ASIAN DEVELOPMENT BANK

PCR: MAL 24051

PROJECT COMPLETION REPORT

ON THE

NORTHERN TERENGGANU RURAL DEVELOPMENT PROJECT
(PHASE I)
(Loan 1068-MAL)

IN

MALAYSIA

June 2001

CURRENCY EQUIVALENTS

Currency Unit – Ringgit (RM)

		At Appraisal	At Project Completion
RM1.00	=	$0.371	$0.260
$1.00	=	RM2.695	RM3.800

ABBREVIATIONS

ADB	–	Asian Development Bank
BADP	–	Besut Agricultural Development Project
BME	–	benefit monitoring and evaluation
DID	–	Drainage and Irrigation Department
DOE	–	Department of Environment
EIRR	–	economic internal rate of return
MOA	–	Ministry of Agriculture
PMU	–	Project Management Unit
PSC	–	Project Steering Committee
TA	–	technical assistance

NOTES

(i) The fiscal year (FY) of the Government ends on 31 December.

(ii) In this report, “$” refers to US dollars.

CONTENTS

BASIC DATA

A. Loan Identification

1.	Country	Malaysia
2.	Loan Number	1068-MAL
3.	Project Title	Northern Terengganu Rural Development Project
4.	Borrower	Malaysia
5.	Executing Agency	Ministry of Agriculture
6.	Amount of Loan	$15.0 million
7.	PCR Number	PCR:MAL 621

B. Loan Data

1.	Appraisal	
	- Date Started	24 September 1990
	- Date Completed	2 October 1990
2.	Loan Negotiations	
	- Date Started	12 November 1990
	- Date Completed	13 November 1990
3.	Date of Board Approval	13 December 1990
4.	Date of Loan Agreement	28 October 1991
5.	Date of Loan Effectiveness	
	- In Loan Agreement	26 January 1992
	- Actual	27 November 1991
	- Number of Extensions	none
6.	Closing Date	
	- In Loan Agreement	31 December 1996
	- Actual	19 January 2000
	- Number of Extensions	2[1]
7.	Terms of Loan	
	- Interest Rate	variable
	- Maturity	20 years
	- Grace Period	5 years

8. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
10 December 1992	19 January 2000	7 years and 1 month

Effective Date	Original Closing Date	Time Interval
27 November 1991	31 December 1996	5 years and 1 month

[1] ADB approved the first extension up to 31 December 1998 in March 1997, and the second extension up to 30 September 1999 in June 1999. The loan account was kept open to 19 January 2000 to maximize and finalize disbursement of funds under the loan.

b. Amount ($ million)

Category	Original Allocation	Amount Reallocated/(Canceled) January 1993[a]	November 1992[b]	January 2000[c]	Total	Revised Allocation	Amount Disbursed
Civil Works							
01A – Part A	7.808			(2.058)	(2.058)	5.750	5.750
01B – Part B	3.820			2.464	2.464	6.284	6.284
01C – Part C	0.885			(0.133)	(0.133)	0.752	0.752
Vehicles							
02A – Part A	0.602	(0.136)		(0.343)	(0.479)	0.123	0.123
02B – Part B	0.294	0.285		(0.348)	(0.063)	0.231	0.231
02C – Part C	0.899	(0.806)		(0.001)	(0.807)	0.092	0.092
Training							
03A - Part B	0.111			(0.069)	(0.069)	0.042	0.042
03B - Part C	0.074			(0.066)	(0.066)	0.008	0.008
Incremental Operating Cost							
04	0.507		(0.507)		(0.507)		
Total	**15.000**	**(0.657)**	**(0.507)**	**(0.555)**	**(1.719)**	**13.281**	**13.281**

[a] ADB approved partial cancellation of $657,000 allocated for vehicles due to a decrease in the number of vehicles required for construction.
[b] ADB approved cancellation of $507,000 allocated for incremental operation costs in November 1992 based on Government's assurance that it would finance expenditure for operation and maintenance.
[c] Cancellation of undisbursed funds were effected as of the loan closing date.

9. Local Costs (Financed) None

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate Amount	%	Actual Amount	%
Foreign Exchange Cost	20.490	37	13.973	28
Local Cost	34.190	63	35.172	72
Total	**54.680**	**100**	**49.145**	**100**

2. Financing Plan ($ million)

Financier	Appraisal Estimate Foreign	Local	Total	%	Actual Foreign	Local	Total	%
ADB	15.000	0.000	15.000	27	13.281	0	13.281	27
Government	5.490	34.190	39.680	73	0.692	35.172	35.864	73
Total	**20.490**	**34.190**	**54.680**	**100**	**13.973**	**35.172**	**49.145**	**100**
%	**37**	**63**	**100**		**28**	**72**	**100**	

ADB = Asian Development Bank.

3. Cost Breakdown by Project Components ($ million)

Component	Appraisal Estimate			Actual Cost		
	Foreign	Local	Total	Foreign	Local	Total
A. Flood Mitigation and Irrigation						
1. Flood Mitigation						
a. Besut River Flood Mitigation	4.108	13.225	17.333	0.318	0.712	1.031
Civil Works	4.108	3.494	7.607	0.318	0.487	0.805
Land Acquisition	0.000	9.727	9.727	0.000	0.225	0.225
b. Besut River Mouth Improvement	3.400	3.026	6.426	4.050	9.090	13.140
Civil Works	3.400	0.130	6.296	4.050	6.213	10.263
Land Acquisition	0.000	3.026	0.130	0.000	2.877	2.877
c. Jetty	0.300	0.256	0.556	0.965	2.159	3.124
Civil Works	0.300	0.256	0.556	0.965	1.475	2.440
Land Acquisition	0.000	0.000	0.000	0.000	0.684	0.684
d. Consulting for Detailed Design and Construction Supervision	0.000	1.171	1.171	0.000	3.544	3.544
Domestic	0.000	1.078	1.078	0.000	3.544	3.544
International	0.000	0.093	0.093	0.000	0.000	0.000
2. Irrigation						
a. Besut Irrigation Scheme	3.820	4.865	8.685	7.087	15.861	22.948
Civil Works	3.820	3.254	7.074	7.087	10.837	17.924
Land Acquisition	0.000	1.611	1.611	0.000	5.024	5.024
b. Water Management Training and Demonstration	0.157	0.120	0.277	0.029	0.000	0.029
International Training	0.111	0.000	0.111	0.029	0.000	0.029
Local Training	0.000	0.074	0.074			
Water Management Pilot Farm	0.046	0.046	0.092			
3. Administration and Management						
a. Office Buildings	0.040	0.034	0.074	0.582	0.891	1.473
Civil Works	0.040	0.034	0.074	0.582	0.891	1.473
Land Acquisition	0.000	0.000	0.000			
b. Vehicles and Equipment	0.896	0.099	0.995	0.139	0.015	0.155
Vehicles	0.110	0.012	0.122	0.139	0.015	0.155
Equipment	0.786	0.087	0.873			
c. Recurrent Costs (Incremental)	0.000	1.681	1.681	0.000	1.394	1.394
d. Administration Costs	0.062	0.534	0.596	0.264	0.398	0.662
e. Operation and Maintenance	0.318	0.825	1.143	0.039	0.597	0.637
B. Agriculture Support Services						
1. Drainage for Tobacco Area	0.094	0.080	0.174	0.064	0.055	0.119
Civil Works	0.094	0.080	0.174	0.064	0.055	0.119
Land Acquisition	0.000	0.000	0.000			

Component	Appraisal Estimate			Actual Cost		
	Foreign	Local	Total	Foreign	Local	Total
2. Land Development for Vegetables and Fruits	0.450	0.383	0.833	0.091	0.078	0.168
Civil Works	0.450	0.383	0.833	0.091	0.078	0.168
Land Acquisition	0.000	0.000	0.000			
3. Office Buildings (DOA)	0.061	0.052	0.113	0.000	0.000	0.000
Civil Works	0.061	0.052	0.113	0.000	0.000	0.000
Land Acquisition	0.000	0.000	0.000	0.000	0.000	0.000
4. Office Buildings (PMU)	0.240	0.204	0.444	0.000	0.000	0.000
Civil Works	0.240	0.204	0.444	0.000	0.000	0.000
Land Acquisition	0.000	0.000	0.000	0.000	0.000	0.000
5. Vehicles	0.193	0.022	0.215	0.300	0.030	0.333
PMU	0.143	0.016	0.159	0.300	0.030	0.333
DOA	0.050	0.006	0.056			
6. Equipment	0.706	0.079	0.785	0.000	0.000	0.000
PMU	0.546	0.061	0.607	0.000	0.000	0.000
DOA	0.160	0.018	0.178	0.000	0.000	0.000
7. Recurrent Costs	0.000	1.489	1.489	0.000	0.093	0.093
PMU	0.000	0.885	0.885		0.093	0.093
DOA	0.000	0.604	0.604			
8. Administration Costs	0.080	0.706	0.786	0.026	0.252	0.278
PMU	0.062	0.535	0.597			
DOA	0.018	0.171	0.189			
9. WID Training	0.074	0.189	0.263	0.017	0.000	0.017
10. BME	0.000	0.037	0.037	0.000	0.000	0.000
Total Base Cost	14.999	29.077	44.076	13.973	35.172	49.145
Physical Contingency (10%)	1.500	2.908	4.408			
Price Escalation	1.703	2.205	3.908			
Interest During Construction	2.288	0.000	2.288			
Total	**20.490**	**34.190**	**54.680**	**13.973**	**35.172**	**49.145**
%	**37**	**63**	**100**	**28**	**72**	**100**

BME = benefit monitoring and evaluation, DOA = Department of Agriculture, PMU = Project Management Unit, WID = women in development.

4. Project Schedule

Milestone	Appraisal Estimate	Actual
A. Date of Contract with Consultants	June 1991[a]	June 1992
B. Completion of Engineering Designs		
Flood Mitigation for Besut River	December 1992[a]	
Besut River Mouth Improvement	December 1991	April 1994
Construction of Jetty	June 1992	June 1994
Drainage Improvement for Tobacco	December 1991	
Land Development	December 1992	January 1994
Office Buildings	December 1991	

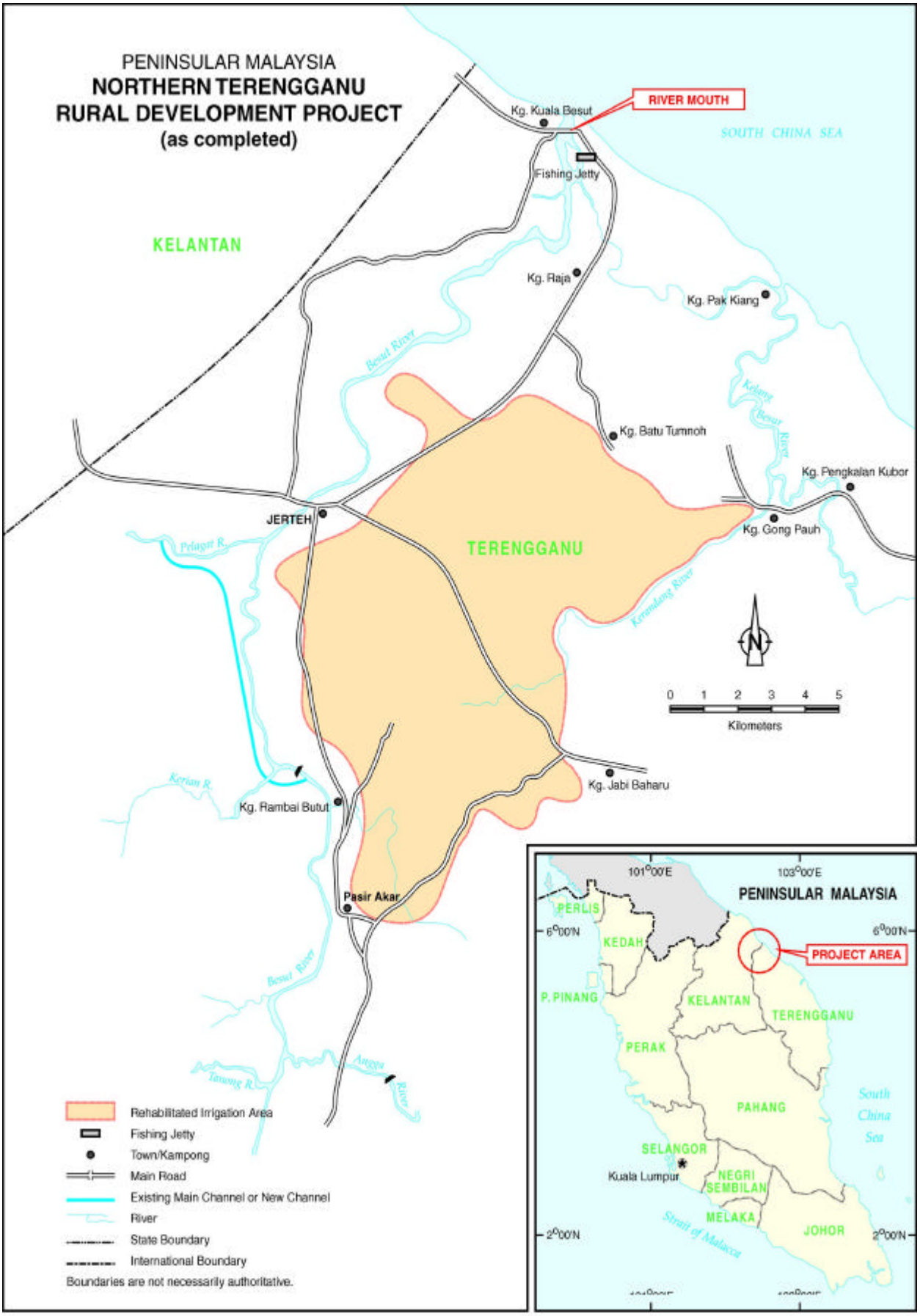
[a] Domestic consultants were to be engaged to undertake both the detailed engineering design and construction supervision under the Project.

Milestone	Appraisal Estimate	Actual
C. Civil Works Contracts		
Dates of Awards		
- Flood Mitigation for Besut River	December 1992	–
- Besut River Mouth Improvement	December 1991	August 1995
- Construction of Jetty	June 1992	June 1994
- Besut Irrigation Scheme	December 1990	May 1991-July 1998
- Drainage Improvement for Tobacco	December 1991	August 1994
- Land Development	December 1991	–
- Office Buildings	December 1991	April 1995
Completion of Work		
- Flood Mitigation for Besut River	June 1996	–
- Besut River Mouth Improvement	June 1994	April 1998
- Construction of Jetty	June 1995	October 1995
- Besut Irrigation Scheme	December 1993	October 1992-October 1999
- Drainage Improvement for Tobacco	June 1993	August 1994
- Land Development	December 1993	–
- Office Buildings	June 1993	–
Start of Operations		
- Flood Mitigation for Besut River	July 1996	–
- Besut River Mouth Improvement	July 1994	August 1995
- Construction of Jetty	July 1993	June 1994
- Besut Irrigation Scheme	January 1994	October 1992-October 1999
- Drainage Improvement for Tobacco	July 1993	April 1995
- Land Development	January 1994	–
- Office Buildings	July 1993	–
D. Equipment and Supplies		
Dates:		
- First Procurement		October 1992
- Last Procurement		March 1999
- Completion of Equipment Installation		
E. Other Milestones		
Agriculture and Support Services		
Start of Implementation		
- Intensification Rice Production	July 1991	May 1991
- Fruit and Vegetables Development	July 1991	July 1991
- Tobacco Production	July 1991	August 1994
Completion of Implementation		
- Intensification Rice Production	June 1996	December 1999
- Fruit and Vegetables Development	June 1996	December 1996
- Tobacco Production	June 1996	April 1995
Training		
Start of Implementation		
- Water Management Training	July 1991	January 1992
- Women in Development Training	July 1991	January 1992
Completion of Implementation		
- Water Management Training	June 1996	June 1998
- Women in Development Training	June 1996	June 1998

D. Data on Asian Development Bank Missions

Name of Mission	Period	No. of Persons	No. of Person-Days	Specialization of Members
Appraisal	24 September–2 October 1990	5	45	Senior Project Economist Senior Programs Officer Senior Project Engineer Environmental Specialist Senior Counsel
Project Inception	13–20 January 1992	2	16	Project Engineer Assistant Project Analyst
Review[a]	20–31 October 1992	2	24	Senior Project Engineer Assistant Project Analyst
Review[b]	22 June–1 July 1993	1	10	Senior Project Engineer
Review[a]	25 September–8 October 1994	2	14	Senior Project Engineer Assistant Project Analyst
Review[a]	18–28 April 1995	1	11	Senior Project Engineer
Review[a]	21 November–1 December 1995	1	11	Senior Project Engineer
Special Project Administration	4–15 March 1996	2	24	Senior Project Engineer Project Engineer
Review[a]	18 November–6 December 1996	1	19	Project Engineer
Review[a]	24 November–5 December 1997	1	12	Project Engineer
Review[a]	29 June–17 July 1998	2	36	Project Engineer Assistant Project Analyst
Review[a]	12–22 October 1999	1	12	Senior Project Engineer
Project Completion Review[bc]	30 October–17 November 2000	5	33	Senior Project Engineer Poverty Specialist Staff Consultant/Civil Engineer Staff Consultant/Economist Associate Project Analyst
Total			**267**	

[a] With Loan 757-MAL: Perlis Integrated Agricultural Development Project.
[b] With Loan 992-MAL: Semerak Integrated Area Development Project.
[c] The Project Completion Review Mission comprised W.H. Menninger, Senior Project Engineer (Mission Leader); S. Setboonsarng, Poverty Reduction Specialist; T. Heiler, Civil Engineer (Staff Consultant); M. Copeland, Economist (Staff Consultant); and L. Medina (Associate Project Analyst).


