
A. Agro-ecological Planning							
1. GIS establishment							
2. Pilot projects							
(i) Rubber land production improvement							
(ii) Idle paddy land conversion							
B. Agriculture Land Development and Consolidation							
1. Horticulture							
2. Village development scheme							
C. Rural Infrastructure							
1. Farm roads and bridges							
2. Irrigation and drainage							
3. Flood protection							
4. Land acquisition survey							
D. Institutional Strengthening							
1. Training and extension							
2. Research activities							
3. Consulting services							
E. Project Management							
1. Administration							
2. Buildings and training centers							
3. Vehicles and equipment							
4. Monitoring and evaluation							



### LIST OF CIVIL WORKS

Contract No.	Description	Cost (RM)	\$ Equivalent <sup>a</sup>
0144	1 Maintenance works for raft house, Jerantut	10,010	4,100
	2 Completion of a store building and other ancillary works for Fresh Water Fish Estate Project, Luas, Temerloh	16,100	6,595
	3 Renovation for Agriculture Marketing Center, Maran	30,500	12,493
	4 Construction/completion of 2 units plant shade building at Community Service Center, Jambu Rias, Karak	39,975	16,374
	5 Construction of 1 building for PPRT at Pagar Sasak, Lipis	47,108	19,295
	6 Other minor civil works	115,118	47,152
	<b>Subtotal</b>	<b>258,811</b>	<b>106,009</b>
0161	1 Construction of shed for agricultural equipment and machinery at Lipis	7,182	2,874
	2 Supply and fittings of wood cabinet for new Agriculture Office, Raub	7,322	2,930
	3 Resurfacing and patch works within IADP Office complex	7,410	2,965
	4 Maintenance/renovation of Agriculture Office, Lipis	7,809	3,125
	5 Maintenance works for breeding center, Raub	9,000	3,601
	6 Maintenance/renovation of Agriculture Office, Jerantut	10,716	4,288
	7 Painting and ancillary works for covered parking space at IADP Office, Temerloh	11,124	4,451
	8 Maintenance works for Agriculture Training Center Office, Temerloh	11,346	4,540
	9 Alteration works, Jambu Rias Commodity Dev. Center	14,649	5,862
	10 Maintenance works for Agriculture Center Office, Lipis	21,307	8,526
	11 Covered parking space at IADP Office, Temerloh	24,869	9,951
	12 Construction of chain link fencing for Merapoh Agriculture Center, Lipis	25,194	10,081
	13 Construction of culvert and parking lot for IADP Office, Temerloh	25,513	10,209
	14 Construction of chain link fencing for Pagar Sasak Agriculture Center, Raub	25,821	10,332
	15 Construction of Agriculture Office, Pintu Padang, Raub	141,617	56,667
	16 Purchase of land for IADP Office, Temerloh	178,515	71,432
	17 Other minor civil works	103,708	41,497
	<b>Subtotal</b>	<b>633,101</b>	<b>253,331</b>
0184	1 Construction of Agriculture Office for Bera, Mukim Triang, Kerayong, Bera	<b>155,698</b>	<b>59,457</b>



Contract No.	Description	Cost (RM)	\$ Equivalent <sup>a</sup>
0196	1 Construction of toilet for Agriculture Center, Bera	6,099	2,450
	2 Construction of store for fisheries component at Agriculture Center, Temerloh	7,125	2,863
	3 Construction of Agriculture Collection Center, Kubang Rusa, Merapoh, Lipis	7,125	2,863
	4 Construction of guardhouse and other ancillary works at Agriculture Center, Bera	7,952	3,195
	5 Fencing works at Agriculture Office, Bentong	8,835	3,550
	6 Maintenance works for store building, Lipis	10,916	4,385
	7 Construction of Agriculture Collection Center, RTP Sungai Ular, Lipis	11,343	4,557
	8 Fencing works at Agriculture Office, Gali, Raub	13,664	5,490
	9 Construction of store for Commodity Dev. Center, Jambu Rias, Karak	14,108	5,668
	10 Maintenance works for hostel at Agriculture Center, Temerloh	16,473	6,618
	11 Upgrading and resurfacing of road within Agriculture Center, Bentong	25,023	10,053
	12 Construction of Agriculture Office for Pintu Padang, Raub	69,267	27,829
	13 Other minor civil works	32,515	13,064
	<b>Subtotal</b>	<b>230,444</b>	<b>92,585</b>
0203	1 Alteration works for Pintu Padang Office Building, Raub	10,596	3,184
	2 Maintenance works for hostel, Buntut Pulau Training Center, Temerloh	10,944	3,288
	3 Construction of Women Extension Group Center, Keledak, Lipis	11,286	3,391
	4 Construction of shed for collection center, Talu, Lipis	11,286	3,391
	5 Completion of 2 units stall with equipment, Jerantut	11,343	3,408
	6 Completion of Agriculture Product Collection Center, Berchang, Lipis	11,343	3,408
	7 Completion of Agriculture Product Collection Center, Darling, Lipis	14,535	4,367
	8 Construction of emergency staircase for IADP Office, Temerloh	18,405	5,530
	9 Construction of Agriculture Office, Mukim Triang, Bera	158,631	47,666
	10 Other minor civil works	68,673	20,637
	<b>Subtotal</b>	<b>327,042</b>	<b>98,270</b>

Contract No.	Description	Cost (RM)	\$ Equivalent <sup>a</sup>
0214	1 Alteration works for diagnostic room and cold room for Agriculture Center, Buntut Pulau, Temerloh	1,640	432
	2 Maintenance and alteration works for input store for Agriculture Center, Lipis	10,939	2,879
	3 Construction of building for Gusai recreation center, Ulu Tembeling, Jerantut	11,172	2,941
	4 Construction of hatchery building, Baharo, Jerantut	11,286	2,971
	5 Alteration works of office building, Agriculture Center, Maran	25,211	6,636
	6 Other minor civil works	95,521	25,144
	<b>Subtotal</b>	<b>155,769</b>	<b>41,003</b>
0229	1 Maintenance works of Agriculture Office, Temerloh	10,659	2,805
	2 Maintenance works of Agriculture Office, Maran	11,286	2,970
	3 Maintenance works of Agriculture Office, Lipis	22,572	5,940
	4 Other minor civil works	94,557	24,889
	<b>Subtotal</b>	<b>139,074</b>	<b>36,604</b>
	<b>Total<sup>b</sup></b>	<b>1,899,939</b>	<b>687,259</b>

IADP = integrated agriculture development project.

<sup>a</sup> Exchange rate value on date of disbursement.

<sup>b</sup> Excluding adjustment of RM164,279 or \$53,480.

