5.3.2. Field Cost for Flood Control Component.

The field cost for the flood control component in equipment lending system was estimated, at the 1977-price, excluding price escalation during construction period, at Rp 4,416,000,000 consisting of Rp 1,950,000,000 of local currency portion and US$ 5,941,000 (equivalent to Rp 2,466,000,000) of foreign currency portion as shown in Table 5-3-4.

As for land necessary for construction of the low-water channel and levees, the usual way of land acquisition was proposed; however, for land necessary for the high-water channels, a way of compensation per unit area was proposed because it seems to be able to avoid changeability of cost compared with the way of compensation per tree.

The area of land to be acquired or compensated for the river improvement works was estimated based on the topographic map prepared in 1977 on a scale of 1/10,000. The area and cost for land acquisition are shown in Tables 5-3-5 and 5-3-6. The unit prices for land acquisition employed here are shown in Table 5-3-7.

The cost for preparatory work of access roads, clearing and others are shown in Table 5-3-8 at the 1977-price.

In the miscellaneous civil works, the cost for construction of rain-gage stations, water-level gage stations and communication stations were estimated as follows.

a. Construction of two rainfall observation stations.

L.C. = Rp 1,680,000
F.C. = US$ 7,884

b. Construction of 5 water level observation stations.

L.C. = Rp 11,400,000
F.C. = US$ 21,162

c. Construction of 3 VHF-radio stations and 3 mobil stations.

L.C. = Rp 8,000,000
F.C. = US$ 99,585

Total L.C. = Rp 21,080,000
F.C. = US$ 128,631

The costs for foreign consultants' services as shown in Table 5-3-4 were estimated at US$ 1,265,783 at the 1977-price excluding contingency and price-escalation during the construction period. The cost for engineering and administration includes the

following costs at the 1977-price excluding contingency and price escalation.

a. Cost for procurement of instrument for surveying and laboratory use :US$ 83,000.-

b. Cost for procurement of cars required in making detailed design and supervision. :US$ 76,883.-

2 jeeps of long chassis including spare parts :US$ 25,628.-

5 jeeps of hard top including spare parts :US$ 51,255.-

c. Cost for foreign consultants' services :US$ 1,105,900.-

As mentioned previously, the whole stretch of the river for improvement was divided into 9 sections. The field cost of civil work for each of the sections is shown in Table 5-3-9 and the field cost for each of the sections is shown in Table 5-3-10.

The annual field cost was estimated as shown in Table 5-3-11 based on the construction schedule as mentioned in the paragraph 3.3.3.(1).

5.4. Field Cost for Irrigation/Drainage Improvement Component.

5.4.1. Unit Cost.

The unit costs for different types of Irrigation/drainage works were estimated as shown in Table 5-4-1. For estimation of unit costs, hourly depreciation cost of equipment, cost for spare parts shown in Table 5-3-1 and cost for operation (consumable materials and labor cost etc. including profits and overhead of the contractor) as shown in Table 5-3-3 were applied.

5.4.2. Field Cost for Irrigation/Drainage Improvement Component.

The field cost for the irrigation/drainage improvement component in equipment-lending system was estimated, at the 1977 price, excluding price escalation during the construction period, at Rp 8,546,000,000 consisting of Rp 6,753,000,000 of local currency portion and US$ 4,321,000 (equivalent to Rp 1,793,000,000) of foreign currency portion as shown in Table 5-4-2.

The area of land to be acquired or compensated for the irrigation/drainage improvement works was estimated based on the size of the lands deemed appropriatory necessary for the intakes, settling basins and irrigation/drainage canals including related structures.

The area of land to be acquired was classified into irrigated area, rain-fed area, plantation area and swampy area as shown in

Table 5-4-4. Trees in the plantation area and houses were estimated as compensation. The unit prices for land acquisition employed here are shown in Table 5-4-3 at the 1977-price.

Table 5-4-5 shows the cost of land acquisition and compensation for irrigation/drainage improvement works.

The following costs were estimated at the 1977-price and included in the engineering and administration cost. But they do not include contingency and price escalation.

a. Cost for instrument for surveying and laboratory use : US$ 38,410.-

b. Cost for cars for making detailed design and supervision : US$ 56,381.-

2 jeeps of long chassis including spare parts : US$ 25,628.-

2 jeeps of hard top including spare parts : US$ 30,753.-

c. Cost for foreign consultants' services : US$ 1,377,499.-

The breakdown of the cost for the civil work mentioned above is shown in Table in 5-4-6. The annual field costs were estimated at the 1977-price based on the sequence of works described in the previous paragraph 3.4.2,(1). They are shown in Table 5-4-7.

5.5. Cost of Construction Equipment and Salvage Values.

The cost required for procuring the equipment, spare parts and others from abroad listed in Table 5-2-1 for the flood control component was estimated as CIF Belawan cost at the 1977-price. The cost worked out at US$ 5,265,000 or Rp 2,185,000,000 equivalent. This is shown in Table 5-5-1. The cost for procuring spare parts by local currency was estimated at Rp 157,000,000 also at the 1977-price. The salvage values of the construction equipment were estimated at US$ 596,113 at the 1977-price.

The cost required for procuring the equipment and spare parts from abroad listed in Table 5-2-2 for the irrigation/drainage improvement component was estimated at US$ 3,210,000 or Rp 1,332,000,000 equivalent as shown in Table 5-5-2. The cost for spare parts to be procured by local currency was estimated at Rp 88,000,000 at the 1977-price. The salvage values of these construction equipment was estimated at US$ 582,530 at the 1977-price.

5.6. Construction Cost.

The construction costs required for flood control and improvement of irrigation and drainage are summarized in Table 5-6-1 and 5-6-2.

The annual construction costs for flood control and improvement of irrigation and drainage are summarized in Table 5-6-3 and 5-6-4.

5.7. Operation, Maintenance and Replacement Cost.

The maintenance cost after the completion of the project for the flood control facilities, including clearing works on the major beds and maintenance of low water channel by dredging, was assumed at Rp 25,000,000 per year at the 1977-price. This amount is equivalent to about 0.5% of the field cost of the flood control component.

The maintenance and operation cost for the irrigation and drainage facilities after the completion of construction was assumed at Rp 88,000,000 at the 1977-price, and the amount of operation and maintenance cost during the construction period was assumed to be proportional to the area to be developed. The annual disbursement schedule of the operation and maintenance cost for the irrigation and drainage facilities is shown below.