PENINSULAR MALAYSIA
NORTHERN TERENGGANU
RURAL DEVELOPMENT PROJECT
(as completed)
RIVER MOUTH
Kg. Kuala Besut
SOUTH CHINA SEA
Fishing Jetty
KELANTAN
Kg. Raja
Kg. Pak Kiang
Besut River
Kg. Batu Tumnoh
Kelang Besar River
Kg. Pengkalan Kubor
JERTEH
Kg. Gong Pauh
Pelagat R.
TERENGGANU
Kemaman River
N
0 1 2 3 4 5
Kilometers
Kg. Jabi Baharu
Kg. Rambai Butut
Pasir Akar
Besut River
Tawang R.
Angga River
Rehabilitated Irrigation Area
Fishing Jetty
Town/Kampong
Main Road
Existing Main Channel or New Channel
River
State Boundary
International Boundary
Boundaries are not necessarily authoritative.
101°00'E
103°00'E
PENINSULAR MALAYSIA
PERLIS
6°00'N
KEDAH
PROJECT AREA
P. PINANG
KELANTAN
TERENGGANU
PERAK
PAHANG
South China Sea
SELANGOR
Kuala Lumpur
NEGRI SEMBILAN
MELAKA
JOHOR
2°00'N
Strait of Malacca

I. PROJECT DESCRIPTION

1. In the early 1980s, the Malaysian Government identified the Besut-Setiu river basins in the state of Terengganu as part of a regional effort to reduce poverty through flood mitigation and environmental protection and management. The Project was the third in the series of Asian Development Bank (ADB)-assisted environmentally oriented rural development projects in the states of Kelantan and Terengganu situated in the northeast of Peninsular Malaysia.[1] The three projects were expected to contribute to improving the quality of life in the flood-prone areas of the two states during the northeast monsoon season (November to April) when floods caused considerable damage to crops and other properties, and posed a threat to public health. The two states had little social and economic infrastructure. Terengganu had the highest incidence of poverty in Peninsular Malaysia with 36.2 percent of households living below the national poverty level in 1990. The Project shared ADB's sectoral objectives for poverty reduction by assisting with smallholder agriculture and environmental protection. The Project was relevant at the time of preparation and remains so as the area is designated as one of the country's eight granary regions. The Government is committed to developing the agriculture potential of the area by mechanizing farming and implementing flood protection works. The main risks for the Project included the possibility of implementation delays, land acquisition problems, and adverse environmental consequences. The Project built in measures to address these concerns based on lessons learned from similar projects. The Project also included a small-scale project preparatory technical assistance (TA) for a second phase project, primarily for the development of the Setiu river basin, which is ravaged by annual floods during the wet season.

2. The main objectives of the Project were to increase income-creating opportunities and improve the quality of life to achieve poverty reduction in the project area by providing flood mitigation and drainage facilities, upgrading irrigation infrastructure, and strengthening agricultural support services. To achieve these objectives, the Project comprised three components:

(i) flood control and drainage: (a) construction of river bunds along both sides of the Besut River for about 47 kilometers (km); (b) construction of the Jerteh bridge; (c) construction of drainage conduits and culverts; (d) construction of the Pengkalan Nangka low weir; (e) construction of the Besut barrage; (f) construction of improvements at the Besut River mouth, including two breakwaters at the estuary of the river; (g) construction of a 70 meter (m) long fishing jetty near the Besut River mouth; and (h) provision of equipment and vehicles for operation and maintenance of facilities;

(ii) upgrading of irrigation infrastructure for improved water management: (a) infrastructure improvements including the construction of 117 km of tertiary canals and 76 km of secondary and tertiary drains; and rehabilitation of 10 km of secondary canals and about 95 km of farm roads; (b) training in water management for project staff and farmers, and international training for selected project staff; and (c) provision of vehicles; and

(iii) agricultural support services: (a) construction of shallow drains for about 260 hectares (ha) of tobacco-growing land, (b) land development—about 500 ha for fruits, 100 ha for chillies and vegetables, and 100 ha for melons; (c) construction of office buildings; (d) extension services for the promotion of paddy production

[1] Loan 497-MAL: *Kemasin Semerak Development Project*, for $40 million, approved on 15 December 1980, and Loan 992-MAL: *Semerak Rural Development Project*, for $33.2 million, approved on 23 November 1989.

including vehicles and farm equipment; and (e) training for women in income-generating activities, including a dormitory, equipment, international training, and vehicles.

II. EVALUATION OF IMPLEMENTATION

A. Project Components

3. The Northern Terengganu Rural Development Project was designed to improve the income and social well-being of the communities in the project area. This was to be primarily done by a series of investments in flood mitigation and drainage facilities and irrigation improvement, with supporting support services and training. The Project, as appraised, comprised the following components: (i) constructing flood mitigation and drainage facilities including river mouth improvements and jetty; (ii) upgrading the irrigation infrastructure and providing training for improving on-farm water management; (iii) providing support services for tobacco production, crop diversification, consolidation of paddy production, and training of women in income-generating activities; and (iv) providing consulting services for detailed engineering design and construction supervision. Details are shown in Appendix 1.

1. Flood Control and Drainage

4. This component as appraised included seven subcomponents (Appendix 1). Of the seven subcomponents, the Government has deferred five.

5. **Besut River Mouth Improvement.** The Project completed the construction of two breakwaters at the mouth of the Besut River to stabilize the mouth as part of the proposed river bunding works and to reduce sedimentation in harbor used by fishing boats at Kuala Besut. This work was carried out in line with the appraisal.

6. **Jetty Construction.** The appraisal design was for the construction of a new 70 m long jetty and associated sheds and facilities on the south side of the river mouth upstream of the new breakwaters. Due to technical justification, approved by ADB, the Project constructed a 240 m long jetty and associated works, and improved an adjacent jetty previously built by the Fisheries Board of the state government.

7. **River Bunds, Jerteh Bridge, Pengkalan Low Weir, Drainage Conduits and Culverts, and Besut Barrage.** These five subcomponents have not been implemented. However, several major studies on their feasibility and final design were carried out by the Government prior to and after project commencement. Additional studies to repair the Besut barrage, as envisaged at appraisal, recommended that the Government construct a new barrage instead. The Besut River bunds were taken to the final construction drawing stage by the Government in 1998. However, escalation of land acquisition costs from appraisal (appraisal cost estimates were based on 1987 valuation data) resulted in a decision by the Project Steering Committee (PSC) and the national Economic Planning Unit in May 1999 to indefinitely delay the works as designed. The Government commissioned a full review of all flood mitigation alternatives in October 2000; it is ongoing. The remaining subcomponents, Jerteh Bridge, Pengkalan low weir, drainage conduits, and culverts, have not been implemented because they are all directly dependent on the final decision to be made by the Government on the final flood mitigation option; in particular the Besut River bunds. The Government has indicated its commitment to complete all of these remaining works.

2. Upgrading Irrigation for Improved Water Management

8. **Infrastructure Improvement.** The Project aimed to improve irrigation canals, drainage channels, and farm roads. The project achievements, compared with the appraisal targets, are shown in Table 1.

Table 1: Infrastructure Improvement–Appraised and Actual

Subcomponent	Target	Achievement	Target (percent)
Improvement of tertiary canals	117 km	117 km	100
Improvement of secondary and tertiary drains	76 km	96 km	126
Rehabilitation of secondary canals	10 km	15 km	150
Construction of farm roads	95 km	113 km	119

Source: Project Office.

9. **Training in Water Management.** The Project aimed to provide local short-term training courses for selected farmers and project staff at the National Water Management Training Center, Kota Bharu. In addition, international training was to be provided to selected project staff and faculty of the training center. The project achievements considerably exceeded appraisal targets (Table 2).

Table 2: Training in Water Management

Subcomponent	Target[a]	Achievement	Target (percent)
Training for farmers in water management	15 groups	19 groups (490 farmers)	127
Training for farmers in improved paddy cultivation[b]		127 groups (4,805 farmers)	
Field trips for project staff	24 staff	111 staff	>100
Training for project staff in water management and related topics	3 groups (24 staff)	56 groups (1,945 staff)	>100
International training for			
farmers		3 groups	>>
project staff		(30 staff)	

[a] Based on training plans approved by ADB.
[b] Inclusive of the farmer leader conference (7 groups comprising 652 farmers) and farmer trips (20 groups comprising 571 farmers).

10. The Project was to establish pilot farms to demonstrate efficient water management practices. One 20 ha pilot area, comprising farms owned by 10 farmers, was established at Kg. Kubang Depu to demonstrate water management control practices. Further pilot farms are planned by the Project Management Unit (PMU), with a target of one for each of the 39 groups that comprise the whole of the project area.

3. Agricultural Support Services

11. The appraisal targets for this component include (i) shallow drainage of bris soils for 250 ha of tobacco production; (ii) development of about 500 ha of new fruit tree plantings, 100 ha of chillies, and 100 ha of melons (Table 3); (iii) construction of new office accommodation for executing agencies; and (iv) strengthening of Department of Agriculture resources in the project area by providing incremental staff, vehicles, and equipment (Appendix 2).

Table 3: Agriculture Support Services

Subcomponent	Target (hectare)	Achievement (hectare)	Target (percent)
Introduction of tobacco production	250	270	108
New fruit tree plantings	500	370	74
New chilli production	100	80	80
New melon production	100	95	95

Source: Project office.

4. Consulting Services

12. The Government provided funds for all consulting services required for the Project, including the services used to implement the flood mitigation subcomponents, and the studies related to subcomponents not implemented. The Drainage and Irrigation Department (DID) provided design and supervision services for the irrigation improvement component. The appraisal estimated that 198 person-months would be required for the flood mitigation component. By June 1999, the Government had utilized about 180 person-months of domestic consulting services for construction supervision of the completed facilities.

5. Project Management

13. The Project was managed by the PMU and project director responsible for the Besut Agricultural Development Project (BADP).[2] It was chaired by the secretary-general, Ministry of Agriculture (MOA), and was structured as designed at appraisal. The PSC and implementation committees assisted in project implementation.

6. Construction Quality, Operation and Maintenance, and Drainage Fees

14. The quality of construction of the major civil works, the Besut River mouth improvements and the fishing jetty, is considered excellent; the works are being operated and maintained in good condition using both federal and state resources and funds made available by the Fisheries Authority. The lower reaches of the Besut River are regularly dredged to remove about 50,000-100,000 cubic meters of sand and gravel deposits with funds provided by the state. The upgraded irrigation and drainage works are well constructed and maintained, but project staff reported that irrigation and drainage services fees are not being charged to the farmers. However, farmers are given the opportunity to clean drains and canals based on a nominal rate per meter depending on the size of the canal and paid under contract by DID. Service fees will not likely be introduced soon because of the proposal to change the irrigation systems into more commercial enterprises. At the

[2] Loan 36(SF)/37-MAL: *Besut Agricultural Development Project*, for $3.3 million, approved on 22 September 1970 and completed in July 1978.

present time, the state charges a very low nominal rate of RM9/ha/year for irrigation through property tax assessments.

B. Implementation Arrangements

15. MOA was the Executing Agency responsible for the overall supervision and execution of the Project. MOA assigned specific roles to the agencies concerned, adopting the same procedures agreed upon for similar ADB-assisted rural development projects in Malaysia. The flood mitigation, drainage, irrigation, river mouth improvements, jetty construction, and on-farm water management training components were implemented by DID, while the agriculture support services and the women's training component were implemented by the Department of Agriculture (Appendix 3).

16. The PMU was responsible for the day-to-day management and implementation. The project director reported to the PSC and coordinated all activities and operations of departments and agencies involved in implementation. The PSC, which was established for the Besut Agricultural Development Project, was chaired by the secretary general of MOA, and was responsible for coordinating, monitoring, reviewing, and evaluating the progress of project implementation and the initial operation of the facilities. The other members of the PSC were the state secretary of Terengganu, and the heads of DID, the departments of environment and agriculture, Farmers' Organization Authority, Federal Agricultural Marketing Authority, and other federal and state departments and agencies.

C. Project Costs

17. At appraisal, the total project cost was estimated at $54.68 million equivalent, consisting of $20.49 million in foreign exchange costs and $34.19 million equivalent in local currency. The actual costs amounted to $49.14 million, of which $13.97 million was the foreign exchange cost and $35.17 million equivalent the local currency cost. ADB’s financing amounted to $13.28 million equivalent, representing 95 percent of the foreign exchange costs, or 27 percent of the total project cost. The loan covered only the Project’s base cost. This was based on the agreement between the Government and ADB to exclude the physical and price contingencies and interest during construction. The reasons for the exclusions were that in certain past projects, the allocations for physical and price contingencies were not utilized, or were canceled during implementation, requiring the Government to pay higher commitment charges (Appendix 4). The Government has given its assurance that it will provide all funds required to meet the implementation of the flood control measures as soon as a decision is made as to which option is most viable. However, no funding is provided in the 8th Malaysia Plan, except for additional studies.

D. Project Schedule

18. The Project was originally to be completed over five years—commencing in mid-1991. This was based on the assumption that construction would start immediately after the declaration of loan effectiveness because detailed designs for the irrigation component were completed and land acquisition for the Besut River bunds was expected to commence soon thereafter. However, several delays occurred, including, (i) loan effectiveness was delayed by one year, (ii) engagement of the construction supervision consultants was behind schedule, (iii) misunderstandings developed on ADB's requirements and guidelines, and (iv) land acquisition for the Besut River bunds never occurred because Government agencies could not agree on the most appropriate method for controlling the floods and land prices spiraled out of control. As

a consequence of these delays, project implementation as completed took nine years, and the major flood control works were not completed as envisioned at appraisal. However, because the area is a designated key granary area, the Government is committed to complete all of the works. The implementation schedule is shown in Appendix 5.

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

19. No international consultants were recruited for the Project. MOA selected and engaged the domestic consultants in accordance with procedures acceptable to ADB; the Government used its own resources to finance the consulting services. The consultants were engaged for the flood control component as appraised, which amounted to RM1.913 million, to help prepare the detailed engineering design and tender documents, supervise construction, and commission completed work. In addition, and not foreseen at appraisal, DID commissioned additional detailed studies involving an additional RM0.593 million of consulting services. These studies were to refine the design of civil works, and evaluate various flood mitigation options (Appendix 1).

20. Procurement of civil works, goods, and services was generally undertaken in accordance with the arrangements as shown in the loan agreement. However, when necessary, amendments to agreed arrangements were considered and approved by ADB, as in the following cases: (i) December 1992—adoption of direct purchase and direct negotiation procedures for minor civil works contacts valued at not more than the equivalent of $20,000, with retroactive financing to the date when the loan became effective; and (ii) July 1992—waiver of prequalification requirements for contracts valued below $1.0 million, with the understanding that only contractors on the central registered contractors' list would be engaged for the Project. Under this procedure, ADB's approval of contract awards was on a post-facto basis. These actions allowed for flexibility and improved implementation.