**COMPLIANCE WITH LOAN COVENANTS**

<b>Loan Covenant</b>	<b>Schedule</b>	<b>Status of Compliance</b>
1. Furnish the Asian Development Bank (ADB) with unaudited copies of separate accounts and financial statements of the Department of Agriculture (DOA) and Department of Irrigation and Drainage (DID).	Article IV, Section 4.06(b)	Complied with
2. Furnish ADB with certified copies of DOA and DID audited accounts and financial statements and the report of the auditors relating thereto in English.	Article IV, Section 4.06(b)	Complied with
3. DOA and DID will submit to the project management unit (PMU) four-monthly reports on the carrying out and the operation and management of Project and the operation and management of project facilities. The PMU will consolidate these reports and submit them to the Ministry of Agriculture (MOA) and ADB.	Article IV, Section 4.06(b)	Complied with
4. Furnish ADB with a project completion report (PCR) containing details of the execution and initial operation of the Project, performance by the Borrower, and accomplishment of the purposes of the loan.	Article IV, Section 4.06(c)	Submitted in November 2000
5. Furnish ADB with certified copies of audited expenditures covered in the statement of expenditures (SOE).	Schedule 3, para. 9 (b)	Complied with
6. Retain all records and other relevant documents (contracts, orders, invoices, bills and receipts), which formed the basis for withdrawal of expenditures in the SOE.	Schedule 3, para. 9 (c)	Complied with
7. Make the existing PMU under the first Pahang Barat integrated agriculture development project (IADP) be responsible for the day-to-day management of the Project.	Schedule 6, para. 4	Complied with
8. Establish a project steering committee (PSC) to serve as coordination link between the Project Executing Agency and Implementing Agencies and the state government of Pahang. The PSC will set general policy guidelines for the Project and, accordingly, guide the PMU and the project director on all policy matters.	Schedule 6, para. 6	Complied with

Loan Covenant	Schedule	Status of Compliance
<p>9. The members of the PSC will include representatives of MOA, DOA, the state government of Pahang, the central agencies – EPU of the Borrower, the treasury of the Borrower, DID, Department of Fisheries (DOF), Department of Veterinary Services (DVS), Federal Agricultural Marketing Authority (FAMA), Malaysian Agricultural Research and Development Institute (MARDI), Farmers' Organization Authority (FOA), and the Bank Pertanian Malaysia (BPM). Other related agencies may be invited to attend the PSC meetings, as and when required. The PSC will be jointly chaired by the secretary general of MOA and the state secretary of Pahang, and will meet at least twice a year.</p>	Schedule 6, para. 7	Complied with
<p>10. Ensure that DOA, FAMA, FOA, BPM, DOF and DVS continue to supply the project area with extension services, technical support, credit, and other technical support services under ongoing programs at an adequate level and on a timely basis.</p>	Schedule 6, para. 8	Complied with
<p>11. Ensure that the State Directorate of Lands and Mines and the Land Office for matters related to land tenure, the State Economic Planning Unit (SEPU) for planning and coordination, the State Agricultural Development Corporation, and State Development Office for State-sponsored agricultural development programs, and other relevant agencies also continue to extend the Project area at an adequate level during project implementation.</p>	Schedule 6, para. 9	Complied with
<p>12. Ensure that all lands or rights to land are promptly acquired or made available in a timely manner for the Project to be implemented in accordance with the agreed-upon implementation schedule.</p>	Schedule 6, para. 14	Complied with
<p>13. Submit to ADB for approval a comprehensive training program (local and international), including selection criteria, duration, and proposed location of the training courses to be undertaken.</p>	Schedule 6, para. 15	<p>Delayed compliance. The training program was submitted in November 1996, delayed by 2.5 years.</p>

Loan Covenant	Schedule	Status of Compliance
14. DOA will upgrade the existing agricultural training center to provide and carry out suitable training programs for rural women based on arrangements similar to the abovementioned training.	Schedule 6, para. 16	Complied with. Upgrading of 3 existing centers was completed between June 1994 and August 1997.
15. Ensure that the recommendations contained in the IEER of the feasibility study are implemented. The Borrower will ensure that based on the plans proposed under Part I.A(2) of the Project, (i) unsuitable agricultural land will be identified and removed from agricultural production and, where possible, returned to forest areas; (ii) steep lands will be, where possible, converted to forests; and (iii) other sloping areas or areas with highly eroded soils will be identified so that application of environmentally sound replanting techniques can be applied; and	Schedule 6, para. 17(a)	Complied with
16. Ensure that the recommendations contained in the IEER of the feasibility study are implemented. The Borrower will ensure that, to reduce soil erosion damages during project implementation, mitigation measures that include the following will be undertaken: (i) land preparation and road construction in the dry season; (ii) contour planting and terracing on slopes greater than 8 degrees; (iii) leguminous cover crops and no intercropping on slopes greater than 20 degrees; (iv) mulching in intercropped areas; and (v) educating farmers on use of pesticides and fertilizer application.	Schedule 6, para. 17(b)	Complied with
17. The PMU will operate and maintain the Project during project implementation. Upon completion, operation and maintenance (O&M) will be transferred to the state government of Pahang. The Borrower will ensure that necessary funds, facilities, counterpart staff, and support for the effective O&M of project facilities are provided during and after project implementation.	Schedule 6, para. 18	The operation and maintenance of the Project was transferred to state government of Pahang on 31 Dec 2000.

Loan Covenant	Schedule	Status of Compliance
18. MOA will continuously monitor, assess, and report on physical and financial aspects of project implementation, and these activities will be reviewed by ADB. Systems for recording data and statistics on such monitoring will be established by IROD.	Schedule 6, para. 19	Complied with
19. MOA will evaluate the benefits of the Project within 2 years after the date referred to in Section 3.05 of the Loan Agreement, in accordance with the terms of reference to be mutually agreed upon with ADB.	Schedule 6, para. 20	Due on 30 June 2002
20. ADB will carry out a midterm review of project implementation and its benefits.	Schedule 6, para. 21	Complied with
21. The Borrower will continue to implement its key programs for poverty reduction to reduce out-migration of the rural population.	Schedule 6, para. 22	Being complied with

**Table A8.1: Use of Loan Proceeds, by Loan Category**

<b>Category</b>	<b>Original Allocation (\$)</b>	<b>Amount Cancelled<sup>a</sup> (\$)</b>	<b>Revised Allocation (\$)</b>	<b>Amount Disbursed (\$)</b>
Civil Works				
01A - Land Development	5,400,000	3,004,466	2,395,534	2,395,534
01B - Rural Infrastructure	19,600,000	7,747,610	11,852,390	11,852,390
01C - Buildings	800,000	112,741	687,259	687,259
Vehicles and Equipment	980,000	8,107	971,893	971,893
Training and Extension	400,000	361,050	38,950	38,950
Research	600,000	560,136	39,864	39,864
Consulting Services	720,000	720,000	0	0
<b>Total</b>	<b>28,500,000</b>	<b>12,514,110</b>	<b>15,985,890</b>	<b>15,985,890</b>

<sup>a</sup> Cancellations as of:

14 Mar 1998	720,000
28 Dec 1999	7,000,000
23 Mar 2000	1,386,051
20 Sep 2000	3,408,059
<b>Total</b>	<b>12,514,110</b>

**Table A8.2: Yearly Project Expenditures, by Project Component 1993-1997<sup>a</sup>**  
(\$'000)

Component	1993			1994			1995			1996			1997			Total 1993-1997		
	ADB	GOM	Total	ADB	GOM	Total	ADB	GOM	Total	ADB	GOM	Total	ADB	GOM	Total	ADB	GOM	Total
A. Ecological Planning and Pilot Projects																		
1. Agro-Ecological Planning			0			0	131 <sup>b</sup>	0	131			0			0	131	0	131
2. Pilot Projects			0															
a. Rubber Land Productivity			0			0			0			0			0	0	0	0
b. Idle Paddy Land Conversion			0			0	21	28	49			0			0	21	28	49
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>152</b>	<b>28</b>	<b>180</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>152</b>	<b>28</b>	<b>180</b>
B. Agricultural Land Development and Consolidation																		
1. Horticulture			0			0	80	105	185	157	207	364	232	308	540	469	620	1,089
2. Villages Development Scheme			0	44	59	103	364	482	846	166	221	387	71	94	165	645	856	1,501
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>44</b>	<b>59</b>	<b>103</b>	<b>444</b>	<b>587</b>	<b>1,031</b>	<b>323</b>	<b>428</b>	<b>751</b>	<b>303</b>	<b>402</b>	<b>705</b>	<b>1,114</b>	<b>1,476</b>	<b>2,590</b>
C. Rural Infrastructure																		
1. Farm Roads and Bridges	782	722	1,504	2,067	1,907	3,974	1,297	1,197	2,494	1,424	1,314	2,738	1,944	1,795	3,739	7,514	6,935	14,449
2. Irrigation and Drainage			0			0			0			0	58	53	111	58	53	111
3. Flood Protection			0			0			0			0			0	0	0	0
4. Land Acquisition Survey			0			0			0			0			0	0	0	0
<b>Subtotal</b>	<b>782</b>	<b>722</b>	<b>1,504</b>	<b>2,067</b>	<b>1,907</b>	<b>3,974</b>	<b>1,297</b>	<b>1,197</b>	<b>2,494</b>	<b>1,424</b>	<b>1,314</b>	<b>2,738</b>	<b>2,002</b>	<b>1,848</b>	<b>3,850</b>	<b>7,572</b>	<b>6,988</b>	<b>14,560</b>
D. Institutional Strengthening																		
1. Training and Extension			0			0	24	73	97			0	12	35	47	36	108	144
2. Research			0			0	32	49	81			0			0	32	49	81
3. Consulting Services			0			0			0			0			0	0	0	0
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>122</b>	<b>178</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>35</b>	<b>47</b>	<b>68</b>	<b>157</b>	<b>225</b>
E. Project Management Support																		
1. Administration																		
2. Buildings and Training Centers			0	84	63	147	206	156	362	118	89	207	106	80	186	514	388	902
3. Vehicles and Equipment			0	534	0	534	133	0	133			0			0	667	0	667
4. Monitoring and Evaluation			0			0			0			0			0	0	0	0
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>618</b>	<b>63</b>	<b>681</b>	<b>339</b>	<b>156</b>	<b>495</b>	<b>118</b>	<b>89</b>	<b>207</b>	<b>106</b>	<b>80</b>	<b>186</b>	<b>1,181</b>	<b>388</b>	<b>1,569</b>
<b>Total</b>	<b>782</b>	<b>722</b>	<b>1,504</b>	<b>2,729</b>	<b>2,029</b>	<b>4,758</b>	<b>2,288</b>	<b>2,090</b>	<b>4,378</b>	<b>1,865</b>	<b>1,831</b>	<b>3,696</b>	<b>2,423</b>	<b>2,365</b>	<b>4,788</b>	<b>10,087</b>	<b>9,037</b>	<b>19,124</b>

ADB = Asian Development Bank, GOM = Government of Malaysia.

<sup>a</sup> Exchange rate used: \$1.00 = RM3.07175 (weighted average rate of disbursements under the ADB Loan).

<sup>b</sup> Disbursed under Loan Category 02 - Vehicles and Equipment.



**Table A8.3: Yearly Project Expenditures, by Project Component 1998-2000<sup>a</sup>**  
(\$'000)

Component	1998			1999			2000			Additional GOM Financing	Total 1998-2000			Grand Total		
	ADB	GOM	Total	ADB	GOM	Total	ADB	GOM	Total		ADB	GOM	Total	ADB	GOM	Total
A. Ecological Planning and Pilot Projects																
1. Agro-Ecological Planning			0			0			0	141	0	141	141	131	141	272
2. Pilot Projects																
a. Rubber Land Productivity			0			0			0	280	0	280	280	0	280	280
b. Idle Paddy Land Conversion			0			0			0	1,707	0	1,707	1,707	21	1,735	1,756
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,128</b>	<b>0</b>	<b>2,128</b>	<b>2,128</b>	<b>152</b>	<b>2,156</b>	<b>2,308</b>
B. Agricultural Land Development and Consolidation																
1. Horticulture	518	686	1,204	536	711	1,247	26	35	61	1,113	1,080	2,545	3,625	1,549	3,165	4,714
2. Villages Development Scheme	252	334	586	23	31	54	19	25	44	386	294	776	1,070	939	1,632	2,571
<b>Subtotal</b>	<b>770</b>	<b>1,020</b>	<b>1,790</b>	<b>559</b>	<b>742</b>	<b>1,301</b>	<b>45</b>	<b>60</b>	<b>105</b>	<b>1,499</b>	<b>1,374</b>	<b>3,321</b>	<b>4,695</b>	<b>2,488</b>	<b>4,797</b>	<b>7,285</b>
C. Rural Infrastructure																
1. Farm Roads and Bridges	2,874	2,653	5,527	1,318	1,217	2,535	228	210	438	2,280	4,420	6,360	10,780	11,934	13,295	25,229
2. Irrigation and Drainage			0			0			0	654	0	654	654	58	707	765
3. Flood Protection			0			0			0	0	0	0	0	0	0	0
4. Land Acquisition Survey			0			0			0	0	0	0	0	0	0	0
<b>Subtotal</b>	<b>2,874</b>	<b>2,653</b>	<b>5,527</b>	<b>1,318</b>	<b>1,217</b>	<b>2,535</b>	<b>228</b>	<b>210</b>	<b>438</b>	<b>2,934</b>	<b>4,420</b>	<b>7,014</b>	<b>11,434</b>	<b>11,992</b>	<b>14,002</b>	<b>25,994</b>
D. Institutional Strengthening																
1. Training and Extension			0			0			0	726	0	726	726	36	834	870
2. Research			0			0			0	702	0	702	702	32	751	783
3. Consulting Services			0			0			0	2,387	0	2,387	2,387	0	2,387	2,387
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3,815</b>	<b>0</b>	<b>3,815</b>	<b>3,815</b>	<b>68</b>	<b>3,972</b>	<b>4,040</b>
E. Project Management Support																
1. Administration										4,724	0	4,724	4,724	0	4,724	4,724
2. Buildings and Training Centers	59	44	103	46	34	80			0	(519)	105	(441)	(336)	619	(53)	566
3. Vehicles and Equipment			0			0			0	444	0	444	444	667	444	1,111
4. Monitoring and Evaluation			0			0			0	141	0	141	141	0	141	141
<b>Subtotal</b>	<b>59</b>	<b>44</b>	<b>103</b>	<b>46</b>	<b>34</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,790</b>	<b>105</b>	<b>4,868</b>	<b>4,973</b>	<b>1,286</b>	<b>5,256</b>	<b>6,542</b>
<b>Total</b>	<b>3,703</b>	<b>3,717</b>	<b>7,420</b>	<b>1,923</b>	<b>1,993</b>	<b>3,916</b>	<b>273</b>	<b>270</b>	<b>543</b>	<b>15,166</b>	<b>5,899</b>	<b>21,146</b>	<b>27,045</b>	<b>15,986</b>	<b>30,183</b>	<b>46,169</b>

ADB = Asian Development Bank, GOM = Government of Malaysia.

<sup>a</sup> Exchange rate used: \$1.00 = RM3.07175 (weighted average rate of disbursements under the ADB Loan).