Annual Disbursement Schedule of Operation and Maintenance Cost for Irrigation and Drainage Facilities

Unit: million Rp

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	After 1986/87
O.M.cost		21	43	61	76	88	88

The cost required for replacing the facilities for irrigation and drainage within the period of project life was assumed mainly for the gates. Their life year was assumed at 30 years. Since the civil works for the irrigation/drainage improvement are scheduled to be carried out for the period of 1980/81 to 1984/85 as shown in Table 5-6-4, replacement will be carried out over the five years extending from 2010/11 to 2014/15. The total amount of the cost for replacement was estimated at Rp 90,000,000. There is no necessity for counting the second replacement because it is beyond the project life. The following table, therefore, shows the annual disbursement schedule of the replacement cost during the said five years.

Annual Disbursement Schedule of Replacement Cost

Unit: million Rp

	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Replacement Cost	30	14	13	13	20

Table 5-1-1 Unit Price of Laborer

unit : per day (7 hours)

a.	Foreman	1,000 Rp
b.	Skilled labor	750
c.	Semi skilled labor	600
d.	Common labor	500
e.	Operator	1,500
f.	Mechanic	1,500
g.	Driver	1,200
h.	Carpenter	800

Table 5-1-2 Unit Price of Materials

Description		Unit	Price : Rp
a.	Cement	ton	40,000
b.	Steel bar (19 mm)	ton	350,000
c.	Log (6 m x 9 cm)	m^3	75,000
d.	Aggregate (20 to 40 mm)	m^3	4,500
e.	Aggregate (sand)	m^3	3,000
f.	Light oil	L	25
g.	Petrol	L	70
h.	Engine oil (diesel)	L	650
i.	Grease (multi-purpose)	Kg	900
j.	Gear oil	L	1,000

Table 5-2-1 Construction Equipment, Spare Parts and Others
(Flood Control, 7-year Plan)

No.	Description	Required Q'ty	Existing Q'ty	New Q'ty
I.	Equipment and spare parts			
1.	Bulldozer, swamp w/winch 15 t class	5	0	5
2.	Bulldozer, swamp w/winch 12 t class	5	1(2x0.5)	4
3.	Bulldozer, swamp 7 t	3	3	0
4.	Backhoe, swamp type 0.5 m^3	3	0	3
5.	Attachment for the above	1 lot	0	1 lot
6.	Backhoe ordinary type 0.6 m^3	2	2	0
7.	Dragline ordinary type 0.6 m^3	1	1	0
8.	Amphibious dredger, w/pipe 40 m^3/hr	3	1	2
9.	Amphibious soft terrain excavator, 0.4 m^3	2	0	2
10.	Attachment for the above	1 lot	0	1 lot
11.	Dump truck, 4 x 4, 6 t	19	1(12x0.15)	18
12.	Crawler type dump trailer, 4.5 m^3	2	0	2
13.	Vibrating roller 2.5 t	6	0	6
14.	" " 1 t	8	0	8
15.	Vibrating plate compactor for slope, 50 kg	15	0	15
16.	Vibrating pile driver/extractor, 15 kw	1	0	1
17.	Truck crane 10 t	1	1	0
18.	Fuel tanker, 4 x 4 4,000 liter	1	0	1
19.	Grease car, 6 t	1	1	0
20.	Service car, 4 x 4 1 t	4	2	2
21.	Ordinary truck 4.5 t	4	2	2
22.	Submergible pump, w/hose 80 mm	10	10	0
23.	Diesel generator 100 KVA	1	0	1
24.	" " 45 KVA	6	1	5
25.	" " 35 KVA	1	1	0
26.	Chain saw, 500 ϕ mm	5	0	5
27.	Tools for repair			LS
28.	Miscellaneous			LS
29.	Spare parts			LS
II.	Materials			
30.	Instrument for surveying and laboratory use			LS
31.	Raingages and water-level gages			LS
32.	VHF radio telephone (3 fixed and 3 movable)			LS

Note: 2 jeeps of long chassis and 5 jeeps hard top are estimated as a part of the cost for engineering and administration.

Table 5-2-2 Construction Equipment and Spare Parts
(Irrigation/Drainage, 7-year Plan)

No.	Machinery		Required Q'ty	Existing Q'ty	New Q'ty
1.	Dragline,	0.6 m^3	3	0	3
2.	Attachment for the above		1 lot		1 lot
3.	Backhoe, swamp type	0.5 m^3	3	0	3
4.	Attachment for the above		1 lot		1 lot
5.	Amphibious soft terrain excavator	0.4 m^3	4	0	4
6.	Bulldozer, swamp	12 t	6	0	6
7.	Dump truck, 4 x 4	6 t	4	0	4
8.	Vibrating roller	1 t	1	0	1
9.	Vibrating plate compactor for slope	50 kg	5	0	5
10.	Portable concrete mixer	0.3 m^3	3	0	3
11.	Concrete vibrator,	30 ϕ mm	2	0	2
12.	Fuel tanker,	4,000 liter	1	0	1
13.	Grease car		1	1	0
14.	Ordinary truck	4.5 t	4	1	3
15.	Service car,	1 t	3	1	2
16.	Diesel generator	45 KVA	2	0	2
17.	Chain saw,	500 ϕ mm	5	0	5
18.	Crawler Type Dump Trailer	4.5 m^3	3	0	3
19.	Truck crane,	10 t	1	1	0
20.	Spare parts		LS		LS
21.	Tools for repair shop		LS		LS
22.	Miscellaneous		LS		LS

Note: 2 jeeps (long chassis) and 2 jeeps (hard top) are estimated as a part of the cost of engineering and administration.