F. Performance of Consultants, Contractors, and Suppliers

21. The performance of the consultants, contractors, and suppliers was generally satisfactory. The work was generally carried out on time and met all of the technical requirements expected. However, extensions were required for the design consultants due to additional terms of reference, particularly for more flood evaluation, and revisions to the jetty and river mouth improvements. The construction quality is considered good to excellent and meets internationally accepted standards.

G. Conditions and Covenants

22. The Government generally complied with the major conditions and covenants under the loan, except for those indicated in Appendix 6. The major covenants that were not complied with include (i) the bonding requirement for international training, primarily because it involved only short-term training of government staff; (ii) collection of irrigation and drainage fees to recover operation and maintenance costs other than RM9/ha/year through land tax; and (iii) environmental monitoring. The Government delayed the submission of audited financial statements although the Project prepared annual unaudited ones that were available. Delays in submission were reported to be due to the heavy workload of the Auditor General's Office.

H. Disbursements

23. The Project was approved in December 1990 and became effective in November 1991. The first disbursement under the loan was made in December 1992, two years after loan approval. During implementation, two partial loan cancellations were made, namely $507,000 allocated for incremental operation costs, canceled in December 1992; and $657,000 allocated for vehicles, canceled in March 1997. These cancellations lowered the loan amount to $13.28 million.

24. The loan proceeds were for the foreign exchange base cost of the Project. Disbursement of funds under the loan was slow because of delays in the award of contracts eligible for financing under the loan, and delays in the submission of withdrawal applications to ADB in view of the project staff's unfamiliarity with ADB disbursement procedures. Total disbursements at loan closing amounted to $13.28 million, or 89 percent of the original loan amount (Appendix 7). Actions taken during project implementation to improve progress and maximize withdrawal of funds under the loan included the following: (i) an increase in the statement of expenditure ceiling from RM50,000,[3] and subsequently to $200,000; (ii) extension of statement of expenditure to cover loan categories relative to irrigation rehabilitation, buildings, procurement of office equipment, and furniture; and (iii) disbursement of funds on a first-come, first-served basis across loan categories, and a reallocation of loan funds among categories on a post-facto basis. ADB also approved an extension of the loan closing date up to 30 September 1999 to maximize and finalize disbursement of funds under the loan.

I. Environmental and Social Impacts

1. Environmental

25. The appraisal noted that while the environmental impact of the appraised Project was positive, it raised concerns about ensuring maintenance of forest reserves in the upper catchment for sediment control. These concerns still apply. Appraisal requirements about preserving riparian strips along tributaries have not been heeded as construction of the Besut River bunds has not yet proceeded. The PMU is monitoring the situation at the river mouth. At appraisal, the Department of Environment was expected to provide environmental monitoring services during project implementation; however, the department's responsibilities were not defined in detail and therefore no support was provided. As of this date, no action on environmental monitoring has been taken by any concerned agency.

26. The Project has not exacerbated the sedimentation problem at the river mouth because the main cause is clearly the movement of sand stored in the river system, which is generally moved downstream as sand dunes during high floods. Land clearance by the Federal Land Development Authority in the upper catchment area has accelerated erosion in local areas. The impact of the irrigation improvements has generally been positive (Appendix 8).

2. Social

27. The project area has benefited from several development programs funded by the Government during the past 10 years. These programs provided improved rural infrastructure for transportation, financial services, rural crafts and industries, and medical facilities, which

[3] The statement of expenditure procedure amount was not included in the Loan Agreement but was agreed to during the early years of implementation.

have all contributed to increased general economic activities. Socioeconomic impacts of the rehabilitated irrigation schemes were favorable. Farmers in the project area indicated that prior to the improvement of irrigation facilities, men from the villages commonly left to work as construction workers in Singapore. The Project's irrigation infrastructure made year-round farming activities possible and reversed the out-migration trend.

28. With the rehabilitated irrigation schemes, farmers had to give up traditional rainfed paddy production, which allowed them to follow their own individual schedule, in order to adopt more coordinated irrigated farming; farmers served by a common irrigation channel must prepare their fields simultaneously. The loan appraisal pointed out that success of the Project would depend on the farmers' acceptance of and conformity to irrigated farming technology. Farmers' organizations supported by the Government and the Project were successful in bringing about an understanding of coordinated irrigated farming and promoted participatory decision making among farmers in the project area. The general livelihood of farmers has greatly improved (Appendix 9).

J. Performance of the Borrower and Executing Agency

29. The Borrower and MOA performed satisfactorily during implementation. The PMU provided excellent office facilities, transportation, and support services at the project office. The PMU staff carried out their tasks in a professional manner; the unit is well staffed with sufficient engineers, technicians, and administrative personnel to complete the Project. The Government had serious financial concerns about the most appropriate solution to flood control and thus did not provide funds for land acquisition for the Besut River bunds. The cost of the land acquisition spiraled out of control and the national Economic Planning Unit decided not to proceed with purchasing it. This decision was appropriate considering the rising costs and concerns that the works would not be completed. However, the Borrower did provide funds for river mouth works and the fishing jetty that could be satisfactorily accomplished during the implementation period while awaiting a decision on flood control. The Government took a significant risk in rehabilitating the irrigation systems as none of the flood protection measures were in place. In January 1996, the Borrower made a sound financial decision to reduce foreign debt payments by asking ADB to expedite disbursements under the loan by financing across categories and on a first-come, first-served basis to reduce commitment charges. Presently, the PMU is considering constructing a small dam at Paya Peda, a tributary of the Besut River, to augment water supplies and a major flood control dam on the Besut River at Kg. Batu 13. Only the Kg. Batu 13 dam would have any major impact on reducing flooding, but it is not planned for implementation until after 2010 if at all because it has serious negative environmental impacts and resettlement concerns that will affect its viability.

30. The Monitoring and Evaluation Division of MOA was expected to carry out benefit monitoring and evaluation (BME) reporting with particular emphasis on the farmers concerned and their families during implementation. Routine data was expected to be compared with baseline information of 143 rural households collected in 1990. Project staff reported that BME data was collected and submitted to MOA on a routine basis but was not submitted to ADB during implementation. However, no special BME unit was set up by the PMU to collect or analyze data or assess the impacts during implementation. Inaccurate records and staff transfers during implementation made it nearly impossible to compare past and present socioeconomic data. No information on socioeconomic changes of target beneficiaries is therefore available either through the Project or other government agencies in the area after 1990. The PMU has scheduled a BME review study to commence in late 2000, at the request of MOA. Based on preliminary data, the

situation has improved considerably for farming due to improvements in the irrigation facilities although the area is still at considerable risk of flooding.

K. Performance of the Asian Development Bank

31. ADB performed in a relatively satisfactory manner during implementation although the project design and administration had some deficiencies. ADB carried out 11 review missions during implementation, identified major problems, and brought them to the attention of the Government and ADB in a timely manner. ADB continued to change project administration officers during implementation that resulted in lack of continuity. In addition, ADB recognized that the flood control aspects of the Project were totally dependent on land acquisition for the Besut River bunds. Because of this, the Project should probably not have been processed until the issue of land acquisition was completely resolved.

III. EVALUATION OF INITIAL PERFORMANCE AND BENEFITS

A. Financial Performance

32. Because the flood control component of the Project has yet to be completed, the impact of the Project on farm incomes has been limited to the following

(i) Annual farm income for a farm of 2.3 ha in the 5,000 ha area with irrigation rehabilitation works completed under the Project increased by RM3,450. As rice yields increase through to 2010, this incremental income is estimated to increase to RM7,800 per annum.

(ii) Annual incomes of farmers receiving assistance under the Project for the development of additional areas of tobacco increased by RM4,290/ha; vegetables, RM6,825/ha; and fruit, RM27,525/ha (once the trees are at full maturity).

33. These impacts are additional to the incremental returns to labor generated by the Project.

34. The Project's on-farm employment impacts will have created 570 new jobs by 2000, increasing to around 740 new jobs when full agricultural benefits take effect in 2008.

35. The upgrading of the fishing jetty at Kuala Besut has enabled the expansion of fishing activities at the port. The Project led to the creation of approximately 375 offshore and onshore jobs for local residents; this number is expected to grow to 605 by 2005 (Appendix 10).

B. Economic Performance

1. Economic Internal Rate of Return

36. An economic internal rate of return (EIRR) of 11.4 percent has been estimated for the base case of the Project. This does not include the uncompleted flood control component; completion of this component is uncertain. This compares with an EIRR of 16.7 percent estimated at appraisal for the much larger project (i.e., including flood control). Negative factors affecting the Project's economics since appraisal include a higher capital cost, longer than anticipated implementation period, lower international price for rice and competition for Kuala

Besut port from the new port facilities at Tok Bali at the mouth of the Semerak River only a few kilometers up the coast. However, the EIRR remains slightly under 12 percent reflecting the inherently high returns from achieving higher cropping intensities and yields for paddy from rehabilitating irrigation schemes where the major costs for the underlying infrastructure are sunk from the point of view of economic analysis (Appendix 10). In estimating these EIRRs, the negative environmental benefits of the Project were not taken into account as the exact damages had not been measured, assessed or valued at the time of the PCR mission. Inclusion of environmental damages in the quantitative analysis would lower the Project's EIRR.

2. Sensitivity Analysis

37. The EIRR for the Project drops by 0.5 percent with (i) a 10 percent reduction in paddy benefits, (ii) keeping fishing benefits at their current levels instead of assuming further growth, or (iii) including the flood mitigation investigation and design costs in the Project's economic costs. A 1 percent drop in the EIRR occurs if the fruit benefits are halved.[4] The sensitivity testing indicates that the project EIRR is not particularly sensitive to changes in key assumptions.

C. Attainment of Benefits

1. Initial Performance

38. The completion of the Besut River mouth improvements and the new jetty have resulted in more intensive use of the harbor facilities. The benefits of the irrigation improvement were felt progressively as each of the 39 group areas within the irrigation system was improved, and the crop yield increases are reflected in the economic performance.

2. Expected Benefits

a. Quantified Benefits

39. In 2000, the estimated value of increased agricultural production benefits (paddy, tobacco, vegetables, and fruits) as a consequence of the Project is RM7.72 million per annum. This is estimated to rise to RM25.28 million by 2010. In addition, project benefits from fishing activities at Kuala Besut are estimated to increase from RM3.11 million in 2000, rising to RM5.01 million in 2005.

b. Nonquantifiable Benefits

40. Tourism benefits result from the development of more reliable boat services from Kuala Besut to offshore islands. The Project also receives benefits from improved transportation links and construction of roads within the project area. Disease risk has been reduced due to more efficient on-farm water management, and innovative nonchemical pest control measures have resulted in reduced chemical use in paddy production activities.

c. Impact on Beneficiaries

41. Statistics from the Terengganu State Economic Planning Unit show that the number of households living under the national poverty criterion in the state has declined consistently from 30 percent in 1989, to 17 percent in 1995, to 1 percent in 1999. The number of hard core

[4] No sensitivity testing in relation to inadequate maintenance of the Project has been undertaken. The Government is expected to maintain the integrity of the upper levels of the irrigation system, while farmers' organizations are continuing to adequately maintain the upgraded facilities under the umbrella of farmers' organizations.

poverty households (households with income less than half of the poverty line) has also declined from 5.4 percent in 1995 to 3.3 percent in 1999.

42. Poverty reduction in the project area was due in part to the overall economic growth of the country and a series of development activities funded by the federal and state governments for Besut District. In particular, the Government's Poverty Alleviation Program (1995-1999) for hard core poverty households in fisheries has been most effective in lifting the small fisher households above the hard core poverty level in the project area. Poverty reduction is also due in part to the implementation of some components of the Project, namely upgrading irrigation, training in water management, and agriculture support services. In addition to the impact in the agriculture sector, the improvement of the river mouth and the upgrading of the jetty at Kuala Besut have directly improved the working conditions of labor in the fisheries industry and improved their income-earning opportunities.

d. Farmers' Organizations

43. In addition to four farmers' organizations established by the Government and functioning in the project area, the Project established 39 water user groups for farmers. Group members elect management positions including chair, secretary, and treasurer every two years. Each group covers an area of about 150 ha. The activities of water user groups extend beyond water use activities into other aspects of agriculture management such as training, input purchasing, labor contract arrangements, provision of credit to group members, and arrangement for transportation of outputs. Women, who make up 30 percent of membership, are active participants but not active in management positions.

e. Training for Women in Income-Generating Activities

44. While all activities under the loan agreement have been implemented, the sustained impacts on women carrying out income-generating activities have been limited. Two international training activities on food processing for female project staff were supported by the Project. Ten staff were trained in Indonesia and 25 in Thailand. A total of 452 women were trained in food processing and handicrafts in 22 training courses organized by the Project. At the time of the Project Completion Review Mission, only 40-60 women were continuing with their group activities. The main beneficiaries of the training program appear to be women from urban households with higher incomes. Involvement of women from farm households has been limited due to such factors as where and when the training course is held, availability of credit and marketing assistance of products, and nonparticipation of husbands.

f. Training Provided by the Project and Impact on Beneficiaries

45. The Project provided training to 7,833 participants of which 7.5 percent were women. Twenty-six percent of total participants were project staff and 74 percent were farmers or housewives, largely from urban areas. Farmers were trained in water management, paddy cultivation improvement, and food processing. Starting in 1993, the Project also supported farm leaders in the water management group to hold annual farmer leadership conferences to exchange their experiences and lessons learned. Of the training given to project staff, two international training courses in the Republic of Korea and the Philippines on water management and in women in development were supported by the Project. Through training provided by the Project, the capacity of DID staff has significantly improved, and farmers' training has resulted in improved water management and improved farm practices (Appendix 9).

IV. THE TECHNICAL ASSISTANCE

46. ADB funded a small-scale TA to prepare a second phase project.[5] The study covered fringe areas around the Project totaling about 2,500 ha of paddy, and flood studies on the Setiu River basin. The final report was completed in August 1992 and provided sufficient information for a follow-up investment loan in the Setiu River basin. However, due to delays under phase 1, the Government did not request ADB assistance to implement phase 2. However, since the completion of the study, civil works, financed by the Government, have commenced where designs have been finalized. In addition, the Government commissioned an additional detailed design of a reach of the Setiu River for which an interim report was completed in October 2000.[6] The TA was carried out satisfactorily but was done too early to be of much use to either ADB or the Government.

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

47. The criteria for rating project success are based on the *Guidelines for Preparation of Project Performance Audit Reports*, and cover relevance, efficacy, efficiency, sustainability, institutional development, and other impacts.

48. **Relevance.** The Project was high on the Government's and ADB's development strategy at the time of appraisal but due to the significant improvements in the poverty situation in the area, is now less so for ADB. The project area is still high on the Government's priority areas as it is one of the major granary areas of Malaysia and they are committed to completing the flood control works in the next two decades.

49. **Efficacy.** The Project achieved most of its development objectives by improving agricultural production and reducing poverty. Nevertheless, the flood mitigation measures were not completed placing the area at risk to flooding. The project preparatory TA for phase 2 was carried out too early and did not lead to a pipeline project for ADB although the Government is now implementing some of the TA's recommendations. Monitoring of the environment is not being carried out on a regular basis even though environmental concerns were identified during the appraisal. ADB expected that the results of the advisory TA for the environment under Loan 992-MAL would be adopted for this Project however the project office did not establish either an environmental or a BME unit.