## **ECONOMIC ANALYSIS**

1. The economic internal rates of return (EIRRs) were calculated for each subcomponent of the Project, namely, (i) rubber land productivity improvement, (ii) idle paddy land conversion, (iii) orchard estates, and (iv) village development schemes; and for the Project as a whole.

2. The economic analysis was undertaken in constant 2000 prices in RM. Costs and benefits in years before 2000 were converted using the price indices and exchange rates set out in Table A9.1. Apart from a relatively small amount of fertilizer used, the farm inputs and outputs of the Project are not internationally traded goods so domestic farmgate prices were used in the analysis. A standard conversion factor of 0.9 was applied to local costs and benefits including labor.

3. The other data and assumptions used in calculating the EIRRs and the results of the analysis are described below.

### **A. Project Implementation Period and Period of Analysis**

4. The major activities under the Project were implemented over six years, 1994 -1999. However, minor expenditures in 1993 (through advance purchase arrangements) and in 2000 (funded from Government of Malaysia's own resources) were included in the economic analysis. The analysis period is taken to extend to 2018, i.e., about 25 years after the planting of the first fruit trees under the Project. In sensitivity testing, the effect of extending the analysis period is examined.

### **B. Economic Costs**

5. The economic costs for each of the four subcomponents are determined on the basis of the project cost data in Appendix 4. However, because the benefits from each of subcomponents also depend on expenditure on the rural infrastructure, institutional strengthening, and project management support components ("other costs"), these costs were apportioned between the four subcomponents on the basis of the level of specific capital expenditure on each of the four subcomponents; i.e. "other costs" were apportioned as 3 percent for rubber land productivity improvement, 18 percent for idle paddy land conversion, 49 percent for orchard estates, and 30 percent for village development schemes (Table A9.2). While such an apportioning of costs is only indicative of the actual allocation, it provides a more realistic assessment of each component's economic performance than if "other costs" are excluded from the economic analysis for each of the four subcomponents, as was the approach taken at appraisal. The assessment of the EIRR for the total Project is unaffected by this apportionment approach.

6. For the year 2000, Government expenditure on the Project was RM10.17 million to cover some minor additional capital works and operation and maintenance (O&M) expenditure (source: PMU staff). Annual O&M costs after 2000 were estimated as RM5 million, based on the amount, which had been requested from the Pahang state government's Economic Planning Unit (EPU). Adjustment was made to exclude 40 percent of the roads and bridges subcomponents costs, since it is assumed there are offsetting nonquantified social benefits from this subcomponent. The same assumption was made in the economic analysis at appraisal. The sensitivity to this assumption of the EIRR calculated for the Project is examined in sensitivity testing analysis.

7. The total economic capital cost for the Project is RM125 million. Appendix 4 shows that the total project cost is only 53 percent of the appraisal estimate. This reflects the following:

- (i) the unit costs for activities such as rubber land productivity improvement, idle paddy land conversion, and roads and bridges were lower than was anticipated at appraisal;
- (ii) the relatively expensive orchard estates subcomponent was reduced in scope;
- (iii) irrigation, drainage, and flood protection subcomponents were reduced in scope;
- (iv) no land acquisition costs were incurred since roads were built on land already owned by the Government, or participating farmers made their land available at no cost,<sup>1</sup> and
- (v) in-house Government experts were used instead of international and domestic consultants.

### C. Project Benefits

8. The project benefits that have occurred since the commencement of the Project and are anticipated over the remainder of the project life were estimated on the basis of data provided by staff of the project management unit (PMU), the socioeconomic benchmark survey,<sup>2</sup> and interviews of participating farmers and Pahang state government field officers during the project completion report (PCR) Mission.

9. Different activities take place under each of the four subcomponents.

10. Under the rubber land productivity subcomponent, the major activity was intercropping of snake fruit ("salak") with the rubber trees across 738 hectares (ha) and involving 933 farmers. A smaller amount (197 ha) of planting of fruit trees as hedges around rubber plantation areas involved another 200 farmers. The returns from snake fruit were taken to be representative of the benefits from these activities. A minor activity under this subcomponent was testing the use of the chemical ethephon (on 200 ha involving 216 farmers) to permit less frequent tapping of rubber. Although PMU staff informed the PCR mission that this piloting had been generally successful, no steps appear to have yet been taken to implement the practice on any significant scale. Therefore, no benefits from this activity were included in the economic analysis.

11. Under the idle paddy land conversion subcomponent, short-term crops and various vegetables were grown and some fruit trees were planted (on 1,738 ha involving 2,194 farmers). In the economic analysis bananas, corn and watermelon were used as representative crops. Also 22 fish estates, covering 607 ha and involving 415 farmers, were developed and are used for either commercial harvesting of fish or as a recreational ("weekend") fishing resource where the sale of tickets gives commercial returns to the participating farmers.

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<sup>1</sup> Since this land generally would have been left idle in the absence of the Project, no economic value was attached to it.

<sup>2</sup> Department of Agriculture. May 1999. *Benchmark Survey of Sixty Village Agricultural Schemes in Pahang Barat Integrated Agricultural Development Project*.

12. Under the orchard estates subcomponent, 2,597 ha of fruit trees, involving 3,199 farmers, were planted: dokong (60 percent), durian (20 percent), citrus (8 percent), and other fruit varieties in small areas. In the economic analysis, the returns from mango are taken to be representative of the returns from the other varieties.

13. Under the village development schemes subcomponent, 2,681 ha of land was developed involving 7,690 farmers. Activities included the planting of fruit trees (1,199 ha) and short-term crops and vegetables (1,365 ha), and fish rearing in fishponds and cages (117 ha). At appraisal it was envisaged that this subcomponent would include reasonably significant livestock development activities, including the introduction of dairy cows. To date however, livestock activities under the Project have been limited to only small-scale poultry and sheep raising and provision of some grazing land (322 ha) for cattle. An integrated cattle-corn wastes feedlot development remains at the pilot stage. Therefore, no benefits from livestock activities were included in the economic analysis. The net economic benefits from food processing and other commercial activities developed under the training subcomponent were also excluded because thus far, these activities are relatively small scale.

14. The assumptions regarding crop yields, prices, and costs of production are in Table A9.3.

15. Tables A9.4 - A9.7 contain data assumed on the areas and production from the various activities under each of the four subcomponents. These estimates are combined with the farm-gate prices for outputs and farm production costs to derive a stream of annual economic benefits for each subcomponent.

## **D. Results**

### **1. Base Case**

16. Tables A9.4 – A9.7 also combine the economic benefits with the project capital and O&M costs for each of the four subcomponents and determine the base case EIRRs as follows: rubber land productivity improvement, 10.5; idle paddy land conversion, 31.1; orchard estates, 6.9; and village development schemes, 13.9.

17. The apportionment of rural infrastructure, institutional strengthening, and project management costs are only approximate. However, the comparative EIRRs for the idle paddy land conversion and orchard estates subcomponents serve to highlight the much lower costs and greater initial productivity of bringing back into productive use land that was previously cultivated.

18. In the appraisal report, which excluded any apportionment of the “other costs” to the four subcomponents, the EIRRs were 39.66 percent for the rubber land productivity improvement and idle paddy land conversion subcomponents combined, and 29.97 percent for the orchard estates and village development schemes subcomponents combined.