Table 5-3-1 Hourly Depreciation Cost of Major Equipment and Spare Parts

Equipment (a)	CIF Belawan (b) US$	Hourly depreciation cost (c) $/hr	Spare parts (b) x % %	Life time of equipment hr
1. Bulldozer, swamp-15 t	87,137	12.07	92	6,500
2. Bulldozer, swamp-12 t	66,390	9.19	92	6,500
3. Backhoe, swamp, 0.5 m^3	62,241	8.62	64	6,500
4. Amphibious dredger, w/pipe	373,444	28.01	68	12,000
5. Amphibious soft terrain excavator, 0.4 m^3	107,884	14.94	68	6,500
6. Dragline 0.6 m^3	66,390	7.97	64	7,500
7. Dump truck, 4 x 4.6 t	18,672	2.80	72	6,000
8. Vibrating roller, 2.5 t	11,203	1.68	68	6,000
9. Vibrating roller, 1 t	6,224	0.85	68	6,000
10. Vibrating plate	830	0.12	56	6,000
11. Compactor for soil, 50 kg				
12. Vibrating pile driver/extractor, 15 KW	12,864	1.40	68	8,000
13. Portable concrete mixer, 0.3 m^3	9,959	1.38	56	6,500

Note: Costs were estimated at the 1977 price.
Spare parts include overhaul and minor repair.
The column (b) means percentage of spare parts necessary during the life time of equipment. The percentage is the ratio of cost of spare parts to that of equipment in CIF Belawan.

Table 5-3-2 Unit Cost for Flood Control Works
(Equipment-lending system)

1977-price

Description	Unit	Unit Cost L.C	Unit Cost F.C	Total
		Rp	$	Rp
1. Dredging				
a. Amp.Dredger (to Emb.direct)	m^3	181	1.578	836
b. Amp.Dredger (to Emb. by Bull.Backh.and DT-3 km)	m^3	548	3.334	1,943
c. Amp.Dredger (to Emb. by Bull.Backh.and DT-5 km)	m^3	677	3.727	2,222
d. Amp.Dredger (to Spoil Bank by Bull.Backh.and DT-1 km & Bull.)	m^3	498	3.266	1,852
e. Amp.Dredger (to Spoil Bank by Bull.)	m^3	219	1.854	988
f. Amp.Excavator (to Emb. by Bull.)	m^3	194	1.511	821
g. Amp.Excavator (to Emb.by Bull.Backh.and DT-1 km)	m^3	398	2.371	1,381
2. Excavation				
a. Bulldozer (to Emb.direct)	m^3	74	0.552	303
b. Bulldozer (to Emb.by Bank and DT-1 km)	m^3	279	1.412	865
c. Bulldozer (to Emb.by Backh.and DT-3 km)	m^3	380	1.756	1,108
d. Bulldozer (to Emb.by Backh.and DT-5 km)	m^3	495	2.149	1,387
e. Bulldozer (to Emb.by Backh.and DT-10 km)	m^3	650	2.674	1,758
f. Bulldozer (to Emb.by Backh.and DT-1 km & Bull.)	m^3	317	1.688	1,017

(to be continued)

Description	Unit	L.C Rp	F.C $	Total Rp
3. Embankment				
a. Com.by V & T and Sod.	m^3	268	0.189	346
b. Com.by V & T and Bull. for $\frac{1}{2}$ Volume and Sod.	m^3	289	0.327	424
c. Comp.by V & T and Bull.and Sod.	m^3	306	0.465	499
d. Amp.Dredger and Bull. for $\frac{1}{2}$ Volume of V,T and Sod.	m^3	470	1.905	1,260
4. Revetment	m	27,208	5.31	29,411
5. Drains	m^3	600	——	600

Note:
- Amp.Dredger = Amphibious dredger
- Emb. = Embankment
- Bull. = Bulldozer
- Backh. = Backhoe
- DT-1 km = Dump track 1 km
- DT-3 km = Dump track 3 km
- DT-5 km = Dump track 5 km
- Amp.Excavator = Amphibious terrain excavator
- DT-10 km = Dump track 10 km
- Com. = Compaction
- V = Vibration roller
- T = Vibration Tamper
- Sod. = Sodding

Table 5-3-3 Unit Operation Cost: Equipment-lending system

1977-price

Equipment	Hourly capacity m^3/hr	Unit operation cost L.C Equip.& Spare parts Rp/m^3	L.C Labor, etc. Rp/m^3	L.C Consumable Material Rp/m^3	F.C Equip.& Spare parts Rp/m^3
1. Amphibious dredger	30	59	66	56	1.578
2. Amphibious soft terrain excavator	25	37	47	35	0.959
3. Bulldozer swamp, 12 t					
a. long distance	35	22	27	18	0.477
b. short distahce	50	16	19	12	0.334
c. spreading	70	11	14	9	0.239
4. Bulldozer swamp, 15 t					
a. long distance	35	29	27	24	0.627
b. short distance	50	21	19	17	0.437
c. spreading	70	15	14	12	0.313
5. Backhoe	30	17	23	18	0.451
6. Dragline 0.6 m^3	30	16	21	21	0.460
7. Dump truck					
a. ℓ = 1 km	8	23	25	120	0.574
b. ℓ = 3 km	5	37	40	129	0.918
c. ℓ = 5 km	3.5	53	57	274	1.311
d. ℓ =10 km	2.5	75	81	384	1.836
8. Vibration roller, 1 t	13	4	45	28	0.105
9. Vibration roller, 2.5 t	20	5	30	28	0.135
10. Plate tamper	2.6	3	78	56	0.069
11. Pile driver	$3^{pcs}/_{hr}$	$29^{Rp}/_{pc}$	$391^{Rp}/_{pc}$	$288^{Rp}/_{pc}$	$0.747^{US\$}/_{pc}$
12. Excavation man power	—	—	$550^{Rp}/_{m^3}$	$50^{Rp}/_{m^3}$	$0^{US\$}/_{m^3}$

Table 5-3-4 Filed Cost for Flood Control
(Equipment-lending system: 7-year Plan)

1977-price

Item	Q'ty of Work Unit	Q'ty	Unit Cost L.C	F.C	Cost L.C	F.C	Total
					10^3Rp	US$	10^3Rp
1. Land acquisition and Compensation			L.S	L.S	193,000	-	193,000
2. Civil Work					1,309,229	3,900,225	2,927,822
a. Preparatory Work			L.S	L.S	259,872	442,280	443,418
b. Dredging	m^3	733,000	(257)	(1.92)	188,310	1,407,273	772,328
c. Excavation	m^3	934,700	(188)	(1.02)	175,687	956,321	572,560
d. Embankment	m^3	1,338,600	(309)	(0.51)	414,023	684,540	698,107
e. Revetment	m	1,800	27,208	5.31	48,974	9,558	52,941
f. Drains	m^3	135,000	600	-	80,996	-	80,996
g. Sluice	place	1	L.S	L.S	26,000	45,643	44,942
h. Miscellaneous			L.S	L.S	115,367	354,610	262,530
Observation station	L.S				13,080	29,046	25,134
Communication system	L.S				8,000	99,585	49,328
Others	L.S				94,287	225,979	188,068
3. Engineering & administration					193,601	1,265,783	718,901
4. Contingency					254,374	774,901	575,959
5. T o t a l					1,950,204	5,940,909	4,415,682

Note: L.C denotes local currency portion. F.C denotes foreign currency portion. The costs were estimated based on depriciation of equipment. The costs exclude price escalation during construction period.