50. **Efficiency.** The Project was prepared too early and implementation was delayed due to land acquisition problems and designs not being agreed upon by all concerned parties for the flood control works. Agriculture production did increase due to improvement in the irrigation systems but this was risky as none of the flood control works have been constructed. The river mouth was improved and a fishing jetty was constructed that provided for a landing facility for fishing boats. The scope was not reformulated at midterm even though ADB and the Government knew that the river bunds (levees) would not be constructed as well as many of the major civil works. Expectations remained high that the Project would be completed as designed during the implementation period. The Project nearly met the expected economic rates of returns and was cost effective in the sense that the Government was practical in not starting

[5] TA 1310-MAL: *Northern Terengganu Rural Development Project*, for $99,000, approved on 4 June 1990.
[6] Government of Malaysia. 2000. Detailed Design, Construction Supervision and Commissioning of Drainage, Flood Mitigation, River Mouth Improvement and Associated Works for Setiu River, Interim Report II, Kuala Lumpur.

works that could not be completed; such as the flood bunds and the diversion barrages. The Project achieved an EIRR of 11.4 percent as compared to the 16.7 percent estimated at appraisal for the base case. The Government was pragmatic during the 1997 Asian financial crisis by requesting ADB to finance across categories on a first-come, first-served basis, which helped to reduce their foreign debt burden. The Government had established a very competent team to manage the Project and continues to staff it with well-qualified professionals. They did have occasional difficulty providing counterpart funding.

51. **Sustainability.** The Project has a likely probability of sustainability as demand for grains is growing, flood protection is needed for the area, and the federal and state governments have accepted responsibility. The main concern is the commitment by the Government to provide the funds needed for the capital works. Even though the Government is committed to developing the area during the next two decades, rising costs and needs in other regions of Malaysia may constrain the availability of funds for this Project. The state has agreed to provide adequate funds to maintain the flood control works, once constructed, as well as the river outlet and through property taxes, a small portion is dedicated to irrigation improvements. After a decision is made on the method to operate the irrigation schemes, the private sector will likely take over their operations and maintenance.

52. **Institutional Development and Other Impacts.** The project office is well staffed with dedicated professionals committed to operating the systems in a sound manner. The skill levels of the project staff are high and the growing economy has lifted the area out of poverty as a direct result of the Project. The Government should implement environmental monitoring and address the upper watershed problem areas. The project management, as well as the local population, are committed to developing the area; however, the Government should improve the areas that were damaged during construction; in particular to the wetlands to restore them as much as possible.

53. **Overall Assessment.** Based on the above criteria, the Project is rated as partly successful (Table 4).

Table 4: Project Performance Rating Assessment

Criterion	Weight	Rating Description	Rating Value
Relevance	20%	Partly Relevant	1.00
Efficacy	25%	Less Efficacious	1.00
Efficiency	20%	Efficient	2.00
Sustainability	20%	Likely	2.00
Institutional Development and Other Impacts	15%	Moderate	2.00
Overall Assessment[a]		**Partly Successful**	**1.55**

[a] Highly successful: overall weighted average (OWA) > 2.5; successful: 2.5 $\geq$ OWA > 1.6; partly successful: 1.6 $\geq$ OWA > 0.6; unsuccessful: OWA $\leq$ 0.6.

B. Lessons Learned

54. The following were lessons learned:

(i) In general, inclusion of mutually dependent components in projects, such as flood mitigation works to protect rehabilitated irrigation systems, requires that special attention be given to flood mitigation as land acquisition is often the major problem.

(ii) The TA to prepare a second phase project was carried out too early and no investment or pipeline resulted.

(iii) BME units should be established at the start of a project under the direction of a project office and be fully supported with adequate resources during implementation. This activity should initially be financed by ADB, with nongovernment organization involvement; this would assure greater likelihood of success in establishing baseline information, and developing a system of collection and data analysis.

(iv) If upper watershed protection is considered important to the achievement of project objectives, and reliance and budgeting is the responsibility of other agencies to implement the programs, ADB and project staff should closely monitor developments and immediately raise any concerns.

(v) Successful training programs for women in this region should include husbands in training and include provision of credit and training in marketing.

C. Recommendations

1. Project Related

55. Project-related recommendations include the following:

(i) The Government should identify the sources of sediment in the Besut River and implement corrective actions for the upper watersheds. This is especially important if the Government decides to construct the Kg. Batu 13 dam to mitigate floods.

(ii) The Government should take action to protect areas from flooding as soon as possible and in the most cost-effective way, in order to protect the agricultural areas, settlements, and towns situated along the Besut River.

(iii) ADB should not schedule the Project Performance Audit Report mission until most of the physical works on the flood control measures are completed.

2. General

56. General recommendations include the following:

(i) The processing of projects, in particular flood control projects where final designs and land acquisition are required, should be delayed until the final design solution is accepted by all concerned parties and land acquisition is nearly complete.

(ii) Because flood mitigation projects have the potential for significant environmental impacts, such projects should be closely monitored by ADB's Environment Division. Loan conditions should be written so they are effective and enforceable by the Government.

(iii) TA, regardless of the type, should be based on timing for the completed study and not necessarily as outlined at appraisal.

(iv) Projects should maintain project administration staff during implementation to provide consistency of administration, improve understanding of problems and concerns, and improve relationships with executing agencies.

APPENDIXES

PROJECT COMPONENTS: FLOOD MITIGATION, DRAINAGE, AND IRRIGATION

A. The Project Background

1. The Northern Terengganu Rural Development Project was designed to improve the income and social well-being of the communities in the project area. This was to be primarily done by a series of investments in flood mitigation and drainage facilities and irrigation improvement, with supporting support services and training.

2. The Project, as appraised, comprises the following components: (i) constructing of flood mitigation and drainage facilities including river mouth improvements and jetty; (ii) upgrading the irrigation infrastructure and providing training for improving on-farm water management; (iii) providing support services for tobacco production, crop diversification, consolidation of paddy production, and training of women in income-generating activities; and (iv) providing consulting services for detailed engineering design and construction supervision.

3. The original implementation schedule anticipated that the irrigation improvement would be implemented over the first three years of the Project. The reason for the planned early start on irrigation works was that the designs were at an advanced stage and little if any land acquisition was anticipated. The flood protection works were to be constructed from the third to the sixth year. The reason for the predicted delay in actual construction was the time estimated to finalize designs and land acquisition for the bunded flood works. The assumptions for irrigation works proved to be reasonably accurate. However, the assumptions for the flood mitigation and drainage works were overly optimistic. This mismatch in timing created several problems for project performance insofar as the Asian Development Bank (ADB) is concerned, and for the Government in realizing returns on project investments in the long term.

4. Studies have been made of controlling floods from the Besut catchment dating back to the 1960s and before. The most relevant studies to the Project commenced in the late 1980s, and these are reviewed in this appendix to illustrate the difficulty that the Government had in finalizing design proposals.

B. Flood Mitigation and Drainage Component

1. The Appraised Project

5. This component as appraised comprises seven interrelated subcomponents:

(i) River Bunds: 47 kilometers (km) of bunds constructed along both sides of the Besut River;

(ii) Jerteh Bridge: improvements to flood passage capability;

(iii) Drainage Conduits: piped entry to bunded channel to allow drainage water to be removed;

(iv) Pengkalan Low Weir: correction of operating deficiencies;

(v) Besut Barrage: improvement to gates and associated erosion control works;

(vi) Besut River Mouth Improvement: two breakwaters to stabilize the mouth and reduce silting; and

(vii) Jetty: construction of 70 meter (m) long jetty on south bank at the mouth.

6. The Project implemented the river mouth improvement and the jetty. Problems with finalizing the flood mitigation proposal based on river bunds meant that all other subcomponents could not proceed, within the project period, as they were dependent on the river bund subcomponent. The reasons for the delays are outlined in the next section.

2. The River Bund Subcomponent

7. The river bund proposal was one of the recommendations of the Besut Flood Mitigation Project (July 1988) prepared for the Drainage and Irrigation Department (DID). This study recommended the river bunds plus a low dam at Paya Peda, the latter for conservation storage to meet shortfalls in the irrigation supplies for the Besut Irrigation Scheme. Other options investigated included a conservation and flood control dam at Kg Batu 13, in lieu of the river bunds. All options included a single southern breakwater to stabilize the river mouth at the end of the bunded reach.

8. The Government approached ADB for assistance in preparing a project for ADB-financing based on the aforementioned study. A small-scale project preparatory technical assistance (TA) provided the basis of subsequent ADB appraisal.[1] This report described a project that was a modification of the Kumarasivam Tan and Ariffin Sdn. Bhd. (KTA) feasibility study, in that two breakwaters were proposed, bund freeboard increased to 1 m, and no emergency spillway was provided for. The KTA recommendation for a dam at Pay Peed was not included in the study, at the request of the Government.

9. ADB proceeded rapidly with processing and the appraisal report of November 1990 was the result—the technical recommendations of the TA were adopted without change. The loan for the Project was signed in December 1990.

10. A detailed feasibility study, commissioned by DID, looked in detail at proposed river bund and river mouth improvement works.[2] This study confirmed the details of the river bund and river mouth works using sophisticated modeling techniques. By this time, according to the appraisal implementation schedule, the river bund construction was to be started.

11. The Government was also looking at the Paya Peda Dam (an element of the original 1988 KTA recommendation) and commissioned a detailed feasibility study.[3] This study recommended a larger dam than KTA, on the basis that it would serve a greater range of water demands, particularly in the KETARA Phase 2 area—south of the Project and outside of the Government-designated granary areas.

12. DID became concerned about the appraisal subcomponent proposal to repair gates at Besut Barrage, following the Ranhill and Tonkin and Taylor study, which looked at various options including substantive and expensive refurbishing, and a new barrage structure. DID commissioned a further study from Ranhill,[4] which recommended that a new barrage structure be constructed.

13. By this time, the Government was moving away from the appraisal design, and was encountering problems with the river bund investigations. DID had commissioned the consultant

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[1] TA 1310-MAL: *Northern Terengganu Rural Development Project (Phase I)*, for $99,000, approved on 4 June 1990.
[2] Besut Flood Mitigation and River Mouth Improvement Project. Ranhill Bersekutu Sdn. Bhd and Tonkin and Taylor International Ltd NZ. September 1993.
[3] Feasibility Study of Paya Peda Dam. ACE (Pak) and Jurutera Perunding Zaaba. July 1995.
[4] Comparative Study of Besut Barrage. October 1998.

to proceed with the final design and land acquisition for all of the project engineering works, including the river bund proposal. Preparation of the river bund design was delayed. The Land Office insisted that the consultants use a registered survey company to carry out the survey work, and considerable delays resulted. By 1995 a substantial amount of final design work had been completed, and the consultant produced a complete set of final plans for the river bunds in draft form in June 1998.[5]

14. In the meantime, the appraisal estimate for land acquisition for the river banks was under review. The Project instructed the Valuation Office to purchase 42 hectares (ha) at Pasir Akr in 1994. Based on recent sales in the area (of private land to the Federal Government for institutional buildings), the cost of the land acquired averaged over RM130,000/ha. The original overall average cost assumed by the appraisal report—RM50,000/ha—was based on 1987 valuations. The Valuation Department estimated that more valuable land in developed areas like Kg Raja could cost up to RM450,000/ha. In 1995, the consultant, based on this advice, and an increase in area required for the bund—47 km at appraisal—estimated that land acquisition costs would be RM105 million compared with appraisal estimate of RM35 million. Given the cost increases, the Economic Planning Unit (EPU) of the federal Government instructed DID to investigate alternatives to the bund proposal as then formulated. The Project Steering Committee in May 1999 formally deferred the river bund proposal as formulated at appraisal, and decided to proceed with the review and the final design of a new Besut Barrage.

15. In response to these developments, DID commissioned a study, Review of Besut Flood Mitigation Project and Detailed Design of Besut Barrage in May 2000, but Treasury approval was not received until October 2000, when the study commenced. The study includes a review of the two dams at Paya Peda and Kg Batu 13, alternative of dredging the river to reduce the need for extensive bunds, extension of dredging of the Besut harbor basin some 1.5 km upstream of the Kuala Besut Bridge, and design of a new Besut barrage. Computer and physical modeling studies are involved. The results will not be known until mid-2002.

16. Prior studies indicate that many problems are associated with the dam sites being investigated. The first is the problem of sediment storage. Average bed load inflows to the Paya Peda dam are estimated at about 52,000 cubic meters (m^3)/year, and for the Kg Batu 13 dam at 100,000 m^3/year. Dredging requirements at Kuala Besut will be of the same order without the dams. Substantial land acquisition costs and resettlement of up to 500 families and more than 2,000 persons at Kg Batu 13 will be difficult issues to resolve. Without this dam, substantial bunding will likely be required.

17. The Government started the Project with full intentions to carry out the flood mitigation work as at appraisal, and were seriously and separately looking at the Paya Peda Dam, as recommended in the 1988 KTA report. Detailed studies commissioned by Government after the Project commenced questioned the appraisal formulation technically. Unforeseen land acquisition costs associated with the river bund proposal were sufficient to attract the attention of federal EPU and the deferment of this appraisal component was then inevitable.

18. These issues and their consequences for the Project should have been obvious to ADB by late 1995, but no appropriate action was taken to reformulate the Project. It was clear by 1996 that there were no prospects for implementing the Flood Mitigation Control as appraised within the Project period.

[5] Besut Flood Mitigation and River Improvement Works, Package 3, Construction of Flood Bunds and Associated Works.

3. River Mouth Improvement

19. The final design and construction of the river mouth improvement works was carried out in line with the appraisal design. These works were completed in April 1998.

4. Jetty

20. The appraisal included the construction of a new jetty facilities some 70 m long on the southern side of the Kuala Besut harbor and associated sheds. Roofing of an adjoining and existing T-shaped jetty constructed by the Fisheries Board of the State Government was included in the Project. This work was completed in October 1995, and included a new jetty 240 m long. The discrepancy between the length assessed at appraisal and eventually built, is not known.

5. Other Subcomponents

21. The remaining subcomponents—Besut Barrage and Pengkalan Low Weir improvements, Jerteh Bridge, and Drainage Conduits—have not been started because of the uncertainties with the River Bunds subcomponent.

B. Upgrading Irrigation for Improved Water Management

1. Infrastructure

22. The appraisal design included the construction of an additional 117 km of tertiary canals, and 76 km of secondary and tertiary drains. In addition, 10 km of existing secondary canals were to be rehabilitated and 95 km of new farm roads were to be constructed.

23. The project achievements were as follows: tertiary canals (117 km, 100 percent), secondary and tertiary drains (73 km, 96 percent), rehabilitation of secondary canals (15 km, 150 percent), and construction of farm roads (113 km, 119 percent). The works have been carried out to a satisfactory standard, and have improved the supply dynamics of the irrigation system considerably.

2. Training in Water Management

24. The appraisal included training for project staff in water management at the National Water Management Training Center (NWMTC), short-term courses for selected farmers (15 groups) from the project area; a bus for transporting trainees; and international training for project staff and staff of NWMTC. Pilot areas were to be developed to demonstrate improved on-farm water management practices.

25. The Project exceeded all targets in this subcomponent: water management training for farmers (19 courses, 490 participants), training in paddy cultivation for farmers (100 courses, 3,582 farmers), training of project staff (56 courses, 1,945 participants), and international training for selected staff (1 trip, 5 participants).