19. Table A9.8 combines the net economic benefits streams for each of the four subcomponents to produce an estimated EIRR for the Project of 11.6 percent. This compares with an appraisal report EIRR for the total Project of 16.92 percent. The difference was due to these reasons:

- (i) the appraisal report's economic analysis includes a significant and profitable dairy cattle development, that did not eventuate; farmers in the project area perceived the risks to be too high;
- (ii) the period of time for land development and fruit trees to reach full maturity was longer than assumed in the appraisal's economic analysis; and
- (iii) the updated economic analysis in the PCR adopts more conservative yield assumptions for short-term crops and vegetables.

20. However, the appraisal report emphasized that its economic analysis was only intended to indicate the economic viability of the Project and not to be tightly prescriptive as to the types of activities and the crops to be grown. The mix of activities and crop selection could not be finalized until the completion of the agro-ecological planning work and the farmer participants had given inputs for the process.

21. The Project gave rise to a number of other benefits, which have not been included in the quantitative economic analysis:

- (i) establishment of a geographic information system (GIS) capability within the Department of Agriculture (DOA), which can be used to assist in agricultural development of additional areas within Pahang State and can be expanded for use elsewhere in Malaysia;
- (ii) the undertaking of a number of experiments such as testing new crop varieties, intercropping snake fruit in rubber plantations, and testing less frequent tapping of rubber trees; the results will have useful applications beyond the immediate project area;
- (iii) farmers' uptake of new initiatives other than those directly provided by the Project, but facilitated by the Project (e.g., short-term cash crops in orchards established by the Project as farmers await the maturity of the fruit trees); and
- (iv) strong demonstration effects. Nonparticipant farmers in the project area will in many instances be able to duplicate the project development options, but without the same level of financial assistance as was available under the Project.

22. The Project provided assistance to farm families in 60 of the poorest rural villages in the project area. This meant that to some extent the Project compromises economic efficiency objectives, as measured by the EIRR, to achieve equity-based objectives.

## **2. Sensitivity Testing**

23. Lowering anticipated yields by 10 percent reduced the project EIRR to 9.1 percent. An assumed 10 percent reduction in product prices reduced the EIRR to 9 percent, slightly more than the effect of a 10 percent yield reduction since a reduction in yields also brings a reduction in harvesting costs. Including 100 percent of the roads and bridges subcomponent costs, instead of excluding 40 percent of these costs because of the additional social benefits they provide, reduces the EIRR to 9.4 percent.

24. The EIRR is not particularly sensitive to increases in future O&M costs for the Project. Doubling the estimated future budget from RM5 million per annum to RM10 million per annum results lowers the EIRR to 11.4 percent. This underlines the importance of adequately maintaining the Project, providing sufficiently competent and motivated extension staff. Comparatively small amounts of expenditure on such items will have a huge payoff if it ensures that the Project is sustained and anticipated yields and areas of cultivation are maintained.

25. The project analysis period in the base case ends in 2018 when some of the Project's early plantings of fruit trees will need replanting. However, even without replanting of these trees, economic benefits will continue beyond 2018 for some project activities. As a sensitivity test, the Project's analysis period was extended for another 5 years. Net economic benefits were assumed to continue as for 2018, except that those for the orchard estates and village development schemes subcomponents are assumed to fall by 20 percent in 2019, 40 percent in 2020, 60 percent in 2021, 80 percent in 2022 and 100 percent in 2023 to reflect increasing numbers of fruit trees reaching the end of their economic life. Extending the analysis period in this manner lifts the EIRR by 0.6 percent to 12.2 percent.

26. Excluded from the base case economic analysis are initiatives taken by farmer participants to intercrop short-term crops (bananas and vegetables) while awaiting the maturity of their fruit trees. Field observations by the PCR Mission indicated that this had occurred in some places. Assuming that 25 percent of areas planted in fruit trees under the Project have a farmer-initiated mix of bananas (75 percent) and vegetables (25 percent) from the time the fruit trees are planted through until 2002 raises the EIRR by 1 percent to 12.6 percent.

27. A summary of the sensitivity testing analysis is in Table A9.9:

**Table A9.9: Sensitivity Testing**

<b>Assumption</b>	<b>EIRR (percent)</b>
Base Case	11.6
10 percent reduction in yields	9.1
10 percent reduction in prices	9
Inclusion of all roads and bridges costs	9.4
Doubling of operation and maintenance (O&M) Costs	11.4
Extending Project Analysis Period	12.2
Farmer-Initiated Intercropping of Fruit Trees in Early Years	12.6

**Table A9.1: Exchange and Inflation Rates**

<b>Year</b>	<b>Exchange Rate<sup>a</sup> RM=\$1</b>	<b>Malaysia CPI<sup>a</sup></b>	<b>G5MUV Index<sup>b</sup></b>
1987	2.52	74.70	88.85
1988	2.62	76.70	95.32
1989	2.71	78.80	94.65
1990	2.70	80.90	100.00
1991	2.75	84.40	102.23
1992	2.55	88.40	106.64
1993	2.57	91.60	104.22
1994	2.62	95.00	107.35
1995	2.50	100.00	108.99
1996	2.52	103.50	110.94
1997	2.81	106.20	108.38
1998	3.92	111.80	104.19
1999	3.80	114.90	103.56
2000 <sup>c</sup>	3.80	117.40	106.15

CPI = Consumer Price Index; G5= Five countries namely, France, Germany, Japan, UK, and US;  
MUV = Manufactures Unit Value

<sup>a</sup>International Financial Statistics, 1999 and July 2000.

<sup>b</sup>The World Bank. Various years. Commodity Price Projections.  
*Global Commodity Markets*. Washington, D. C.

<sup>c</sup>Based on incomplete actual data and projections

**Table A9.2: Project Costs, by Component**

<b>Item</b>	<b>Actual Costs</b>		<b>Adjusted Costs <sup>a</sup> (\$'000)</b>
	<b>\$'000</b>	<b>Percent</b>	
Rubber Land Productivity	280	3	1,075
Paddy Land Conversion	1,756	18	6,523
Orchard Estates	4,714	49	17,691
Village Development Costs	2,843	30	10,788
<b>Subtotal</b>	<b>9,593</b>	<b>100</b>	<b>36,077</b>
Other Costs <sup>b</sup>	26,484		
<b>Total</b>	<b>36,077</b>		

<sup>a</sup> With "other costs" included in proportion to relative actual costs.

<sup>b</sup> Excluding 40% of roads and bridges costs assumed to have offsetting social benefits as per appraisal report.



**Table A9.3: Product Yields, Prices, Costs of Production, and Net Revenues**

Item		Short-term			Dokong	Durian	Citrus	Other Fruit <sup>c</sup>	Fish Estates	Fish-ponds	Fish Cages
		Snake fruit	Crops <sup>a</sup>	Vegetables <sup>b</sup>							
Maximum Yield	(t/ha)	1.25	10.00	46.00	8.40	8.00	3.85	11.40	1.56	11.20	3.73
Time to First Yield	(years)	3	1	1	8	8	3	4	1	1	1
Time to Maximum Yield	(years)	8	1	1	18	16	8	14	1	1	1
Price	(RM/t)	3,000	400	350	1,500	2,000	1,500	2,000	3,800	3,800	3,800
Production Costs Excluding Labor	(RM/ha)	750	1,335	3,080	675	675	750	1,370	3,300	19,470	6,490
Labor for Harvesting Fruit <sup>d</sup>	(RM/ha) <sup>e</sup>	563			1,260	1,200	580	1,710			
Other Labor	(RM/ha)	400	1,400	3,000	300	300	500	1,000	960	2,400	1,120
Net Revenues at Maximum Yields	(RM/ha)	2,037	1,265	10,020	10,365	13,825	3,945	18,720	1,668	20,690	6,564

<sup>a</sup> Representative crop: 50/50 mix of corn and banana.