Table 5-3-5 Cost for Land Acquisition and Compensation (Flood Control)

1977-price

Stretch		Land						House				Other	Total
		Area (ha)			Cost (1,000 Rp)			House			Cost		
		L	R	Total	L	R	Total	L	R	Total	1,000 Rp		1,000 Rp
K	K												
-12.25	-11.25	14.4	15.5	29.9	6,285	5,275	11,560	5	2	7	1,050	665	13,275
-11.25	- 7.5	45.3	49.0	94.3	17,875	20,430	38,305	11	2	13	1,950	2,634	42,889
- 7.5	- 2.5	53.9	48.1	102.0	22,420	20,335	42,755	9	10	19	2,850	2,390	47,995
- 2.5	0.0	0	0	0	0	0	0	0	0	0	0	0	0
0.0	10.0	0	0	0	0	0	0	0	0	0	0	0	0
10.0	15.0	75.0	45.4	120.4	22,650	18,135	40,785	0	29	29	4,350	3,881	49,016
15.0	19.0	0	50.6	50.6	0	24,585	24,585	0	10	10	1,500	1,486	27,571
19.0	22.25	0	7.8	7.8	0	2,760	2,760	0	22	22	3,300	1,088	7,148
Pulau Gambar												5,106	5,106
T o t a l		188.6	216.4	405.0	69,230	91,520	160,750 1/	25	75	100	15,000	17,250	193,000

L: Left

R: Right

1/: Refer to: Table 5-3-6

Table 5-3-6 Breakdown of Cost for Land Acquisition and Compensation
(Flood Control)

1977-price

Land Unit Cost Rp/m² Stretch		Paddy Field		Other Productive		Unproductive		Swamp		Residensial		Total	
		Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)
K	K		x10^3										
Left Side													
-12.25	-11.25	10.5	4,725	-		3.3	660	-		0.6	900	14.4	6,285
-11.25	- 7.5	24.2	10,890	9.4	2,820	2.3	460	7.7	1,155	1.7	2,550	45.3	17,875
- 7.5	- 2.5	44.9	20,205	-		1.1	220	7.3	1,095	0.6	900	53.9	22,420
- 2.5	0.0	-		-		-		-		-		-	
0.0	10.0	-		-		-		-		-		-	
10.0	15.0	26.4	11,880	10.5	3,150	38.1	1,620	-		-		75.0	22,650
15.0	19.0	-		-		-		-		-		-	
19.0	22.25	-		-		-		-		-		-	
Sub-total		106.0	47,700	19.9	5,970	44.8	8,960	15.0	2,250	2.9	4,350	188.6	69,230
Right Side													
-12.25	-11.25	8.7	3,915	-		6.8	1,360	-		-		15.5	5,275
-11.25	- 7.5	38.4	17,280	7.7	2,310	2.7	540	-		0.2	300	49.0	20,430
- 7.5	- 2.5	32.9	14,805	6.7	2,010	7.1	1,420	-		1.4	2,100	48.1	20,335
- 2.5	0.0	-		-		-		-		-		-	
0.0	10.0	-		-		-		-		-		-	
10.0	15.0	22.5	10,125	1.8	540	18.6	3,720	-		2.5	3,750	45.4	18,135
15.0	19.0	38.7	17,415	8.9	2,670	-		-		3.0	4,500	50.6	24,585
19.0	22.25	2.8	11,260	5.0	1,500			-		-		7.8	2,760
Sub-total		144.0	64,800	30.1	9,030	35.2	7,040			7.1	10,650	216.4	91,520
Total		250.0	112,500	50.0	15,000	80.0	16,000	15.0	2,250	10.0	15,000	405.0	160,750

Table 5-3-7 Unit Price of Land Acquisition and Compensation (Flood Control)

Description	Unit	1977-price Price: Rp.
Paddy field	m^2	40 - 50 Rp/m^2
Other productive area	m^2	20 - 40 Rp/m^2
Unproductive area	m^2	10 - 30 Rp/m^2
Swamp area	m^2	10 - 20 Rp/m^2
Residensial area	m^2	100 -200 Rp/m^2
House		150,000 Rp/house

Table 5-3-8 Cost of Preparatory Works for Flood Control (Equipment-lending system, 7-year Plan)

Description	1977-price Estimated Cost		
	L.C:Rp	F.C:$	Total:Rp
1. Access road	210,000,000	159,336	276,124,000
2. Clearing	32,000,000	276,348	146,685,000
3. Others	17,872,000	6,596	20,609,000
4. Total	259,872,000	442,280	443,418,000

Table 5-3-9 Breakdown of Field Cost of Civil Work for Flood Control (Equipment-lending system, 7-year Plan)

1977-price

Work item	Quantity Unit	Q'ty	L.C Unit cost (Rp)	L.C Cost (1,000Rp)	F.C Unit cost ($)	F.C Cost ($)
Dredging works						
-12.25 k ~ -11.25 k	m^3	46,400		8,411		73,220
1 - a	"	46,400	181	8,411	1.578	73,220
-11.25 k ~ - 7.5 k	m^3	146,100		27,097		227,196
1 - a	"	96,100	181	17,397	1.578	151,646
1 - f	"	50,000	194	9,700	1.511	75,550
- 7.5 k ~ - 2.5 k	m^3	309,800		99,180		699,075
1 - a	"	96,200	181	17,412	1.578	151,804
1 - b	"	102,200	548	57,371	3.334	340,735
1 - e	"	111,400	219	24,397	1.854	206,536
- 2.5 k ~ 0.0 k	m^3	76,100		18,025		137,214
1 - a		58,000	181	10,511	1.578	91,524
1 - d		3,100	498	1,544	3.266	10,125
1 - g		15,000	398	5,970	2.371	35,565
0.0 k ~ 10.0 k	m^3	0		0		0
10.0 k ~ 15.0 k	m^3	104,400		26,374		192,022
1 - a		70,000	181	12,670	1.578	110,460
1 - g		34,400	398	13,704	2.371	81,562
15.0 k ~ 19.0 k	m^3	44,600		8,208		69,709
1 - a		34,600	181	6,268	1.578	54,599
1 - f		10,000	194	1,940	1.511	15,110
19.0 k ~ 22.65 k	m^3	0		0		0
Pulau Gambar	m^3	5,600		1,015		8,837
1 - a		5,600	181	1,015	1.578	8,837
T o t a l	m^3	733,000		188,310		1,407,273