VEHICLES AND EQUIPMENT

Table A2.1: Vehicles and Equipment, Costs as Appraised and Actual
($'000)

	At Appraisal						Actual					
Vehicles/Equipment/Specification	**Unit Cost**	**PMU**	**DID**	**DOA**	**Total No.**	**Total Cost**	**Unit Cost**	**PMU**	**DID**	**DOA**	**Total No.**	**Total Cost**
A. Vehicles												
Office car	30	1	1		2	90						
Bus (44 passengers, auto door)	37	1			1	7						
4-Wheel Drive (net payload 600 kg)	19	4	5	3	12	128						
Small Bus (25 passengers, auto door)	19	1			1	19	57,987.34	4			4	231,945.38
Subtotal (A)		**7**	**6**	**3**	**16**	**344**						
B. Construction, Survey, and Office Equipment												
Lorry (net paylod 5 1/2 ton, STD body)	37	2	4		6	222	70,250.00	2			2	140,500.00
Small lorry (net payload 3 1/2 ton, STD body)	19			1		19						
Tractors (65/80 HP, 2/4 wheel drive)	19	18	5	1	1	199	49,200.00	18			18	885,600.00
Bulldozer (200 HP, track wheel, front bucket)	56		1		21	50						
Backhoe (75 HP, Bucket 1.0 m^2												
Ditch bucket (0.3 m^2)	67		2			130	97,000.00	1			1	97,000.00
Excavator (120 HP, Bucket 0.5 m^2												
(hydraulic)	93					80						
Grader (120 HP, Scraper with												
4.5m, 4-wheel d)	81		1			1						
Roller (Gross weight 8 ton, 58 HP												
Ballast-water	26				1	1						
Mobile Kitchen	34					14	38,445.58	1			1	38,445.58
Food Processing	4				10	40						
Office Equipment	67	3	3		7	469						
Subtotal (B)		**23**	**16**		**53**	**1,666**						
Total		**30**	**22**	**17**	**69**	**2,010**						

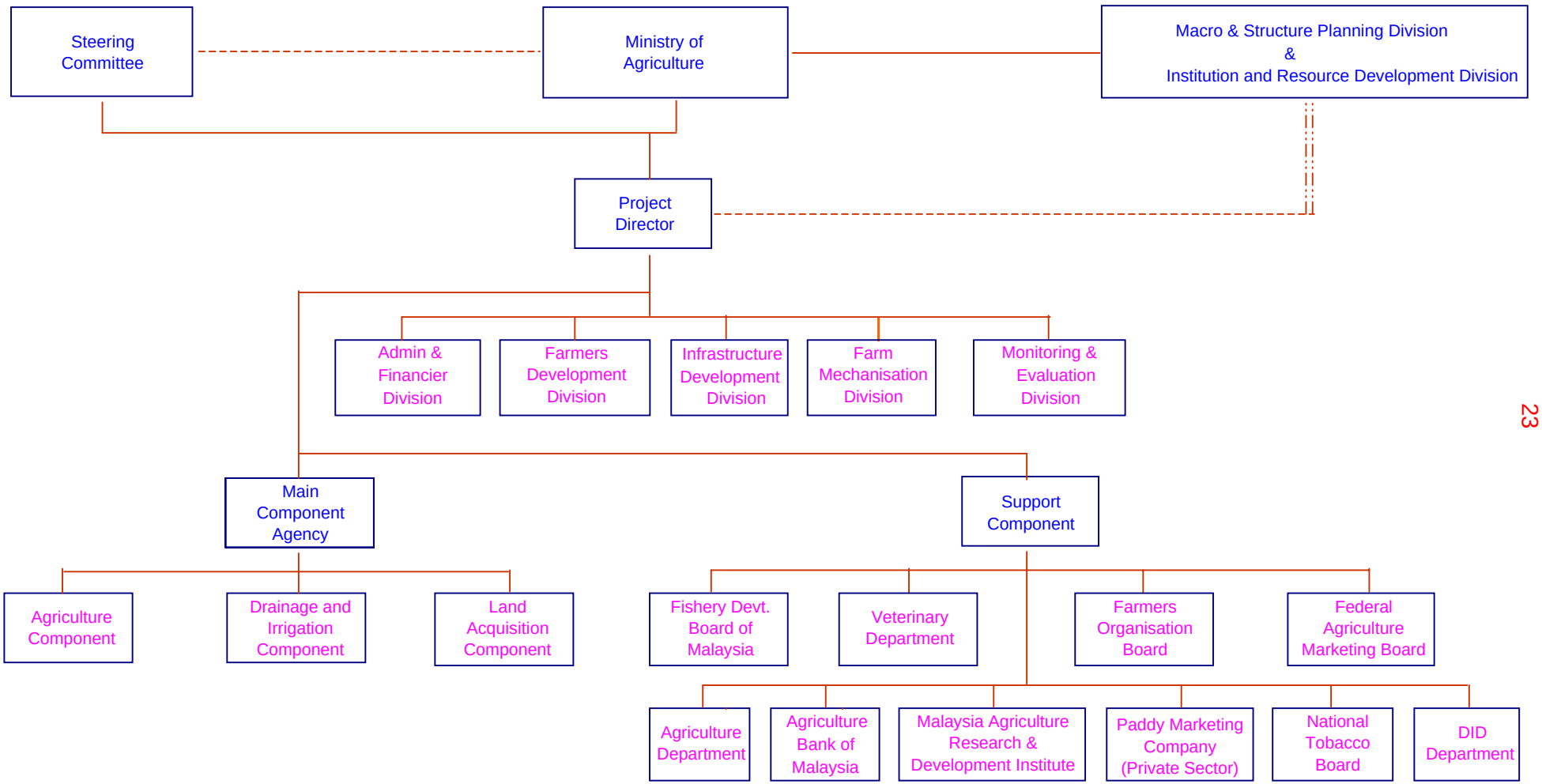
DID = Drainage and Irrigation Department, DOA = Department of Agriculture, PMU = Project Management Unit.

Source: Project Management Unit.

Table A2.2: Vehicles and Equipment Financed, Disbursed and Actual

Contract No.	Description	Amount Financed (RM)	Amount Disbursed (RM)	Contract Date	Actual (RM)
0001	Vehicles and Office Equipment	360,443.00	360,443.00	14 Oct 92	231,949.39
0003	Backhoe Loader (1 Unit)	150,525.00	150,525.00	11 Jan 93	97,000.00
0004	Heavy Duty Lorry (1 Unit)	36,311.02	36,311.02	30 Dec 92	70,250.00
0005	Portable Water Pum & Access (2 Unit)	28,408.50	28,408.50		37,100.00
0006	Typewriter, Kenwood Chef	1,526.40	1,526.40	30 Dec 92	850.00
0007	Video Tape (1 Unit) Direct Projector (1 Unit)	4,116.96	4,116.96	30 Dec 92	4,350.00
0018	Rotary Tiller (Celli)	281,178.00	281,178.00	19 Aug 93	4,410.00
0021	Mobile Kitchen (1 Unit)	39,223.00	39,223.00	13 Apr 94	38,445.53
0053	Office & Food Processing Equipment Electrical Machinery, Apparatus & Appliances	47,291.40	47,291.40	04 Apr 96	38,840.00
0067	Tractors (2 Units)	88,560.00	88,560.00	17 Dec 97	98,400.00
0068	Water Pumps (5 Units)	39,951.00	39,951.00	24 Jul 97	44,390.00
	Total	**1,077,534.28**	**1,077,534.28**		**665,984.92**

ORGANIZATION CHART



PROJECT COST AND FINANCING PLAN

($ million)

Component	Per Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Flood Mitigation and Irrigation						
1. Flood Mitigation and Drainage						
a. Besut River Flood Mitigation						
Civil Works	4.108	3.499	7.607	0.318	0.487	0.805
Land Acquisition		9.726	9.726	0.000	0.225	0.225
Subtotal (a)	**4.108**	**13.225**	**17.333**	**0.318**	**0.712**	**1.031**
b. Besut River Mouth Improvement						
Civil Works	3.400	2.896	6.296	4.050	6.213	10.263
Land Acquisition		0.130	0.130	0.000	2.877	2.877
Subtotal (b)	**3.400**	**3.026**	**6.426**	**4.050**	**9.090**	**13.140**
c. Jetty						
Civil Works	0.300	0.256	0.556	0.965	1.475	2.440
Land Acquisition					0.684	0.684
Subtotal (c)	**0.300**	**0.256**	**0.556**	**0.965**	**2.159**	**3.124**
d. Consultancy for Detailed Design and Construction Supervision						
Domestic	0.000	1.078	1.078	0.000	3.544	3.544
Foreign	0.000	0.093	0.093	0.000	0.000	0.000
Subtotal (d)	**0.000**	**1.171**	**1.171**	**0.000**	**3.544**	**3.544**
Subtotal (1)	**7.808**	**17.678**	**25.486**	**5.333**	**15.505**	**20.838**
2. Irrigation						
a. Besut Irrigation Scheme						
Civil Works	3.820	3.254	7.074	7.087	10.837	17.924
Land Acquisition	0.000	1.611	1.611	0.000	5.024	5.024
Subtotal (a)	**3.820**	**4.865**	**8.685**	**7.087**	**15.861**	**22.948**
b. Water Management Training and Demonstration						
International Training	0.111		0.111	0.029	0.000	0.029
Local Training		0.074	0.074			
Water Management Pilot Farm	0.046	0.046	0.092			
Subtotal (b)	**0.157**	**0.120**	**0.277**	**0.029**	**0.000**	**0.029**
Subtotal (2)	**3.977**	**4.985**	**8.962**	**7.116**	**15.861**	**22.977**

Component	Per Appraisal Foreign Exchange	Per Appraisal Local Currency	Per Appraisal Total Cost	Actual Foreign Exchange	Actual Local Currency	Actual Total Cost
3. Administration and Management						
a. Office Buildings						
Civil Works	0.040	0.034	0.074	0.582	0.891	1.473
Land Acquisition						
Subtotal (a)	**0.040**	**0.034**	**0.074**	**0.582**	**0.891**	**1.473**
b. Vehicles and Equipment						
Vehicles	0.110	0.012	0.122	0.139	0.015	0.155
Equipment	0.786	0.087	0.673			
Subtotal (b)	**0.896**	**0.099**	**0.995**	**0.139**	**0.015**	**0.155**
c. Recurrent Costs (Incremental)	0.000	1.681	1.681	0.000	1.394	1.394
d. Administration Costs	0.062	0.534	0.596	0.264	0.398	0.662
e. Operation and Maintenance	0.318	0.825	1.143	0.039	0.597	0.637
Subtotal (c,d,e)	**0.380**	**3.040**	**3.420**	**0.303**	**2.390**	**2.693**
Subtotal (3)	**1.316**	**3.173**	**4.489**	**1.025**	**3.296**	**4.321**
Subtotal (A)	**13.101**	**25.836**	**38.937**	**13.374**	**34.662**	**48.136**
B. Agriculture Support Services						
1. Drainage for Tobacco Area						
Civil Works	0.094	0.080	0.174	0.064	0.055	0.119
Land Acquisition						
Subtotal (1)	**0.094**	**0.080**	**0.174**	**0.064**	**0.055**	**0.119**
2. Land Development for Vegetables and Fruits						
Civil Works	0.450	0.383	0.833	0.091	0.078	0.168
Land Acquisition						
Subtotal (2)	**0.450**	**0.383**	**0.833**	**0.091**	**0.078**	**0.168**
3. Office Buildings (DOA)						
Civil Works	0.061	0.052	0.113	no expenditures incurred		
Land Acquisition						
Subtotal (3)	**0.061**	**0.052**	**0.113**	**0.000**	**0.000**	**0.000**
4. Office Buildings (PMU)						
Civil Works	0.240	0.204	0.444	no expenditures incurred		
Land Acquisition						
Subtotal (4)	**0.240**	**0.204**	**0.444**	**0.000**	**0.000**	**0.000**
5. Vehicles						
PMU	0.143	0.016	0.159	0.300	0.033	0.333
DOA	0.050	0.006	0.056			
Subtotal (5)	**0.193**	**0.022**	**0.215**	**0.300**	**0.033**	**0.333**

DOA = Department of Agriculture, PMU = Project Management Unit.

Component	Per Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
6. Equipment						
PMU	0.546	0.061	0.607	no expenditures incurred		
DOA	0.160	0.018	0.178			
Subtotal (6)	**0.706**	**0.079**	**0.785**	**0.000**	**0.000**	**0.000**
7. Recurrent Costs						
PMU		0.885	0.885	0.000	0.093	0.093
DOA		0.604	0.604			
Subtotal (7)		**1.489**	**1.489**	**0.000**	**0.093**	**0.093**
8. Administration Costs						
PMU	0.062	0.535	0.597	0.026	0.252	0.278
DOA	0.018	0.171	0.189			
Subtotal (8)	**0.080**	**0.706**	**0.786**	**0.026**	**0.252**	**0.278**
9. WID Training						
Subtotal (9)	**0.074**	**0.189**	**0.263**	**0.017**	**0.000**	**0.017**
10. BME						
Subtotal (10)		**0.037**	**0.037**	**0.000**	**0.000**	**0.000**
Subtotal (B)	**1.898**	**3.241**	**5.139**	**0.499**	**0.510**	**1.009**
Subtotal (Base Cost)	**14.999**	**29.077**	**44.076**	**13.973**	**35.172**	**49.144**
Physical Contingency (10%)	1.500	2.908	4.408			
Price Escalation	1.703	2.205	3.908			
Interest During Construction	2.288	0.000	2.288			
Total	**20.490**	**34.190**	**54.680**	**13.973**	**35.172**	**49.145**
	37	**63**	**100**	**28**	**72**	**100**

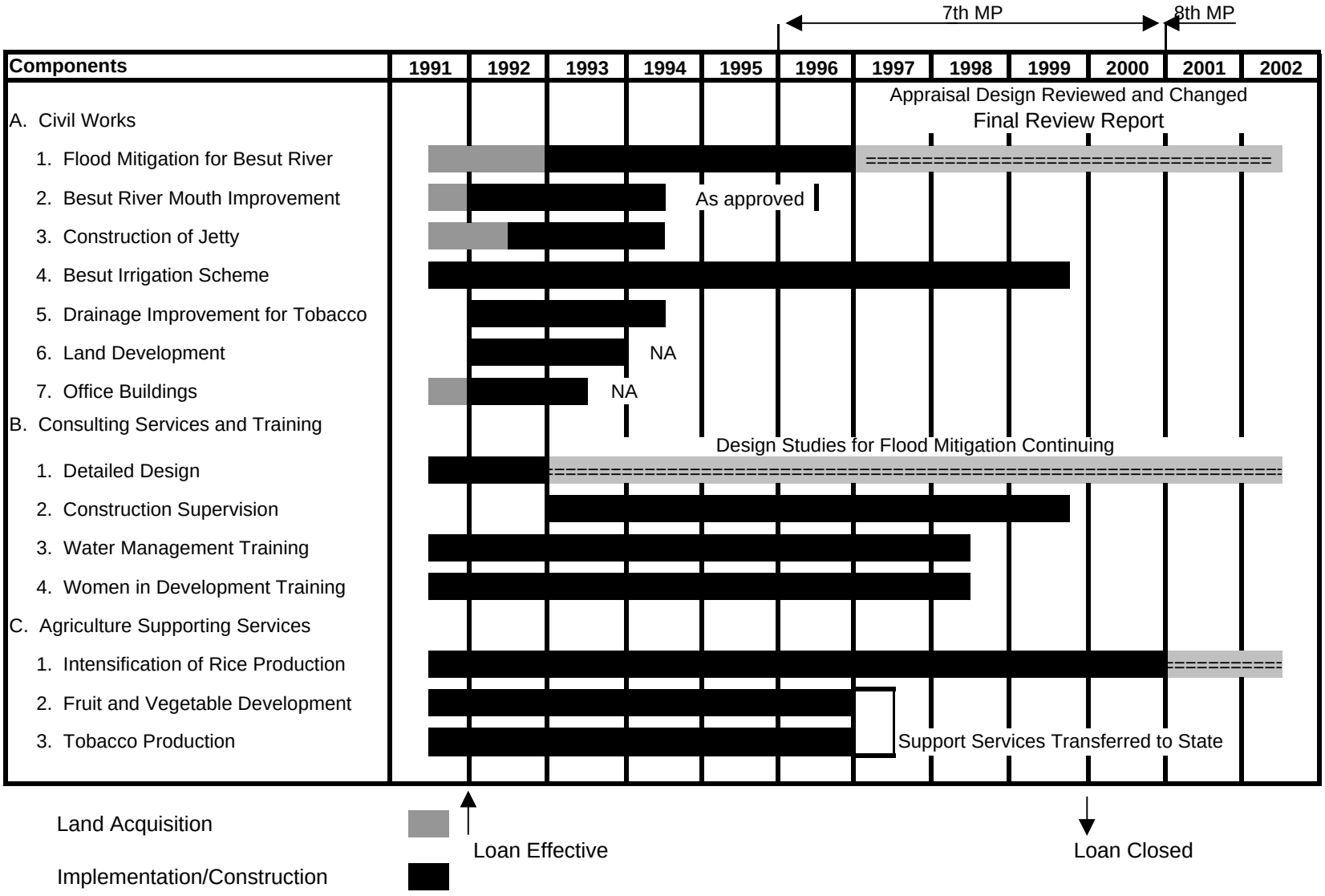
BME = benefit monitoring and evaluation, WID = women in development.