<sup>b</sup> Representative crop: watermelon, assumed to be double-cropped (i.e., data in the table are per annum).

<sup>c</sup> Representative crop: mango.

<sup>d</sup> Taken as RM0.15/kg, except for snake fruit, which is RM0.45/kg.

<sup>e</sup> At maximum yield.

**Table A9.4: Rubber Land Productivity Improvement Economic Internal Rate of Return**

Year	Area (ha)	Production (t)	Economic Revenue (RM' 000)	Production Costs Excluding Labor (RM' 000)	Labor (RM' 000)	Economic Benefits (RM' 000)	Capital Costs (RM' 000)	O&M Costs (RM' 000)	Net Economic Benefits (RM' 000)
1993	0	0	0	0	0	0	199		(199)
1994	180	0	0	122	65	(187)	576		(763)
1995	315	0	0	213	114	(326)	511		(837)
1996	415	2	5	280	150	(426)	423		(849)
1997	591	32	86	399	226	(538)	515		(1,053)
1998	757	86	233	511	307	(586)	783		(1,369)
1999	935	172	465	631	406	(573)	476		(1,049)
2000	935	325	877	631	468	(222)	275		(497)
2001	935	506	1,366	631	541	193		135	58
2002	935	679	1,834	631	612	591		135	456
2003	935	846	2,284	631	679	973		135	838
2004	935	998	2,695	631	741	1,323		135	1,188
2005	935	1,109	2,995	631	786	1,578		135	1,443
2006	935	1,152	3,110	631	803	1,676		135	1,541
2007	935	1,152	3,110	631	803	1,676		135	1,541
2008	935	1,152	3,110	631	803	1,676		135	1,541
2009	935	1,152	3,110	631	803	1,676		135	1,541
2010	935	1,152	3,110	631	803	1,676		135	1,541
2011	935	1,152	3,110	631	803	1,676		135	1,541
2012	935	1,152	3,110	631	803	1,676		135	1,541
2013	935	1,152	3,110	631	803	1,676		135	1,541
2014	935	1,152	3,110	631	803	1,676		135	1,541
2015	935	1,152	3,110	631	803	1,676		135	1,541
2016	935	1,152	3,110	631	803	1,676		135	1,541
2017	935	1,152	3,110	631	803	1,676		135	1,541
2018	935	1,152	3,110	631	803	1,676		135	1,541

ha = hectare, O&M = operation and maintenance, t= metric ton.

EIRR= 10.5%

Table A9.5: Paddy Land Conversion Economic Internal Rate of Return

Year	Short Term Crops/Vegetables <sup>a</sup>		Fish Estates		Paddy Land Conversion Subcomponent			
	Area (ha)	Economic Benefits (RM 000)	Area (ha)	Economic Benefits (RM' 000)	Economic Benefits (RM' 000)	Capital Costs (RM' 000)	O&M Costs (RM' 000)	Net Economic Benefits (RM' 000)
1993	0	0	0	0	0	1,195		(1,195)
1994	34	106	473	710	816	3,457		(2,641)
1995	207	643	485	728	1,372	3,065		(1,693)
1996	492	1,529	575	863	2,392	2,539		(147)
1997	723	2,247	607	911	3,158	3,093		65
1998	1,490	4,632	607	911	5,544	4,700		844
1999	1,738	5,403	607	911	6,315	2,859		3,456
2000	1,738	5,403	607	911	6,315	1,648		4,667
2001	1,738	5,403	607	911	6,315		810	5,505
2002	1,738	5,403	607	911	6,315		810	5,505
2003	1,738	5,403	607	911	6,315		810	5,505
2004	1,738	5,403	607	911	6,315		810	5,505
2005	1,738	5,403	607	911	6,315		810	5,505
2006	1,738	5,403	607	911	6,315		810	5,505
2007	1,738	5,403	607	911	6,315		810	5,505
2008	1,738	5,403	607	911	6,315		810	5,505
2009	1,738	5,403	607	911	6,315		810	5,505
2010	1,738	5,403	607	911	6,315		810	5,505
2011	1,738	5,403	607	911	6,315		810	5,505
2012	1,738	5,403	607	911	6,315		810	5,505
2013	1,738	5,403	607	911	6,315		810	5,505
2014	1,738	5,403	607	911	6,315		810	5,505
2015	1,738	5,403	607	911	6,315		810	5,505
2016	1,738	5,403	607	911	6,315		810	5,505
2017	1,738	5,403	607	911	6,315		810	5,505
2018	1,738	5,403	607	911	6,315		810	5,505

ha = hectare, O&M = operation and maintenance.

<sup>a</sup> 75% short-term crops/25% vegetables.

EIRR= 31.1%

Table A9.6: Orchard Estates Economic Rate of Return

Year	Dokong		Durian		Citrus		Other Fruit		Economic Benefits (RM' 000)	Capital Costs (RM' 000)	O&M Costs (RM' 000)	Net Economic Benefits (RM' 000)
	ha	t	ha	t	ha	t	ha	t				
1993	0		0		0		0		0	3,254		(3,254)
1994	85		28		11		17		(148)	9,412		(9,560)
1995	339		113		45		68		(592)	8,345		(8,937)
1996	719		240		96	0.34	144		(1,255)	6,911		(8,166)
1997	1,095		365		146	7	219	41	(1,837)	8,419		(10,256)
1998	1,401		467		187	32	280	163	(2,137)	12,796		(14,933)
1999	1,558		519		208	86	312	447	(1,873)	7,782		(9,655)
2000	1,558		519		208	180	312	829	(1,123)	4,485		(5,608)
2001	1,558	81	519	38	208	319	312	1,316	18		2,205	(2,187)
2002	1,558	336	519	208	208	479	312	1,810	1,628		2,205	(577)
2003	1,558	751	519	509	208	623	312	2,201	3,460		2,205	1,255
2004	1,558	1,229	519	903	208	727	312	2,493	5,311		2,205	3,106
2005	1,558	1,710	519	1,366	208	784	312	2,676	7,040		2,205	4,835
2006	1,558	2,095	519	1,799	208	800	312	2,782	8,423		2,205	6,218
2007	1,558	2,333	519	2,104	208	800	312	2,917	9,445		2,205	7,240
2008	1,558	2,579	519	2,355	208	800	312	3,093	10,455		2,205	8,250
2009	1,558	2,971	519	2,658	208	800	312	3,273	11,735		2,205	9,530
2010	1,558	3,689	519	3,014	208	800	312	3,423	13,450		2,205	11,245
2011	1,558	4,814	519	3,314	208	800	312	3,515	15,470		2,205	13,265
2012	1,558	6,433	519	3,584	208	800	312	3,553	17,950		2,205	15,745
2013	1,558	8,412	519	3,755	208	800	312	3,522	20,588		2,205	18,383
2014	1,558	10,331	519	3,825	208	800	312	3,418	22,863		2,205	20,658
2015	1,558	11,790	519	3,825	208	800	312	3,245	24,347		2,205	22,142
2016	1,558	12,711	519	3,825	208	800	312	3,047	25,136		2,205	22,931
2017	1,558	13,088	519	3,825	208	800	312	2,846	25,260		2,205	23,055
2018	1,558	12,936	519	3,825	208	800	312	2,623	24,704		2,205	22,499

ha = hectare, t = metric ton.