Work item	Unit	Quantity Q'ty	L.C Unit cost (Rp)	L.C Cost (1,000Rp)	F.C Unit cost ($)	F.C Cost ($)
Embankment works						
-12.25 k ~ -11.25 k	m^3	203,800		82,587		273,519
3 - a	"	6,900	268	1,849	0.189	1,304
3 - b	"	42,200	289	12,196	0.327	13,799
3 - c	"	25,200	306	7,711	0.465	11,718
3 - d	"	129,500	470	60,831	1.905	246,698
-11.25 k ~ - 7.5 k	m^3	316,400		90,108		97,502
3 - a	"	136,100	268	36,422	0.189	25,723
3 - b	"	87,400	289	25,259	0.327	28,580
3 - c	"	92,900	306	28,427	0.465	43,199
- 7.5 k ~ - 2.5 k	m^3	195,900		53,681		44,961
3 - a		138,400	268	37,063	0.189	26,158
3 - b	"	57,500	289	16,618	0.327	18,803
- 2.5 k ~ 0.0 k	m^3	70,500		21,565		32,783
3 - c	"	70,500	306	21,565	0.465	32,783
0.0 k ~ 10.0 k	m^3	144,700		44,258		67,286
3 - c	"	144,700	306	44,258	0.465	67,286
10.0 k ~ 15.0 k	m^3	205,300		61,014		82,120
3 - a	"	32,700	268	8,764	0.189	6,180
3 - b	"	31,300	289	9,046	0.327	10,235
3 - c	"	141,300	306	43,204	0.465	65,705
15.0 k ~ 19.0 k	m^3	64,200		18,750		22,995
3 - a	"	9,100	268	2,439	0.189	1,720
3 - b	"	31,500	289	9,089	0.327	10,301
3 - c	"	23,600	306	7,222	0.465	10,974
19.0 k ~ 22.65 k	m^3	42,600		13,030		19,809
3 - c	"	42,600	306	13,030	0.465	19,809
Pulau Gambar	m^3	95,200		29,030		43,565
3 - b	"	5,100	289	1,474	0.327	1,668
3 - c	"	90,100	306	27,556	0.465	41,897
T o t a l	m^3	1,338,600		414,023		684,540

Work item	Quantity Unit	Q'ty	L.C Unit cost (Rp)	L.C Cost (1,000Rp)	F.C Unit cost	F.C Cost
Excavation works						
-12.25 k ~ -11.25 k	m^3	0		0		0
-11.25 k ~ - 7.5 k	m^3	99,700		7,417		55,034
2 - a	"	99,700	74	7,147	0.552	55,034
- 7.5 k ~ - 2.5 k	m^3	180,000		25,051		143,597
2 - a	"	152,300	74	11,270	0.552	84,070
2 - d	"	27,700	495	13,781	2.149	59,527
- 2.5 k ~ 0.0 k	m^3	68,700		6,588		44,852
2 - a	"	62,600	74	4,654	0.552	34,555
2 - f	"	6,100	317	1,934	1.688	10,297
0.0 k ~ 10.0 k	m^3	202,400		41,864		229,600
2 - a	"	79,200	74	5,861	0.552	43,718
2 - b	"	80,000	279	22,309	1.412	112,960
2 - f	"	43,200	317	13,694	1.688	72,922
10.0 k ~ 15.0 k	m^3	320,800		73,437		381,378
2 - a	"	155,400	74	11,500	0.552	85,781
2 - c	"	99,100	380	37,656	1.756	174,020
2 - e	"	9,800	650	6,370	2.674	26,205
2 - f	"	56,500	317	17,911	1.688	95,372
15.0 k ~ 19.0 k	m^3	63,100		21,330		101,860
2 - b	"	26,000	279	7,254	1.412	36,712
2 - c	"	37,100	380	14,076	1.756	65,148
19.0 k ~ 22.65 k	m^3	0		0		0
Pubau Gambar	m^3	0		0		0
T o t a l	m^3	934,700		175,687		956,321

Work item	Qantity Unit	Q'ty	L.C Unit cost (Rp)	L.C Cost (1,000Rp)	F.C Unit cost ($)	F.C Cost ($)
Revetment works						
-12.25 k ~ -11.25 k	m	0	27,208	0	5.310	0
-11.25 k ~ - 7.5 k	m	0	27,208	0	5.310	0
- 7.5 k ~ - 2.5 k	m	600	27,208	16,325	5.310	3,186
- 2.5 k ~ 0.0 k	m	600	27,208	16,325	5.310	3,186
0.0 k ~ 10.0 k	m	0	27,208	0	5.310	0
10.0 k ~ 15.0 k	m	300	27,208	8,162	5.310	1,593
15.0 k ~ 19.0 k	m	0	27,208	0	5.310	0
19.0 k ~ 22.65 k	m	300	27,208	8,162	5.310	1,593
Pulau Gambar	m	0	27,208	0	5.310	0
T o t a l	m	1,800		48,974		9,558
Drains						
-12.25 k ~ -11.25 k	m^3	7,600	600	4,560	0	0
-11.25 k ~ - 7.5 k	m^3	22,800	600	13,679	0	0
- 7.5 k ~ - 2.5 k	m^3	29,200	600	17,519	0	0
- 2.5 k ~ 0.0 k	m^3	16,400	600	9,840	0	0
0.0 k ~ 10.0 k	m^3	59,000	600	35,399	0	0
10.0 k ~ 15.0 k	m^3	0	600	0	0	0
15.0 k ~ 19.0 k	m^3	0	600	0	0	0
19.0 k ~ 22.65 k	m^3	0	600	0	0	0
Pulau Gambar	m^3	0	600	0	0	0
T o t a l	m^3	135,000		80,997	0	0
Sluice						
-12.25 k ~ -11.25 k				0		0
-11.25 k ~ - 7.5 k				0		0
- 7.5 k ~ - 2.5 k				0		0
- 2.5 k ~ 0.0 k				0		0
0.0 k ~ 10.0 k				0		0
10.0 k ~ 15.0 k				0		0
15.0 k ~ 19.0 k				0		0
19.0 k ~ 22.65 k				0		0
Pulau Gambar	ℓ.S.			26,000		45,643
T o t a l				26,000		45,643