Project Financing

Item	Per Appraisal				Actual			
	Foreign Exchange	Local Currency	Total Cost	% of Financing	Foreign Exchange	Local Currency	Total Cost	% of Financing
ADB	15.000	0.000	15.000	27	13.281	0.000	13.281	27
Government	5.490	34.190	39.680	73	0.692	35.172	35.864	73
Total	**20.490**	**34.190**	**54.680**	**100**	**13.973**	**35.172**	**49.145**	**100**
%	**37**	**63**	**100**		**28**	**72**	**100**	

ADB = Asian Development Bank.

IMPLEMENTATION SCHEDULE



MP = Malaysia Plan, NA = not applicable.

STATUS OF COMPLIANCE WITH LOAN COVENANTS

Loan Covenant	Reference	Status
Project Executing Agency		
The Ministry of Agriculture (MOA) will be responsible for parts A, B, C(i) and C(iii) Flood Mitigation and Drainage and Irrigation Components; the Department of Agriculture (DOA) for parts C(ii) and C(iv) – (v) Agricultural Support Services.	Schedule 6, para. 1	Complied with.
Project Management Unit and Project Director		
The existing Project Management Unit (PMU), which is in charge of the Besut Agricultural Development Project (BADP), financed by the Asian Development Bank (ADB) under Loan 36(F)/37-MAL, will be strengthened to function as the PMU for the Project and be responsible for the day-to-day project management and implementation. The PMU will be headed by a project director with qualifications and experience satisfactory to ADB.	Schedule 6, para. 2	Complied with.
Project Steering Committee		
The existing project steering committee (PSC), originally established for the BADP, with the addition of representatives of the Department of Environment (DOE), the Terengganu State Department of Irrigation and Drainage, and other related agencies will function as PSC for the Project. The PSC will be responsible for coordinating, monitoring, reviewing, and evaluating project implementation.	Schedule 6, para. 3	Complied with.
Training		
The Drainage and Irrigation Department (DID) will prepare a five-year training program on water management under part B(ii)(a) and (b) of the Project and inform ADB of this. DID will prepare and submit through the PMU to ADB for approval of a five-year program for international training for women in income-generating activities under part C(v) of the Project, all by December 1991.	Schedule 6, para 4(a)	Partially complied with. International training was carried out, but a 5-year program for women in development was not submitted to ADB.

Loan Covenant	Reference	Status
DID and DOA will enter into bonding arrangements with international trainees, as appropriate.	Schedule 6, para. 4(b)	Not complied with, because the international training for staff was short-term.
Complementary Programs		
DOA, Federal Agricultural Marketing Authority, Farmers' Organization Authority, Bank Pertanian Malaysia, and concerned agencies, will extend to the Project area the extension services, technical support, credit, and other support services for effective project implementation.	Schedule 6, para. 5	Complied with.
Marketing of Fruits and Vegetables		
The Federal Agricultural Marketing Authority will prepare an operational plan for the marketing of fruits and vegetables grown in the project area.	Schedule 6, para. 6	Complied with.
Operation and Maintenance (O&M)		
The PMU will operate and maintain the project facilities during project implementation. Upon project completion, the responsibility for O&M of the project facilities will be transferred to the state government of Terengganu.	Schedule 6, para. 7(a)	Complied with. O&M was routinely and carried out by the Project for the main system. Farmers are paid to maintain an on-farm system based on standard rates per meter based on the size of the canal. Major river mouth structures have not required routine O&M although dredging was carried out. The fishing jetty is the responsibility of the fishing cooperative.
The Borrower will provide adequate funds including foreign exchange resources in a timely manner as required for effective O&M of the project facilities during and after project implementation.	Schedule 6, para. 7(b)	Complied with (para 8[a]).

Loan Covenant	Reference	Status
The Borrower will ensure that irrigation and drainage fees are collected from the farmers within the project area to recover O&M cost. The Borrower will review the levels and methods of O&M cost recovery with a view to achieving full cost recovery.	Schedule 6, para. 7(b)	Not complied with. A small water fee at the rate of RM9/hectare/year is collected through the land tax, and goes directly to state revenues.
Project Benefit Monitoring and Evaluation (BME)		
MOA will carry out BME of the socioeconomic impact of the Project with particular emphasis on the benefits to the farmers concerned and their families. BME reports assessing the benefits from those portions of the Project that have been completed will be submitted to ADB by MOA during project implementation. A BME review study examining the benefits derived from each component will be prepared by Monitoring and Evaluation Division within two years following the loan closing date in accordance with terms of reference to be agreed upon by ADB and MOA.	Schedule 6, para. 8	Partially complied with. Reports prepared by the PMU during implementation were submitted to MOA. No BME reports were sent to ADB. A socioeconomic study is expected to begin in 2000.
Land Acquisition and Water Rights		
The state government of Terengganu will acquire land or rights for land, water, or privileges required for the Project.	Schedule 6, para. 9	Complied with for all works except the Besut River bunds. The high cost of land along the Besut River has required new options for flood control. This is still under study.
Paddy Production		
The Borrower will ensure that (i) paddy production is concentrated only in the granary areas designated by the Borrower for intensive paddy production through productivity improvements; and (ii) paddy production outside such granary area is gradually phased out, wherever feasible.	Schedule 6, para. 10	Complied with.

Loan Covenant	Reference	Status
Environmental Protection		
Permanent Forest Reserves. The Borrower will ensure that the three permanent forest reserves in the catchment area of the Besut River will not be converted into agricultural land, and that the current land cover will be maintained extending at least 100 meters on both sides of the Besut River.	Schedule 6, para. 12	Assumed complied with. No evidence is available to indicate that Government has controlled land use change in the upper catchment and along the tributaries.
Use of Pesticides. The Borrower will ensure the use of pesticides and fertilizers in the project area are in accordance with the provisions in ADB's *Handbook on the Use of Pesticides in the Asia and the Pacific Region.*	Schedule 6, para. 12	Complied with.
Environmental Monitoring. DOE will carry out regular monitoring of the environmental impact of the Project during its implementation and take appropriate mitigating measures, as required.	Schedule 6, para. 12	Not complied with. No regular monitoring was carried out. DOE prepared an evaluation of the Project area as part of the Government's project completion report. No major impacts were cited.
Provision of Funds, Facilities, etc.		
The Borrower will cause the Project to be in accordance with plans, design standards, specifications, acceptable to the Borrower and ADB.	Schedule 6, para. 12	Complied with for the work completed. Due to many changes in the flood control plan, most of the major civil works have not yet been constructed.
Submission of Plans, Designs, etc.		
The Borrower will cause the Project to be in accordance with plans, design standards, and specifications acceptable to the Borrower and ADB.	Article IV, Section 4.03(b)	Partially complied with. ADB was not involved in the review of final designs.

Loan Covenant	Reference	Status
The Borrower will (i) cause DID and DOA to maintain separate accounts for their respective parts of the Project, (ii) ensure that DID and DOA have such accounts and related financial statements audited annually in accordance with sound auditing standards by auditors acceptable to ADB; (iii) furnish to ADB, as soon as available but in any event not later than six (6) months after the end of each related fiscal year, unaudited copies of such accounts and financial statements; and not later than nine (9) months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and related reports of the auditors, all in English language.	Article IV, Section 4.06(b)	Complied with.
Progress Report		
The Borrower will cause DID and DOA each to prepare and submit to the PMU progress reports (3 times per year) on the carrying out of their respective parts of the Project and the O&M of the project facilities, and cause the PMU to consolidate these reports and submit them to MOA and ADB. The consolidated reports will be submitted within six weeks of the end of the four-month period.		Partially complied with. The progress reports were generally submitted late. The reports were simple and easy to interpret. However, they did not include a detailed analysis of problems, issues or recommendations.
Project Completion Report		
Promptly after physical completion of the Project, but in any event not later than six months thereafter or such other date as may be agreed for this purpose between the Borrower and ADB, the Borrower will prepare and furnish to ADB a report, in such form and detail as ADB will reasonably require.	Article IV, Section 4.07(c)	Complied with. Submitted to ADB in November 2000.

UTILIZATION OF LOAN PROCEEDS

Table A7.1: Allocation of Loan Proceeds

($'000)

Item	Original Allocation	Reallocations/(Cancellations)				Revised Allocation	Amount Disbursed
		19 Nov 1992[a]	6 Jan 1991[b]	19 Jan 2000[c]	Total		
	1	2	3	4	5=2+3+4	6=1-4	7
Civil Works							
01A - Part A	7.808			0.000	(2.058)	5.750	5.750
01B - Part B	3.820			0.000	2.464	6.284	6.284
01C - Part C	0.885			0.000	(0.133)	0.752	0.752
Vehicles							
02A - Part A	0.602		(0.136)	0.000	(0.479)	0.123	0.123
02B - Part B	0.294		0.285	0.000	(0.063)	0.231	0.231
02C - Part C	0.899		(0.806)	0.000	(0.807)	0.092	0.092
Training							
03A - Part B	0.111			0.000	(0.069)	0.042	0.042
03B - Part C	0.074			0.000	(0.066)	0.008	0.008
Incremental Operating Cost							
04	0.507	(0.507)		0.000	(0.507)	0.000	0.000
Total	**15.000**	**(0.507)**	**(0.657)**	**0.000**	**(1.719)**	**13.281**	**13.281**

[a] Asian Development Bank approved partial cancellation of $657,000 allocated for vehicles due to a decrease in the number of vehicles required for construction.

[b] Cancellation of $507,000 allocated for incremental operation costs was approved by ADB in December 1992 based on the Government's assurance that it would provide financing for expenditure in operation and maintenance.

[c] Final reallocation and cancellation of undisbursed funds were effected at loan closing date.

Table A7.2: Yearly Contract Awards and Disbursements

($)

Year	Original Loan Amount	Contract Awards			Disbursements		
		Cumulative	For theYear	%	Cumulative	For the Year	%
	1	2	3	4=2/1	5	6	7=5/1
1992	15,000,000	0	0		0	0	
1993	15,000,000	1,144,656	1,144,656		671,916	671,916	
1994	15,000,000	2,258,737	1,114,081		1,628,890	956,974	
1995	15,000,000	5,002,931	2,744,194	33	4,234,484	2,605,594	28
1996	15,000,000	9,716,017	4,713,086	65	7,501,873	3,267,389	50
1997	15,000,000	11,372,904	1,656,887	76	9,980,103	2,478,230	67
1998	15,000,000[a]	12,686,762	1,313,858	85	12,329,519	2,349,416	82
1999	15,000,000	13,280,997	594,235	89	13,278,510	948,991	89
2000	15,000,000	13,281,102	105	89[a]	13,281,102	2,592	89[a]

[a] Based on approved loan amount. Loan amount was reduced to $14.343 million in 1991 and to $13.836 million in 1992.

ENVIRONMENTAL IMPACT

A. Appraisal Concerns

1. The appraisal report identified four areas of environmental concern: (i) need to maintain about 65,000 hectares (ha) of permanent forest reserves in the catchment area and of riparian reserves extending 100 meters (m) on either side of the Besut River and its tributaries to ensure sustainable watershed management; (ii) design and construction of river mouth works, including the breakwaters and groynes, to minimize sedimentation in the estuary from littoral drift and erosion up-current from the breakwaters; (iii) drainage of the tobacco area by shallow and gated structures to prevent lowering of the groundwater table; and (iv) management of areas inside the bunds using vegetative cover to minimize erosion.

2. The Department of Environment (DOE) was expected to undertake monitoring of the Project during the construction period and provide the Project Management Unit (PMU) with timely advice and recommendations for implementing appropriate measures. The DOE expertise was expected to be strengthened under the technical assistance (TA) for Environmental Impact and Evaluation,[1] which was part of the Semerak Rural Development Project (SRDP).

3. The appraisal anticipated that improving the irrigation systems could worsen waterborne disease problems.

B. Experience with Project Implementation

1. Watershed and Upper River Issues

4. The main concerns of the appraisal for the need to protect the upper watershed remain valid. The permanent forest reserves status given to the hill areas of the upper catchment under the National Forestry Act (1984) was assumed to ensure that upper watershed problems would not arise. The Project Completion Review Mission noted that Federal Land Development Authority (FELDA) land clearance in the 1980s and 1990s for oil palm is generating considerable sediment in the form of sand to the river system. The Project has not monitored this development. Given the nonimplementation of the river bunds and associated works on barrages and other structures, the Project has not had an impact on areas upstream of the river mouth.

2. River Mouth Issues

5. The appraisal noted concerns with river mouth sedimentation caused by the construction of the breakwaters and the jetty. Sedimentation at the mouth of the Besut River will likely remain a chronic problem, with or without the river mouth works. Estimates of bed load at the mouth from the river itself vary from 75,000 to 100,000 cubic meter (m^3)/year without river bunds and 150,000 m^3/year with the river bunds.

6. The Besut River is highly productive in terms of sediment bed load compared with the adjacent rivers in Terengganu. Sources of sediment of concern to the river mouth are dominated by sediment already in the riverbed. Primary sources of sediment are likely the land clearance activities from FELDA's oil palm activities, and erosion from logging roads left after

[1] TA 1231-MAL, *Environmental Impact Monitoring and Evaluation*, for $350,000, approved on 23 November 1989.

approved logging under license has been undertaken. Any upper watershed rehabilitation program will not likely alter the sediment situation in the foreseeable future, and regular dredging will be required well into the future.

7. Some 600,000 m^3 of sediment were dredged from the river mouth in 1986. Surveys after a moderate monsoon flood period in the 1986/87 monsoon season indicated that 60,000 m^3 of sand, primarily from the river side, had entered the excavation. Clearly the need for regular dredging will continue, with or without the proposed river bunds, and monitoring as suggested at appraisal needs to continue.

3. Irrigation Developments

8. The improvement to the secondary and tertiary irrigation canals, involving concrete lining in most instances, has had a generally beneficial environmental effect. The Project has probably not worsened the disease situation.

4. Monitoring

9. Socioeconomic benefit monitoring is being carried out in the project area by the Project. The Project also monitors the engineering condition of the breakwaters after heavy storms, and carries out surveys of river mouth conditions before and after the monsoon period.

10. The appraisal expectation that DOE would take an interest in environmental monitoring has not come to pass. The TA influence on DOE expertise is not known, but DOE will not likely become involved without direction and budgetary support. Given that studies are under way to review the flood mitigation plans for the future, initiation of a formal environment monitoring activity under the Project Management Unit (PMU), as soon as possible, would be timely.

IMPACT ON BENEFICIARIES

A. Financial Impacts

1. Because the flood mitigation component of the Project has yet to be undertaken, the financial impact of the Project on households within the project area has been limited to increased agricultural production benefits (paddy, vegetables, and fruit) and the benefits to those involved in the fishing industry as a consequence of the new sea works and the upgraded jetty at Kuala Besut.

1. Farm Incomes

2. For farmers in the 5,000 hectares (ha) area with the new irrigation facilities, cropping intensity now averages around 190 percent as compared with 152 percent prior to the project works. Yields have also increased from an average of 3.27 metric tons (t)/ha before the Project to 4.1 t/ha in 2000 and are projected to increase to 5.5 t/ha by 2010. On the basis of an average farm size of 2.3 ha per farm (from the Project Management Unit [PMU]), a financial farm-gate price of RM0.79 kilogram (kg) and production costs of RM1,480/ha (Table A9.1), the incremental income for these farm households averages RM3,450 in 2000, rising to RM7,800 in 2010 if an average yield of 5.5 t/ha is achieved.