EIRR= 6.92%

Table A9.7: Village Development Scheme Economic Internal Rate Of Return

Year	Dokong		Fruit		Durian		Other Fruit		Economic Benefits		Ponds		Fish		Economic Benefits		Short-Term Crops		Vegetables		Economic Benefits		Capital Costs		O&M Costs		Net Economics Benefits	
	ha	t	ha	t	ha	t	ha	t	(RM' 000)	(RM' 000)	ha	ha	ha	ha	(RM' 000)	(RM' 000)	ha	ha	ha	ha	(RM' 000)	(RM' 000)	(RM' 000)	(RM' 000)	(RM' 000)	(RM' 000)	(RM' 000)	(RM' 000)
1993																												
1994	142		19		47		28		(247)		2		9		95		313		31		0		1,992				1,992	(1,992)
1995	230		31		77		46		(402)		13		26		404		464		48		483		5,762				5,762	(5,279)
1996	350		47	1	117		70		(611)		20		40		612		565		64		960		5,109				5,109	(4,149)
1997	463		62	10	154		93	68	(684)		26		61		850		750		100		1,221		4,231				4,231	(3,010)
1998	598		80	27	199		120	145	(771)		26		80		961		991		133		1,925		5,155				5,155	(3,230)
1999	719		96	57	240		120	258	(706)		26		91		1,026		1,128		146		2,519		7,834				7,834	(5,315)
2000	719		96	106	240		120	443	(338)		26		91		1,026		1,219		146		3,028		4,764				4,764	(1,736)
2001	719	136	96	165	240	63	120	635	324		26		91		1,026		1,219		146		3,396		2,746					650
2002	719	238	96	224	240	197	120	835	1,075		26		91		1,026		1,219		146		4,058				1,350			2,708
2003	719	398	96	277	240	327	120	992	1,813		26		91		1,026		1,219		146		4,809				1,350			3,459
2004	719	559	96	323	240	457	120	1,124	2,498		26		91		1,026		1,219		146		5,547				1,350			4,197
2005	719	775	96	357	240	643	120	1,245	3,315		26		91		1,026		1,219		146		6,232				1,350			4,882
2006	719	971	96	369	240	863	120	1,303	4,030		26		91		1,026		1,219		146		7,049				1,350			5,699
2007	719	1,077	96	369	240	1,045	120	1,378	4,587		26		91		1,026		1,219		146		7,764				1,350			6,414
2008	719	1,245	96	369	240	1,169	120	1,442	5,102		26		91		1,026		1,219		146		8,322				1,350			6,972
2009	719	1,530	96	369	240	1,326	120	1,503	5,813		26		91		1,026		1,219		146		8,837				1,350			7,487
2010	719	1,921	96	369	240	1,468	120	1,564	6,625		26		91		1,026		1,219		146		9,547				1,350			8,197
2011	719	2,425	96	369	240	1,589	120	1,611	7,518		26		91		1,026		1,219		146		10,359				1,350			9,009
2012	719	3,246	96	369	240	1,696	120	1,640	8,743		26		91		1,026		1,219		146		11,252				1,350			9,902
2013	719	3,973	96	369	240	1,783	120	1,589	9,686		26		91		1,026		1,219		146		12,477				1,350			11,127
2014	719	4,704	96	369	240	1,837	120	1,537	10,577		26		91		1,026		1,219		146		13,420				1,350			12,070
2015	719	5,281	96	369	240	1,837	120	1,481	11,186		26		91		1,026		1,219		146		14,311				1,350			12,961
2016	719	5,751	96	369	240	1,837	120	1,409	11,636		26		91		1,026		1,219		146		14,920				1,350			13,570
2017	719	6,042	96	369	240	1,837	120	1,316	11,835		26		91		1,026		1,219		146		15,371				1,350			14,021
2018	719	5,788	96	369	240	1,837	120	1,147	11,244		26		91		1,026		1,219		146		15,569				1,350			14,219
2019	719	5,788	96	369	240	1,837	120	1,147	11,244		26		91		1,026		1,219		146		14,978				1,350			13,628

ha = hectare, O&amp;M = operation &amp; maintenance, t = metric ton.

EIRR= 13.9%

**Table A9.8: Total Project Economic Internal Rate of Return  
(RM '000)**

Year	Rubber Land Productivity	Paddy Land Conversion	Horticulture Estates	Village Development Schemes	Total Project
1993	(199)	(1,195)	(3,254)	(1,992)	(6,640)
1994	(763)	(2,641)	(9,560)	(5,279)	(18,243)
1995	(837)	(1,693)	(8,937)	(4,149)	(15,618)
1996	(849)	(147)	(8,166)	(3,010)	(12,172)
1997	(1,053)	65	(10,256)	(3,230)	(14,474)
1998	(1,369)	844	(14,933)	(5,315)	(20,773)
1999	(1,049)	3,456	(9,655)	(1,736)	(8,984)
2000	(497)	4,667	(5,608)	650	(788)
2001	58	5,505	(2,187)	2,708	6,084
2002	456	5,505	(577)	3,459	8,843
2003	838	5,505	1,255	4,197	11,795
2004	1,188	5,505	3,106	4,882	14,681
2005	1,443	5,505	4,835	5,699	17,481
2006	1,541	5,505	6,218	6,414	19,678
2007	1,541	5,505	7,240	6,972	21,257
2008	1,541	5,505	8,250	7,487	22,782
2009	1,541	5,505	9,530	8,197	24,773
2010	1,541	5,505	11,245	9,009	27,300
2011	1,541	5,505	13,265	9,902	30,213
2012	1,541	5,505	15,745	11,127	33,917
2013	1,541	5,505	18,383	12,070	37,498
2014	1,541	5,505	20,658	12,961	40,664
2015	1,541	5,505	22,142	13,570	42,757
2016	1,541	5,505	22,931	14,021	43,997
2017	1,541	5,505	23,055	14,219	44,320
2018	1,541	5,505	22,499	13,628	43,173

EIRR = 11.6%

## PROJECT IMPACTS ON BENEFICIARIES

### A. Poverty in the Project Area

1. A principal objective of the Project was to increase the income of rural populations in Pahang Barat (West Pahang). One significant Project subcomponent (the village development schemes) was specifically required to direct its assistance measures to 60 of the poorest villages in the project area.

2. The incidence of poverty in Malaysia is assessed on the basis of poverty line income, which takes into account the minimum requirements for food, clothing, shelter, and other basic expenditures. The national poverty line was defined as RM4,560 (\$1,689) per family per year in 1990 and is currently RM4860 (\$1,279) per family per year. The hard-core poverty line is defined as half the poverty line; i.e., currently RM2,430 (\$639) per annum.

3. A combination of high economic growth (following industrialization) and widespread government interventions has reduced poverty incidence significantly. For Malaysia as a whole, poverty incidence declined from 17.1 percent in 1990 to around 10 percent in 1999. Rural poverty declined from 21.8 percent to 11 percent over the same period.