Table 5-3-10 Field Cost (Flood Control) for Divided Sections
(Equipment-lending Syetem, 7-year Plan)

Work item	Q'ty of work Unit	Q'ty	Unit price L.C (Rp)	F.C ($)	Cost L.C (10^3Rp)	F.C ($)
Section -12.25 k to -11.25 k						
1. Land acquisition	m^3				13,275	-
2. Civil works	-	-	-	-	133,964	438,915
a. Preparation	l.s	-	-	-	26,601	52,270
b. Dredging	m^3	46,400	181	1.58	8,411	73,220
c. Excavation	m^3	0	0	0	0	0
d. Embankment	m^3	203,800	405	1.34	82,587	273,519
e. Revetment	m	0	0	0	0	0
f. Drains	m^3	7,600	600	0	4,560	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	11,805	39,906
3. Engineering and administration	l.s	-	-	-	18,976	142,446
4. Contingency (15%)	l.s	-	-	-	24,932	87,204
5. T o t a l	-	-	-	-	191,147	668,565
Section -11.25 k to -7.5 k						
1. Land acquisition	m^2				42,889	-
2. Civil works	-	-	-	-	194,300	497,323
a. Preparation	l.s	-	-	-	38,878	72,374
b. Dredging	m^3	146,100	185	1.56	27,097	227,196
c. Excavation	m^3	99,700	74	0.55	7,417	55,034
d. Embankment	m^3	316,400	285	0.31	90,108	97,502
e. Revetment	m	0	0	0	0	0
f. Drains	m^3	22,800	600	0	13,679	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	17,121	45,217
3. Engineering and administration	l.s	-	-	-	30,568	161,402
4. Contingency (15%)	l.s	-	-	-	40,164	98,809
5. T o t a l	-	-	-	-	307,921	757,534
Section -7.5 k to -2.5 k						
1. Land acquisition	m^2				47,995	-
2. Civil works	-	-	-	-	300,661	1,117,022
a. Preparation	l.s	-	-	-	62,411	124,643
b. Dredging	m^3	309,800	320	2.26	99,180	699,075
c. Excavation	m^3	180,000	139	0.80	25,051	143,597
d. Embankment	m^3	195,900	274	0.23	53,681	44,961
e. Revetment	m	600	27,208	5.31	16,325	3,186
f. Drains	m^3	29,200	600	0	17,519	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	26,494	101,560
3. Engineering and administration	l.s	-	-	-	44,933	362,519
4. Contingency (15%)	l.s	-	-	-	59,039	221,930
5. T o t a l	-	-	-	-	452,628	1,701,471

Work item	Q'ty of work Unit	Q'ty	Unit price L.C (Rp)	F.C ($)	Cost L.C (10^3Rp)	F.C ($)
Section -2.5 k to 0.0 k						
1. Land acquisition	m^2				0	-
2. Civil works	-	-	-	-	106,262	284,071
a. Preparation	l.s	-	-	-	24,555	40,208
b. Dredging	m^3	76,100	237	1.80	18,025	137,214
c. Excavation	m^3	68,700	96	0.65	6,588	44,852
d. Embankment	m^3	70,500	306	0.47	21,565	32,783
e. Revetment	m	600	27,208	5.31	16,325	3,186
f. Drains	m^3	16,400	600	0	9,840	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	9,364	25,828
3. Engineering and administration	l.s	-	-	-	13,695	92,193
4. Contingency (15%)	l.s	-	-	-	17,994	56,440
5. T o t a l	-	-	-	-	137,951	432,704
Section 0.0 k to 10.0 k						
1. Land acquisition	m^2				0	-
2. Civil works	-	-	-	-	166,923	366,385
a. Preparation	l.s	-	-	-	30,694	36,187
b. Dredging	m^3	0	0	0	0	0
c. Excavation	m^3	202,400	207	1.13	41,864	229,600
d. Embankment	m^3	144,700	306	0.47	44,258	67,286
e. Revetment	m	0	0	0	0	0
f. Drains	m^3	59,600	600	0	35,398	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	14,709	33,312
3. Engineering and administration	l.s	-	-	-	21,512	118,907
4. Contingency (15%)	l.s	-	-	-	28,265	72,794
5. T o t a l	-	-	-	-	216,700	558,086
Section 10.0 k to 15.0 k						
1. Land acquisition	m^2				49,016	-
2. Civil works	-	-	-	-	216,732	784,753
a. Preparation	l.s	-	-	-	28,647	56,290
b. Dredging	m^3	104,400	253	1.84	26,374	192,022
c. Excavation	m^3	320,800	229	1.19	73,437	381,378
d. Embankment	m^3	205,300	297	0.40	61,014	82,120
e. Revetment	m	300	27,207	5.31	8,162	1,593
f. Drains	m^3	0	0	0	0	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	19,098	71,350
3. Engineering and administration	l.s	-	-	-	34,258	254,685
4. Contingency (15%)	l.s	-	-	-	45,000	155,916
5. T o t a l	-	-	-	-	344,996	1,195,354