Table A9.1: Crop Budgets

Crop	Item	Amount	Price (RM)	RM/ha
Paddy				
Revenue	Yield	4.1 mt/ha	790/t	3,239.0
Cost	Land Prep 1st	1	150	60.0
	Land Prep 2nd	1	100/t	30.0
	Seed	100/kg	1/kg	100.0
	Urea	100/kg	0.3/kg	30.0
	NPK	250/kg	0.6/kg	81.0
	Lime	2.5 mt	100/t	250.0
	Chemicals	1	280	280.0
	Land Tax	1	5/crop	5.0
	Combine Harvester	1	270	270.0
	Labor	25 days	15/day	375.0
				1,481.0
Net Revenue				**1,758.0**
Water Melons				
Revenue	Yield	23 t/ha	300/t	6,900.0
Cost	Land Prep	1	250	250.0
	Seed	250 g	0.85/g	212.5
	Chicken Manure	3 mt	100/t	300.0
	NPK	700 kg	0.6/kg	420.0
	Lime	3 mt	100/t	300.0
	Chemicals	1	250	250.0
	Plastic Covers	20 rolls	45/roll	900.0
	Water Pump Petrol	1	90/ha	90.0
	Plastic Bags for Seed	1	17	17.0
	Land Tax	1	5/crop	5.0
	Labor	100 days	15/day	1,500.0
				4,244.5
Net Revenue				**2,655.5**

Crop	Item	Amount	Price (RM)	RM/ha
Chillies				
Revenue	Yield	12 mt/ha	1,750/t	21,000.0
Cost	Land Prep	1	400	400.0
	Seed	0.5 kg	50/kg	25.0
	Chicken Manure	5	100/t	500.0
	NPK	3,000 kg	0.6/kg	1,800.0
	Lime	3 mt	100/t	300.0
	Chemicals	1	500	500.0
	Plastic Covers	35 rolls	45/roll	1,575.0
	Other Costs	1	550/ha	550.0
	Land Tax	1	5/crop	5.0
	Labor	290 days	15/day	4,350.0
				10,005.0
Net Revenue				**10,995.0**
Tobacco				
Revenue	Yield	4.5 mt/ha	800/t	10,400.0
Cost	Labor	1,500 kg	15/kg	3,900.0
	Other Costs	1	2,210/ha	2,210.0
				6,110.0
Net Revenue				**4,290.0**
Rambutan				
Revenue	Yield	4.5 mt/ha	1,500/t	6,750.0
Cost	Labor	1,500 kg	15/kg	225.0
	Other Costs	1	535/ha	535.0
				760.0
Net Revenue				**5,990.0**
Durian/Lansium				
Revenue	Yield	12 mt/ha	2,500/t	30,000.0
Cost	Labor	12,000 kg	15/kg	1,800.0
	Other Costs	1	675/ha	675.0
				2,475.0
Net Revenue				**27,525.0**

ha = hectare, NPK = Nitrogen Phosphorus Potassium, t = ton.
Source: Project Office.

3. Because all harvesting of paddy in the project area is now done by combine harvester, employment growth as a consequence of the irrigation component is limited. However, as a result of the cropping intensity increase, around 215 new on-farm jobs were created by 2000.

4. The additional areas of tobacco, vegetables, and fruit are relatively small, but for individual farmers fortunate enough to have been covered by these aspects of the Project, the financial benefits are significant. For example, for farmers with an additional 1.0 ha holding of tobacco and vegetables (assumed to be a 50/50 combination of chilies and watermelon) developed under the Project, the financial returns (excluding returns to labor) are RM4,290 and RM6,825 per annum, respectively. The fruit trees developed under the Project are only just starting to bear fruit. However, when these trees reach full maturity (by around 2008) the net

returns for a farmer with a 1.0 ha holding will be around RM27,525 per annum (Table A9.1 provides crop budgets).

5. The promotion of tobacco, vegetables, and fruit by the Project led to the creation of about 355 new on-farm jobs in 2000. This will rise to 525 new jobs by 2008 when the fruit trees established reach full maturity.

2. Nonfarm Incomes

6. The Project has resulted in substantially increased employment opportunities associated with fishing at Kuala Besut. In 2000, the additional value of fish landed was around RM10 million (Fisheries Department, Kuala Besut). Data gathered during the Project Completion Review Mission indicated that on-board labor costs were around 25 percent of the landed catch value, and that fishers on average earned about RM10,000 per annum (RM40 per day, 25 days per month, 10 months per year). This implies that by 2000, the Project had generated 250 new jobs at sea. Fishing industry sources interviewed during the Mission indicated that around half of these jobs are taken by foreigners (Thais) on either foreign- or Malaysian-owned boats. On the other hand, for each job generated at sea another is likely generated on land for the maintenance of the fishing boats and equipment; provisioning of the boats; and the unloading, storage, distribution, marketing, and processing of the fish (albeit at an average wage rate of only about half that for on-board fishers). Therefore, the development of the fishing industry at Kuala Besut by the Project has created up to around 375 jobs in the project area. By 2005, this is expected to grow to around 605 new jobs.

B. Poverty and Social Impacts

1. Poverty in Malaysia

7. The incidence of poverty among Malaysians is moderate and manageable. Remarkable progress has been achieved in poverty reduction as the consequences of high economic growth following industrialization and widespread government interventions. Incidence of poverty is estimated on the basis of the poverty line income, which takes into account the minimum requirements for food, clothing and shelter, and other basic expenditures. The national poverty line was defined as RM4,560 per family per year in 1990 and RM5,520 per family year in 1999. For Malaysia as a whole, poverty incidence, which was 17.1 percent in 1990, reduced to 10 percent in 1999. Rural poverty has declined from 21.8 percent to 11.0 percent in the same period.

8. Among rural poor households, 72 percent have access to electricity, 65 percent have access to safe drinking water, 88 percent live within 9 kilometers of either a government or private clinic, and 94 percent have access to primary education.

2. Poverty Alleviation Program

9. Since the 1970s, the Government has successfully implemented various programs and projects on poverty eradication.

10. The poverty alleviation program has two major categories:

(i) Rural poor with land suitable for agriculture. For this group of rural households, the approach has been to provide better technology and various other incentives. Rice farmers have been provided with high yielding varieties, improved irrigation

facilities, and direct subsidy of 140 kg of fertilizer/acre. Other crops and livestock productivity improvement programs have also been implemented.

(ii) Rural poor without land or with land not suitable for agriculture. For this group of rural households, the approach has been to move them out of poverty sectors into nonpoverty sectors. This has normally been done by resettling farmers to new land development schemes organized by different governmental agencies, particularly Federal Land Development Authority.

11. The Government classifies the poor into (i) the hard-core poverty group, those with income less than half of the poverty line and (ii) the poor whose income is below the poverty line but not less than half of the poverty line. The Development Program for the Poorest was implemented for the hard-core poverty group. The program encompassed income generating projects and the inculcation of positive values, such as self-reliance and hard work, as well as provision of direct welfare assistance. A summary of poverty alleviation programs is presented in Tables A9.2 and A9.3.

Table A9.2: Summary of Rural Development Strategies and Poverty Reduction Programs in Malaysia

	Strategy	Brief Description of Programs
1.	Area Development	
	Agricultural Development	This strategy was implemented as the Integrated Area Development Project (IADP) based on the concept of site development to improve productivity and incomes of farmers. A package of physical and economic infrastructure, social amenities, technology, inputs, and agricultural support services is provided.
	Regional and Land Development	Large-scale regional and land development projects involve resettlement of landless or marginal farmers into land schemes. Package of physical, economic, and social infrastructures, and amenities is provided.
	Land Consolidation and Rehabilitation	Uneconomic holdings in existing agricultural and rural areas are consolidated and rehabilitated to improve farmers' productivity and incomes.
2.	Agricultural Support Services and Subsidies	Institutional and agricultural support services such as extension, training, input and price subsidies, research, marketing, etc. are provided to reduce real costs of production and increase production efficiency.
3.	Assisting Smallholders and Traditional Farmers	Assistance and funds are provided for replanting rubber, pineapple, and coconut; and for crop diversification and multicropping strategies.
4.	Rural Industrialization	Agricultural resource-based industries and rural handicrafts are expanded to create employment and supplement rural incomes.
5.	Social Development	
	Social Amenities	Basic social amenities like education, health, water and electricity supplies, and community and religious facilities are provided.

	Strategy	Brief Description of Programs
	Community Development	Community development programs and amenities aim to instill positive values and self-help among rural households and youths.
6.	Applied Food and Nutrition Program	The program supports better food and nutrition among rural households for better health, and encourages local food production and self-help among rural communities.
7.	Rehabilitation of Traditional Villages	The socioeconomic well-being of households in traditional villages is improved by providing basic socioeconomic infrastructure and amenities.
8.	Rural Urbanization	Basic amenity infrastructure is improved and urban facilities are brought to rural areas.

Source: Compiled from various five-year plan documents in Chamhuri Siwar (1992).

Table A9.3: Federal Government Development Allocation Directed Towards Eradication of Poverty, 1971-1995
(RM million)

Item	2MP (1971-75)	3MP (1976-80)	4MP (1981-85)	5MP (1986-90)	6MP (1991-95)	7MP (1996-2000)
Poverty Reduction (A)	2,350	6,376	9,319	13,661	–	72.4
Agricultural and Rural Development (B)	2,127	4,443	8,000	7,611	9,019	18,200
Commerce and Industry	1	76	–	71	–	–
Social	13	781	–	2,597	–	–
Infrastructure	110	974	–	3,382	–	–
Total Development Allocations (C)	7,250	21,202	39,329	49,262	55,000	67,500
A as of % of C	32.4	30.1	23.7	27.7	–	–
B as of % of C	29.3	21.0	21.9	15.4	16.4	27.0

– = not available; MP = Malaysia Plan.
Source: Malaysia (1976,1981,1991,1996).

Table A9.4: Poverty Line and Poverty Headcount in Besut District in 1995 and 1999

Year	Poverty Line (RM/household/year)	No. of Households Below Poverty Line	Total Households (percent)	No. of Core Poverty Households	Total Households (percent)
1995	4,560	4,389	17	1,365	5.4
1999	5,520	2,586	10	862	3.3

12. While poverty incidence has continued on a downward trend, the decline in poverty incidence is expected to slow down as the remaining pockets of poverty are the hardest and the most difficult to eradicate.

3. Poverty in Project Area

13. Various factors have contributed to the high incidence of poverty among households in Terengganu. Among them are inadequate infrastructure, lack of skilled human resource, distance from major cities and ports of the nation, poor road networks, and the occurrence of natural disasters such as floods during the monsoon season (November to February). In the agriculture

sector, farms are characterized by uneconomic farm size, inefficient farm management, high production costs, low education level of farmers, and the lack of production credits.

14. Several activities implemented by the Project have addressed the cause of poverty in the project area. While the major activity of a flood mitigation system is yet to be built, the upgrading of irrigation infrastructure, the water management training, the agriculture support services, and the sea works and jetty upgrade at Kuala Besut have contributed to poverty reduction.

15. The provision of tertiary canals, and secondary and tertiary drains; rehabilitation of secondary canals; and construction of farm roads in the project areas have contributed to the increased cropping intensity from 152 percent in 1996 to 190 percent in 2000.

16. Prior to the start of the Project, a socioeconomic survey of 160 households was conducted during the project preparatory technical assistance in 1990. However, no subsequent monitoring of socioeconomic change has been carried out by the Project since. Information on socioeconomic change was also not available from other government agencies in the project area. The assessment on social impacts of the Project were carried out based on macro data from the state, discussions in the field with representatives of different groups of target beneficiaries, and discussions with project staff.

17. Farmers visited by the Project Completion Review Mission stated that in the early 1990s, farmers in the area were migrating to Singapore for employment. With improved irrigation infrastructure and agriculture services, double cropping of rice with increased yield was possible in 1999. With the increased net annual farm income (averaging RM3,450 per farm), farmers no longer need to seek employment outside of their village. Many farmers who used to depend on wage labor income as a source of income during the dry season now work on their own farms. In fact, shortage of wage labor has become a problem in the project area in particular in the fishing industry where some of the wage labor has been replaced by laborers from Thailand.

18. Statistics from 1990 show that as many as 3,000 households were classified as hard core poverty households in the district. Among the core poverty households in Besut district in 1990, about 80 percent were fishers living in Kula Besut near the mouth of the river. The remaining 20 percent hard core poverty households were scattered throughout the district, mainly in rainfed areas where single crop rice was grown.

19. During 1995-1999, the federal Government implemented a Hard Core Poverty Eradication Program for fishers; those under the hard core poverty line (RM212.50/month) received small fishing boats and some basic fishing equipment. The program also provided one workshop for every 35 fishers for boat repairs and maintenance of fishing equipment. Several fishers interviewed by the Mission stated that the Poverty Eradication Program has been a great success in alleviating poverty among them and their families in the district of Besut.

20. Statistics from the Besut district office confirmed that poverty in the project area has decreased by half during the project period from 4,389 households in 1995 to 2,586 households in 1999. Among them the number of hard core poverty households has decreased from 1,365 to 862 in 1999.

21. Poverty reduction in the Project area is likely partially a result of (i) overall economic growth of the country of Malaysia, (ii) a series of development activities funded both by the federal Government and the state government for Besut District, and (iii) implementation of some components of the Project, namely irrigation upgrading, water management training, agriculture support services improvement, river mouth, and Kuala Besut jetty upgrading.

4. Development of Farmers' and Fishers' Organizations in Project Area

22. In the project area, the four most important farmers and fishers organizations established by the Government are the PPK Gerai, PPK Kerandang, PPK Pelagat, and the fishers' association—known as PPK Kuala Besut. These organizations were operating at the start of the Project and activities have increased during project implementation. Total membership increased from 4,495 to 7,046 in 1989 (Table A9.5). The three farmers' organizations cover the different areas of the district, while carrying out similar economic activities including credit provision, input provision, training, marketing services, etc. The activities of the fishers' association include sale of diesel, ice, fish marketing, transportation services, and the slipway project.

Table A9.5 Membership and Share Capital of Farmers' Organizations

Farmers' Organization	Membership Year		% Membership Year		Share Capital (RM) Year		Share Capital/Member (RM) Year	
	1989	1999	1989	1999	1989	1999	1989	1999
PPK Tiga Daerah	1,964	2,905	77.7	115.00	38,158	253,910.80	19.42	87.40
PPK Bukit Awang	1,166	2,386	94.3	105.50	41,912	179,221.00	25.22	75.10
PPK Semerak	1,365	1,755	70.5	98.30	20,537	107,334.70	15.05	61.10
Total/Average	**4,495**	**7,046**	**80.83**	**106.27**	**100,607**	**540,466.50**	**19.90**	**74.53**

23. Thirty-nine water user groups were established for farmers during the project period. The establishment of water user groups was assisted by the Project. A group generally covers an area of about 50 ha with membership ranging from 30 to 40 households. Each group consists of an elected chair, secretary, and treasurer. Trainings were given six times per year on water management and crop management. The activities of the water user groups extended beyond water use activities to other aspects of agriculture management, such as input purchasing, labor contract arrangements, provision of credit to group members, arrangement for transportation of outputs, etc.

24. A farmers' water management group of 32 farmers in Besut district was visited by the PCR Mission. Representative farmers stated that prior to the Project, the average paddy yield was low; crop density was below optimum with seed rate of 50 kg/ha, and fertilizer use was low. The upgrading of farm roads and the irrigation system by the Project in 1999 increased farmers' confidence in investing in their farming system. Since then, some farmers in the area have increased the seed rate to 75 kg/ha and have put additional fertilizer on their farms. The integrated pest management program has also been implemented in the area.

25. With the goal of 65 percent self-sufficiency in rice production targeted by the Government in the 8th Five-Year Plan, a program aims to improve paddy yield in the area by developing each water user group into a mini-estate group. Under the plan, the Department of Agriculture will support farmers to level paddy land, adjust soil pH, make compost, and introduce catfish rearing in rice fields as pest control agents.

5. Training for Women in Income-Generating Activities

26. While all the activities under the loan agreement have been implemented, the sustained impacts on women carrying out income-generating activities have been limited. The Project supported two international training sessions for female project staff. Ten staff were trained in Indonesia and 25 staff were trained in Thailand (Table A9.6). A total of 452 women were trained in food processing and handicrafts in 22 training courses organized by the Project. At the time of the Mission, only 40-60 women are continuing with their group activities. The main beneficiaries of the training program appear to be women from urban households of higher income and/or with better connections to government officials. Involvement of women from farm households has been limited due to a number of factors such as where and when the training course is held, availability of credit and marketing assistance of products. Also, training the women without participation of their husbands does not lead to sustainable outcomes.