4. In rural areas, poverty reduction measures from both federal and state government agencies include the provision of basic housing, the gifting of land and trees in the Federal Land Consolidation and Rehabilitation Agency (FELCRA) rubber and oil palm estates, and the provision of livestock, fish, and associated facilities (e.g., fish cages), depending on the needs and capabilities of the targeted poverty groups. In addition, a number of agriculture development projects provide combinations of infrastructure, initial land preparation, farm inputs, agriculture equipment, and training.

5. Pahang State ranked seventh of the 14 states in poverty incidence in 1990 and 1997 (the latest year for which state-level data is available). Poverty incidence in Pahang went down from 10.0 percent in 1990 to 4.4 percent in 1997. Over the same period, hard-core poverty went down from 2.1 percent to 0.8 percent. However, the project area consisting of the seven districts of Pahang Barat is less developed than other parts of the state and poverty incidence is higher. The Report and Recommendation of the President (RRP) at appraisal in 1993 stated (RRP Appendix 6, page 2) that the incidence of poverty among the intended project participants was high, with over 75 percent having incomes below the poverty line. A benefit monitoring and evaluation (BME) preparatory report<sup>1</sup> for the Project stated that about 50 percent of the Pahang Barat population had an income below the poverty line and that the average income for Pahang Barat was RM4,200 per annum (equivalent to RM4,640 in 2000 prices).

6. A subsequent socioeconomic benchmark survey in late 1997/early 1998<sup>2</sup> of the 60 villages targeted for assistance indicates that the average income of farm families in the project area was RM6,096 or RM6,544 in 2000 prices.<sup>3</sup> A significant proportion of this income (85 percent) is from off-farm sources (Table A10.1). This is consistent with reports received during

<sup>1</sup> Department of Agriculture. March 1997. *Benefit Monitoring and Evaluation System of Pahang Barat Integrated Agriculture Development Project*.

<sup>2</sup> This survey was conducted before the Project had any substantial impact. In particular, even fruit trees planted as early as 1994 will have produced no fruit apart from minor plantings of citrus trees.

<sup>3</sup> Department of Agriculture. May 1999. *Benchmark Survey of Sixty Village Agricultural Schemes in Pahang Barat Integrated Agricultural Development Project*.

the Project Completion Report (PCR) Mission that interest in rubber tapping in the project area is now low as a result of the low prices received for latex.

7. This average income estimate from the benchmark survey in 1997/98 is RM1,684 or 35 percent above the poverty line, suggesting that the extent of poverty in the project area has declined since the time of appraisal, even without the project interventions. This is due to the presence of other poverty reduction programs and rapid economic growth in Malaysia as a whole over 1992 - 1997 and industrialization providing an increased number of jobs in and around the towns of Pahang Barat. However, the average farm family income figure still shows a sizable proportion of the targeted project participants below the poverty line (perhaps up to 30 percent) before the project activities were implemented.

## **B. Project Financial Impacts**

8. Table A10.2 lists the average incremental financial benefits from each of the project components. For the Project as a whole, the financial analysis indicates that by the year 2000 the net returns after deducting the cost of farmers' own labor (valued at RM20 per day) were RM666 (\$175) per annum. This is expected to increase to RM2,321 (\$611) per farmer per annum by the year 2010 and to RM3,647 (\$960) by 2018, the end of the project analysis period.

9. Including the returns to farmers' own labor gives income increases averaging RM1,507 (\$397), RM3,374 (\$888), and RM4,887 (\$1,286) per annum for the years 2000, 2010, and 2018, respectively. This compares with appraisal estimates of between RM7,000 and RM13,000 per annum for increase in net farm revenues at full development. However, this is substantially influenced by a significant and profitable dairy cattle subcomponent, which the appraisal report had anticipated but was not realized, since farmers were unwilling to take on the perceived risks. Ignoring this subcomponent gives an appraisal estimate of RM3,500 or RM4,490 in 2000 prices for incremental income at full development.

10. The increase in the number of new jobs created is relatively modest (2,401 in 2000, 3,005 in 2010, and 3,540 in 2018) compared with the total number of participating farmers (14,847). This suggests that the incremental financial benefits from the Project can be achieved without a significant reduction in other agricultural and nonagricultural employment. Key outputs from the Project are increases in labor and land productivity illustrated by the increasing returns to labor. In 2000, total returns to labor per person-day were estimated to be RM36 (\$9), growing to RM64 in 2010 (\$17) and RM79 (\$21) in 2018. This compares with a current wage rate of RM20 (\$5) per day for an agricultural worker in the project area.

## **C. Impact on Women**

11. Women played a number of key roles in project implementation, including one who held the office of director of the project management unit (PMU) from 1993 to 1997. In addition, a number of women's groups received training and other assistance in establishing new, or upgrading existing small-scale food processing activities under the Project. These were done under the village development schemes subcomponent of the Project and involved the provision of new or renovated buildings, equipment, and appropriate training from the Department of Agriculture (DOA) and Malaysian Agricultural Research and Development Institute (MARDI) staff in processing, packaging, hygiene accreditation, and marketing. Activities involved the manufacturing and marketing of cakes, confectionery, snack foods, and sauces.



12. Many women in the project area are also involved in on-farm activities. Even if they are not, they will benefit indirectly from the financial impacts of the Project described above.

**D. Social Impacts**

13. Social as well as economic benefits result from the new roads and bridges built as part of the Project. These new or improved roads and bridges will provide better access to health, education, and commercial facilities as well as assist with the marketing of farm outputs. Another social benefit was the development of village plans and farmers groups. These outputs improved the cohesiveness of villages, assisting future development and creating a greater sense of village identity.

**Table A10.1: Average Annual Farm Incomes, 1997/98**

<b>Land Use/Activity</b>	<b>Average Net Income (RM)</b>	<b>Farmers (percent)</b>	<b>Weighted Average Net Income (RM)</b>
Fruit	398	68	269
Rubber	596	52	310
Oil Palm	777	6	46
Cocoa	656	10	63
Coconut Oil	17	4	1
Paddy	407	4	15
Vegetables	1,993	3	60
Short-term Crops	1,323	8	112
Fishponds	352	1	4
Livestock	154	49	76
Other Farm Income	2,014	6	116
Off-Farm Income	5,947	85	5,026
<b>Total</b>		<b>100</b>	<b>6,096</b>
In 2000 Prices			6,544

**Table A10.2: Incremental Financial Benefits**  
(RM per annum per farmer participant)

Item	2000	2010	2018
<b>Net Revenue</b>			
(Labor costs deducted) <sup>a</sup>			
Rubber Land Productivity Improvement	580	1,644	1,644
Paddy Land Conversion	2,689	2,689	2,689
Orchard Estates	(390)	4,204	8,580
Village Development Schemes	435	1,534	2,276
<b>Total Project</b>	<b>666</b>	<b>2,321</b>	<b>3,647</b>
<b>Total Returns to Labor<sup>b</sup></b>			
Rubber Land Productivity Improvement	1,000	2,126	2,126
Paddy Land Conversion	4,112	4,112	4,112
Orchard Estates	(18)	5,042	9,852
Village Development Schemes	1,347	2,648	3,569
<b>Total Project</b>	<b>1,507</b>	<b>3,374</b>	<b>4,887</b>
Equivalent Returns Per Person Day	36	64	79
Number of New Jobs	2,401	3,005	3,540

<sup>a</sup> Labor costs RM20/day, except that harvesting costs are RM0.45/kilogram for snake fruit and RM0.15/kilogram for other fruit.

<sup>b</sup> Net revenue plus labor costs.

## O & M ORGANIZATION CHART