Work item	Q'ty of work Unit	Q'ty	Unit price L.C (Rp)	F.C ($)	Cost L.C (10^3Rp)	F.C ($)
Section 15.0 k to 19.0 k						
1. Land acquisition	m^2				27,571	-
2. Civil works	-	-	-	-	64,174	236,138
a. Preparation	l.s	-	-	-	10,231	20,104
b. Dredging	m^3	44,600	184	1.56	8,208	69,709
c. Excavation	m^3	63,100	338	1.61	21,330	101,860
d. Embankment	m^3	64,200	292	0.36	18,750	22,995
e. Revetment	m	0	0	0	0	0
f. Drains	m^3	0	0	0	0	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	5,655	21,470
3. Engineering and administration	l.s	-	-	-	11,824	76,636
4. Contingency (15%)	l.s	-	-	-	15,535	46,916
5. T o t a l	-	-	-	-	119,104	359,690
Section 19.0 k to 22.65 k						
1. Land acquisition	m^2				7,148	-
2. Civil works	-	-	-	-	35,581	41,233
a. Preparation	l.s	-	-	-	11,254	16,082
b. Dredging	m^3	0	0	0	0	0
c. Excavation	m^3	0	0	0	0	0
d. Embankment	m^3	42,600	306	0.47	13,030	19,809
e. Revetment	m	300	27,207	5.31	8,162	1,593
f. Drains	m^3	0	0	0	0	0
g. Sluice	l.s	-	-	-	0	0
h. Miscellaneous	l.s	-	-	-	3,135	3,749
3. Engineering and administration	l.s	-	-	-	5,507	13,382
4. Contingency (15%)	l.s	-	-	-	7,235	8,192
5. T o t a l	-	-	-	-	55,471	62,807
Section Pulau Gambar						
1. Land acquisition	m^2				5,106	-
2. Civil works	-	-	-	-	90,632	134,385
a. Preparation	l.s	-	-	-	26,601	24,122
b. Dredging	m^3	5,600	181	1.58	1,015	8,837
c. Excavation	m^3	0	0	0	0	0
d. Embankment	m^3	95,200	305	0.46	29,030	43,565
e. Revetment	m	0	0	0	0	0
f. Drains	m^3	0	0	0	0	0
g. Sluice	l.s	-	-	-	26,000	45,643
h. Miscellaneous	l.s	-	-	-	7,986	12,218
3. Engineering and administration	l.s	-	-	-	12,338	43,613
4. Contingency (15%)	l.s	-	-	-	16,211	26,700
5. T o t a l	-	-	-	-	124,287	204,698

Table 5-3-11 Annual Field Cost for Flood Control Component
(Equipment-lending system 7-year Plan)

1977-price

	1st 1978/79		2nd 1979/80		3rd 1980/81		4th 1981/82		5th 1982/83		6th 1983/84		7th 1984/85		Total Total	
	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)	L.C (10^3Rp)	F.C ($)
1. Land acquisition	0	0	47,995	0	49,016	0	0	0	42,889	0	53,100	0	0	0	193,000	0
2. Civil works	0	0	0	0	136,311	668,019	212,972	804,942	229,343	792,232	353,258	822,318	377,345	812,714	1,309,229	3,900,225
a. Preparation	0	0	0	0	26,572	63,252	42,875	94,392	45,891	92,902	62,296	96,430	82,238	95,304	259,872	442,280
b. Derdging	0	0	0	0	49,591	349,538	58,380	413,544	35,608	265,229	27,097	227,196	17,634	151,766	188,310	1,407,273
c. Excavation	0	0	0	0	12,526	71,799	37,004	198,924	55,546	299,104	49,281	284,634	21,330	101,860	175,687	956,321
d. Embankment	0	0	0	0	26,841	22,481	47,178	49,853	62,241	87,530	134,366	164,788	143,397	359,888	414,023	684,540
e. Revetment	0	0	0	0	0	0	0	0	0	0	0	0	48,974	9,558	48,974	9,558
f. Drains	0	0	0	0	8,760	0	8,759	0	9,840	0	49,077	0	4,560	0	80,996	0
g. Sluice	0	0	0	0	97,718	443,818	0	0	0	0	0	0	26,000	45,643	26,000	45,643
h. Miscellaneous	0	0	0	0	12,021	160,949	18,776	48,229	20,217	47,467	31,141	49,270	33,212	48,695	115,367	354,610
3. Engineering and administration	16,581	238,723	66,323	315,360	22,139	142,340	22,139	142,340	22,139	142,340	22,140	142,340	22,140	142,340	193,601	1,265,783
4. Contingency	2,487	35,808	17,148	47,304	31,120	121,554	35,267	142,092	44,156	140,186	64,274	144,699	59,922	143,258	254,374	774,901
5. T o t a l	19,068	274,531	131,466	362,664	238,586	931,913	270,378	1,089,374	338,527	1,074,758	492,772	1,109,357	459,407	1,098,312	1,950,204	5,940,909

Note: The costs exclude price escalation during construction period.

Table 5-4-1 Unit Cost for Irrigation/Drainage Works
(Equipment-lending system, 7-year Plan)

1977-price

Item	Unit	Unit Cost L.C	Unit Cost F.C	Remarks
		Rp/m^3	US$	
Irrigation canal				
Excavation by machinery	m^3	134	1.04	Backhoe (0.5 m^3) Swamp Bulldozer (12 t)
Excavation by manpower (A)	m^3	288	-	
Excavation by manpower (B)	m^3	541	-	
Embankment by machinery	m^3	428	0.61	Dump Truck (6 t) Vibrating Roller (1 t) Vibrating Plate Compactor (50 kg)
Embankment by manpower (A)	m^3	366	-	
Embankment by manpower (B)	m^3	660	-	
Excavation by machinery (A)	m^3	134	1.00	Dragline (0.6 m^3) Swamp Bulldozer (12 t)
Drains				
Excavation by machinery (B)	m^3	134	1.04	Backhoe (0.5 m^3) Swamp Bulldozer (12 t)
Excavation by machinery (C)	m^3	204	1.65	Amphibious Excavation (0.4 m^3) Swamp Bulldozer (12 t)
Excavation by manpower (A)	m^3	396	-	
Excavation by manpower (B)	m^3	696	-	
Reinforced concrete	m^3	21,704	2.31	Port concrete Mixer (0.3 m^3) Concrete Vibrator (30 ϕ mm)
Plain Concrete	m^3	18,231	2.31	Port Concrete Mixer (0.3 m^3) Concrete Vibrator (30 ϕ mm)
Form	m^2	9,233	-	
Reinforcement bar	ton	376,930 Rp/t	-	
Stone masonry	m^3	24,526 Rp/m^2	-	

Table 5-4-2 Field Cost for Irrigation/Drainage Improvement (Equipment-lending system 7-year Plan)

Item	1977-price Local Currency ($x10^3$Rp)	Foreign Currency (US$)	Total ($x10^3$Rp)
I. Land acqusition and compensation expenses	417,000	-	417,000
II. Civil work	4,825,940	2,284,980	5,774,206
1. Preparatory work	195,000	180,000	269,700
2. Irrigation work	1,537,110	218,880	1,627,945
3. Drainage work	1,305,140	1,583,340	1,962,226
4. On-farm work	1,387,500	-	1,387,500
5. Miscellaneous work	401,190	302,760	526,835
III. Engineering and administrative expenses	629,470	1,472,290	1,240,470
IV. Contingency	880,860	563,590	1,114,750
T o t a l	6,753,270	4,320,860	8,546,426

Note: The costs were estimated based on depreciation of equipment.