Table A9.6: Training Program Organized Under KETARA until 31 December 1999

Item	Training/ Study Trips	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
		No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants	No. of Courses / No. of Participants
I	Training for Rural Women Group	- / -	- / -	1x / 15	8x / 155	5x / 115	4x / 80	2x / 52	1x / 20	1x / 15	22x / 452
II	Training in Water Mgt. for Farmers[a]	- / -	1x / 30	1x / 28	2x / 57	4x / 103	- / -	4x / 100	4x / 97	3x / 75	19x / 490
III	Training in Paddy Cultivation Practice	15x / 754	20x / 754	- / -	44x / 1320	7x / 172	6x / 174	5x / 125	2x / 113	1x / 160	100x / 3582
IV	Farmer Leader Conference	- / -	- / -	1x / 60	1x / 60	1x / 60	1x / 180	1x / 60	1x / 160	1x / 72	7x / 652
V	Farmer Trips	1x / 36	2x / 49	- / -	10x / 318	4x / 98	2x / 42	- / -	- / -	1x / 28	20x / 571
VI	Project Staff Trips	- / -	1x / 4	2x / 24	1x / 22	2x / 33	1x / 8	- / -	3x / 20	- / -	10x / 111
VII	Training for Project Staff	8x / 250	6x / 232	6x / 215	4x / 174	8x / 181	8x / 226	6x / 180	5x / 205	5x / 282	56x / 1945
VIII	Overseas Training for Project Staff	- / -	- / -	- / -	1x / 5	- / -	- / -	- / -	- / -	- / -	1x / 5
	a) Trip to Indonesia	- / -	1x / 10	- / -	- / -	- / -	- / -	- / -	- / -	- / -	1x / 10
	b) Trip to Thailand	- / -	- / -	1x / 15	- / -	- / -	- / -	- / -	- / -	- / -	1x / 15

[a] Water Management Training includes Water Management, Socio-economic and Agronomic and Pest Management.

ECONOMIC PERFORMANCE

1. The economic internal rate of return (EIRR) has been recalculated for the Project completed during the period of the loan (i.e., for all project components as appraised excluding the flood control works, which now seem unlikely to be constructed within the next 5 to 10 years).

2. The economic analysis was undertaken in constant 2000 prices in ringgit. Costs and benefits in years prior to 2000 were converted using the price indices and exchange rates set out in Table A10.1. Farm gate prices for paddy and fertilizers were calculated from international prices (Tables A10.2, A10.3, and A10.4), while a standard conversion factor (SCF) of 0.9 was applied to local costs. The financial and economic farm gate prices for agricultural inputs and outputs are summarized in Table A10.5.

Table A10.1: Exchange and Inflation Rates

Year	Exhange Rate[a] RM=$1	Malaysia CPI[a]	G5MUV Index[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[c]	3.80	117.40	106.15

CPI = consumers price index, G5MUV = *G5 Group of Countries Manufactures Unit Value Index*.
[a] *International Financial Statistics*, International Monetary Fund, 1999 and July 2000.
[b] World Bank. Various years. Commodity Price Projections. *Global Commodity Markets*. Washington, D.C.
[c] Based upon incomplete actual data and projections.

Table A10.2: Import Parity Price for Rice Paddy
(constant 2000 prices)

Item	1990	1995	2000	2005	2010
Rice Paddy[a] ($/t)	288	286	250	279	271
Less Quality Differential (10%)	29	29	25	28	27
Plus Freight and Insurance	34	34	34	34	34
CIF Price Port Kelang ($/t)	293	291	259	285	278
CIF Price Port Kelang (RM/t)	1,114	1,107	984	1,083	1,056
Landing Charges, Transport, and Margin	90	90	90	90	90
Whole Price	1,204	1,197	1,074	1,173	1,146
Less Transport, Mill to Wholesaler	15	15	15	15	15
Ex-Mill Price	1,189	1,182	1,059	1,158	1,131
Paddy Equivalent (65%)	773	769	688	753	735
Less Milling Costs Net of By-Products	70	70	70	70	70
Value of Paddy into Mill	703	699	618	683	665
Less Transport and Handling, Farm to Mill	30	30	30	30	30
Import Parity Price at Farm Gate (RM/t)	673	669	588	653	635
Financial Farm Gate Price			790		

CIF = cost, insurance, and freight included in the price; t = ton.
[a] Thai (White) milled, 5% broken, government standard, freight on board, Bangkok.
Source: World Bank. Various years, Commodity Price Project, *Global Commodity Markets*. Washington, D.C.

Table A10.3: Import Parity Price for Urea
(constant 2000 prices)

Item	1990	1995	2000	2005	2010
DAP Price[a] ($/t)	139	189	90	107	110
Plus Freight and Insurance	40	40	40	40	40
CIF Price Port Kelang ($/t)	179	229	130	147	150
CIF Price Port Kelang (RM/t)	680	870	494	559	570
Plus Port Charges	25	25	25	25	25
Plus Transport and Handling	40	40	40	40	40
Plus Storage and Distribution	25	25	25	25	25
Import Parity Price at Farm Gate (RM/t)	770	960	584	649	660
Financial Farm Gate Price			300		

CIF = cost, insurance, and freight included in the price; DAP = Diammonium Phosphate; t = ton.
[a] DAP (Bulk), Free on Board United States of American Gulf Ports.
Source: World Bank. Various years, Commodity Price Project, *Global Commodity Markets*. Washington, D.C.

Table A10.4: Import Parity Price for Diammonium Phosphate
(constant 2000 prices)

Item	1990	1995	2000	2005	2010
DAP Price[a] ($/t)	182	193	165	173	161
Plus Freight and Insurance	40	40	40	40	40
CIF Price Port Kelang ($/t)	222	233	205	213	201
CIF Price Port Kelang (RM/t)	884	885	779	809	764
Plus Port Charges	25	25	25	25	25
Plus Transport and Handling	40	40	40	40	40
Plus Storage and Distribution	25	25	25	25	25
Import Parity Price at Farm Gate (RM/t)	934	975	869	899	854
Financial Farm Gate Price			600		

CIF = cost, insurance, and freight included in the price; DAP = Diammonium Phosphate; t = ton.
[a] DAP (Bulk), Free on Board United States of American Gulf Ports.
Source: World Bank. Various years, Commodity Price Project, *Global Commodity Markets*. Washington, D.C.

Table A10.5: Farm Gate Prices of Agricultural Outputs and Inputs
(constant 2000 prices)

Item	Unit	Financial	Economic
A. Outputs			
Paddy	RM/t	790	588[a]
Watermelon	RM/t	300	270
Chillies	RM/t	1,750	1,575
Rambutan	RM/t	1,000	900
Durian/Lansium	RM/t	2,500	2,250
Tobacco	RM/t	800	720
B. Inputs			
Seeds			
Paddy	RM/kg	1.2	0.64
Watermelon	RM/kg	850	765
Chillies	RM/kg	50	45
Fertilizer			
Urea	RM/t	300	630[b]
DAP	RM/t	600	869[c]
Lime	RM/t	100	90

Item	Unit	Financial	Economic
Chemicals			
Paddy	RM/ha	280	252
Watermelon	RM/ha	250	225
Chillies	RM/ha	500	450
Rambutan	RM/ha	350	315
Durian	RM/ha	350	315
Lansium	RM/ha	350	315
Plastic Covers	RM/roll	45	40.5
Combine Harvester	RM/ha	270	243
Fruit Picking	RM/kg	0.15	0.14
Labor	RM/day	15	13.5

[a] Table A10.2 provides for economic price variations by year.
[b] Table A10.3 provides for economic price variations by year.
[c] Table A10.4 provides for economic price variations by year.

3. The other data and assumptions used in calculating the EIRR are described here.

A. Project Implementation Period and Period of Analysis

4. The major project works were implemented over 10 years from 1990 to 1999. The Project is assumed to have a 30-year life from 1999, extending the analysis period for project costs and benefits to 2028.

B. Economic Costs

5. The economic costs are net of taxes, which are transfer payments. Land costs incurred for the flood protection component have been excluded, as they do not relate to the completed Project components. In any case the land in question has thus far remained in the same productive use albeit under different ownership. The costs associated with the flood mitigation investigations and design were also excluded from the project costs in the economic analysis, as the facilities under this component have not been constructed; implementation plans are not available.

6. Incremental operation and maintenance costs for the irrigation scheme are estimated at RM200/hectare (ha), while annual dredging costs at Kuala Besut are assumed to average RM0.4 million per annum throughout the project life.

7. The total economic capital cost of the Project is RM132.73 million. This compares with an equivalent (i.e., in 2000 prices and RM) economic cost estimate at appraisal of RM71.35 million, excluding the flood control component.

C. Flood Control Benefits

8. No flood protection benefits are included in the economic analysis, because of the level of uncertainty surrounding the future implementation of this component.

D. Agricultural Production Benefits

1. Paddy

9. The irrigation component of the Project has refurbished facilities serving some 5,000 ha of paddy area. The cropped area for the main season has increased from 4,070 ha before the Project to 5,000 ha in 2000. In the off-season, the area cropped has increased from 3,560 ha before the Project to 4,800 ha in 2000.The cropping intensity has risen from 152 percent before the Project to around 190 percent in 2000. This is considered to be the maximum cropping intensity that can be sustained.

10. The yield increases as a consequence of the Project up to 2000 have been from 3.27 metric ton (t)/ha to 4.1 t/ha in both the main and off-seasons. Yields in both seasons are expected to increase still to 5.5 t/ha by 2010.

11. The economic benefits of the irrigation component are determined by combining the with- and without-project cropped area and yield assumptions with the economic farm gate prices for paddy (Table A10.2) and economic production costs for paddy. The economic production costs of RM1,246/ha for paddy incorporate the farm-gate economic prices for fertilizers (Tables A10.3 and A10.4).

12. Finally the economic benefits from the irrigation component of the Project were multiplied by a factor of 0.9 to account for around 50 percent of the irrigated area being susceptible to floods in the main season, and dry year water shortages in the off-season. The 0.9 factor assumes a five year return period for flood and water shortage years, and zero incremental benefits for 50 percent of the irrigated area under such conditions.

2. Tobacco

13. Because of the improved drainage facilities and agricultural support services provided under the Project an additional 268 additional ha of tobacco is now grown in the project area. No further growth in the area planted in tobacco is assumed due to government quota limits. The growth in area is assumed to be linear since 1996.

14. The economic benefits of additional tobacco are estimated to be RM3,860 per ha, based upon an economic price of RM720/t and production costs of RM5,500/ha (based on 1998 Tobacco Board statistics and the economic farm gate prices for fertilizers–Tables A10.3 and A10. 4).

3. Vegetables

15. At appraisal, the flood mitigation and agricultural extension components of the Project were expected to result in an additional 200 ha of vegetables being grown. By 2000, an additional 175 ha of vegetable crops were harvested in the project area. The most popular of these are chillies, watermelons, long beans, brassica, and cucumber. The buildup in vegetable cropped area is assumed to be linear since 1996.

16. No further expansion of vegetable cropped area is expected as a result of the Project since the focus of project staff during the 7th Malaysia Plan switched to maximizing paddy production in the project area.

17. The net economic benefits per ha for vegetables have been based on the average net returns for chilies and watermelons (RM5,920/ha) since discussions with project management unit staff and beneficiaries during the mission indicated that these were the most popular vegetable crops grown.

4. Fruit

18. At appraisal an additional 200 ha of fruit tree plantings were assumed to result from the Project. By 1999, actual additional plantings totaled 368 ha. The most popular of these are durian and lansium. Full production from the additional fruit trees is assumed in 2008 with linear growth from 2002. Yields will increase from 6 t/ha in 2002 to 12 t/ha in 2008.

19. Net economic benefits of these fruit trees at full production are estimated to be RM25,200/ha (assumes a farm-gate financial price of RM2.50/kg, full production yield of 12 t/ha, harvesting costs of RM.15/kg, and other costs of RM650/ha/annum).

E. Other Benefits

1. Fishing

20. Since the completion of the river mouth works and the jetty; larger vessels can now access the Kuala Besut port, and fishing boats of all sizes have access to operational efficiencies. The total financial value of the catch has been RM9.65 million in 1996, RM11.57 million in 1997, RM13.89 million in 1998, RM16.67 million in 1999, and RM20.00 million in 2000.

21. The additional trade since 1996 is assumed to reflect the benefits of the new sea works and jetty. Without the Project, the 1996 economic value was assumed to have increased, because of competition from the new port of Tok Bali, only a short distance away. Assuming that the net profit from fishing is 30 percent of the value of the landed catch, converting to constant 2000 prices and applying the 0.9 SCF gives no net economic benefits in 1996, but then RM0.57 million in 1997, RM1.20 million in 1998, RM1.94 million in 1999, and RM2.79 million in 2000.

22. These economic benefits are assumed to grow at 10 percent per annum until 2005.

2. Tourism and Other Benefits

23. The completion of the Kuala Besut sea works has increased the reliability of the regular boat services to Pulau Perhentian and other off-shore islands. No account of this benefit has been taken in the economic analysis.

F. Results

1. Base Case

24. The various economic cost and benefit items and the net economic benefit streams for the Project are shown in Table A10.6. The base case EIRR is 11.4 percent. This compares with an EIRR for the much larger project at appraisal (i.e., including the flood mitigation component) of 16.7 percent. Negative factors impacting on the Project's EIRR have been higher capital costs, the longer than anticipated implementation period, the lower international prices for rice, and the competition for Kuala Besut port from the new facilities at Tok Bali at the mouth of the Semerak River. However the EIRR remains only a little under 12 percent reflecting the inherent high returns from achieving significant increases in paddy yield from rehabilitation works to irrigation schemes where the major costs of the underlying infrastructure are sunk costs from the point of view of economic analysis.

Table A10.6: Project Costs and Benefits
(RM million)

Year	Capital Costs	O&M Costs	Total Costs	Paddy Irrigation		Additional Tobacco	Additional Vegetables	Additional Fruit	Fishing	Total Benefits	Net Benefits
				Main Season	Off-Season						
1989											0.00
1990											0.00
1991											0.00
1992	7.47		7.47								(7.47)
1993	11.04		11.04								(11.04)
1994	15.24		15.24								(15.24)
1995	18.09		18.09								(18.09)
1996	27.52		27.52			0.04	0.15			0.19	(27.33)
1997	25.08		25.08	0.72	0.70	0.17	0.30		0.64	2.53	(22.55)
1998	21.56		21.56	1.45	1.43	0.38	0.44		1.34	5.04	(16.52)
1999	6.73		6.73	2.17	2.14	0.67	0.59		2.15	7.72	0.99
2000		1.26	1.26	2.79	2.86	1.03	1.04		3.11	10.83	9.57
2001		1.26	1.26	3.58	3.22	1.03	1.04		3.42	12.29	11.03
2002		1.26	1.26	4.00	3.74	1.03	1.04	0.64	3.76	14.21	12.95
2003		1.26	1.26	4.43	4.27	1.03	1.04	1.48	4.14	16.39	15.13
2004		1.26	1.26	4.85	4.79	1.03	1.04	2.56	4.55	18.82	17.56
2005		1.26	1.26	5.28	5.31	1.03	1.04	3.85	5.01	21.52	20.26
2006		1.26	1.26	5.61	5.66	1.03	1.04	5.37	5.01	23.72	22.46
2007		1.26	1.26	5.98	6.00	1.03	1.04	7.10	5.01	26.16	24.90
2008		1.26	1.26	6.34	6.35	1.03	1.04	9.07	5.01	28.84	27.58
2009		1.26	1.26	6.71	6.69	1.03	1.04	9.07	5.01	29.55	28.29
2010		1.26	1.26	7.10	7.04	1.03	1.04	9.07	5.01	30.29	29.03
to											
2028		1.26	1.26	7.10	7.04	1.03	1.04	9.07	5.01	30.29	29.03

Economic Internal Rate of Return = 11.36%

O&M = operation and maintenance.

2. Sensitivity Testing

24. Sensitivity testing was undertaken assuming a 10 percent reduction in paddy benefits (from lower yields, higher production costs, and/or lower economic farm-gate paddy prices); fishing benefits not growing beyond the year 2000; a 50 percent reduction in the benefits assumed from additional fruit tree plantings as part of the Project; and the inclusion of the flood mitigation and design costs (Table A10.7).

Table A10.7: Sensitivity Testing Results

Scenario	EIRR (%)
Base Case	11.4
10% Reduction in Paddy Benefits	10.9
Fishing Benefits Constant from 2000 Onwards	11.0
50% Reduction in Project Fruit Tree Benefits	10.4
Inclusion of Flood Mitigation Investigation and Design Costs	10.9

EIRR = economic internal rate of return.

25. The sensitivity testing indicates that the Project's EIRR is not particularly sensitive to changes in key assumptions.