The costs exclude price escallation during construction period.

Table 5-4-3 Unit Price for Land Acqusition and Compensation (Irrigation/Drainage)

Depreciation	Unit	1977-price Price: Rp
Irrigated area	m^2	50
Rainfed area	"	30
Plantation area	"	50
Swampy area	"	10
Oil palm tree	tree	6,250
Rubber tree	"	2,250
Permanent house/office	m^2	25,550 ~ 25,400
Semi permanent house	"	15,400
Bamboo house	"	2,700

Table 5-4-4 Land Acquisition and Compensation (Irrigation and Drainage)

Description	Land				Tree		House
	Irrigated area	Rain-fed area	Plantation area	Swampy area	Oil palm	Rubber	
	ha	ha	ha	ha	No	No	No
. Irrigation							
Pulau Gamber	1.8	-	-	-	-	-	-
Buluh	2.0	20.7	10.9	-	2,894	1,860	-
Timbang Deli	0.6	-	-	-	-	-	-
Perbaungan	6.7	12.3	2.3	-	631	360	-
Sumber Rejo	2.5	5.8	1.0	-	371	-	-
Bendang	2.3	1.6	-	-	-	-	-
Singosari	0.6	2.2	1.3	-	482	-	-
Ramonia	2.5	1.3	-	-	-	-	-
Sub-total	19.0	43.9	15.5	-	4,378	2,220	-
. Drainage							
S. Perbaungan	11.6	22.0	-	3.4	-	-	85
Canal S. Buluh	25.4	50.0	38.0	7.6	5,100	14,500	24
S. Buluh	5.1	8.0	2.1	8.3	300	780	16
S. Teluk Mengkudu	6.8	11.0	-	-	-	-	5
S. Pavdo	-	4.4	-	-	-	-	60
S. Denai, Paluh Babi	4.0	7.7	3.3	1.5	1,220	-	-
Kwala Lawa, Pematang Kasih	8.0	16.3	6.8	3.1	2,520	-	-
S. Sijenggi, L. Sabah	4.0	7.7	3.3	1.5	1,220	-	-
S. Baru, S. Mayang	3.0	5.5	2.4	1.1	890	-	-
Sub-total	67.9	132.6	55.9	26.5	11,250	15,280	190
Grand total	86.9	176.5	71.4	26.5	15,628	17,500	190

Table 5-4-5 Cost for Land Acquisition and Compensation
(Irrigation/Drainage)

1977-price

Name of Area	Irrigated Area		Rainfed Area		Plantation Area		Swampy Are		Oil palm		Rubber		House	Others	Total
	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	No.	Cost (10^3Rp)	No.	Cost (10^3Rp)	(10^3Rp)	(10^3Rp)	(10^3Rp)
1. Irrigation work															
a. Pulau Gamber and Swadaya area	1.8	900	-	-	-	-	-	-	-	-	-	-	-	-	900
b. S. Buluh area	2.0	1000	20.7	6210	10.9	5450	-	-	2894	18090	1860	4190	-	-	34,940
c. Timbang Deli area	0.6	300	-	-	-	-	-	-	-	-	-	-	-	-	300
d. Perbaungan area	6.7	3350	12.3	3690	2.3	1150	-	-	631	3940	360	810	-	-	12,940
e. Sumbar Rejo area	2.5	1250	5.8	1740	1.0	500	-	-	371	2320	-	-	-	-	5,810
f. Bendung area	2.3	1150	1.6	480	-	-	-	-	-	-	-	-	-	-	1,630
g. Singosari area	0.6	300	2.2	660	1.3	650	-	-	482	3010	-	-	-	-	4,620
h. Ramonia area	2.5	1250	1.3	390											1,640
Sub total	19.0	9500	43.9	13170	15.5	7750	-	-	4378	27360	2220	5000	-	-	62,780
2. Drainage work															
a. S. Perbaungan	11.6	5800	22.0	6600	-	-	3.4	340	-	-	-	-	33860	14120	60,720
b. Canal S. Buluh	25.4	12700	50.0	15000	38.0	19000	7.6	760	5100	31880	14500	32630	4670	35340	151,980
c. S. Buluh	5.1	2550	8.0	2400	2.1	1050	8.3	830	300	1880	780	1760	4140	4430	19,040
d. S. Teluk Mengkudu	6.8	3400	11.0	3300	-	-	-	-	-	-	-	-	970	2330	10,000
e. S. Pavdo		0	4.4	1320	-	-	-	-	-	-	-	-	19140	6200	26,660
f. S. Denai, Paluk Babi	4.0	2000	7.7	2310	3.3	1650	1.5	150	1220	7630	-	-	-	4170	17,910
g. Kwala Lama, Pematang Kasih	8.0	4000	16.3	4890	6.8	3400	3.1	310	2520	15750	-	-	-	8590	36,940
h. S. Sijenggi, L. Sabah	4.0	2000	7.7	2310	3.3	1650	1.5	150	1220	7630	-	-	-	4170	17,910
i. S. Baru, S. Mayang	3.0	1500	5.5	1650	2.4	1200	1.1	110	890	5560	-	-	-	3040	13,060
Sub total	67.9	33950	132.6	39780	55.9	27950	26.5	2650	11250	70330	15280	34390	62780	82390	354,220
Total	86.9	43450	176.5	52950	71.4	35700	26.5	2650	15628	97690	17500	39390	62780	82390	417,000

Table 5-4-6 Breakdown of Field Cost of Civil Work for Irrigation/Drainage Improvement (Equipment-Lending System; 7-Year Plan)

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
1. Preparatory work						
1-a. Office and quarters				23,000		-
1-b. Temporary work				117,000		180,000
1-c. Survey cost				55,000		-
T o t a l				195,000		180,000
1-a. Office and quarters						
Branch office	m^2	200	20,000	4,000		
Guest house	m^2	120	30,000	3,600		
Staff house	m^2	350	20,000	7,000		
Ware house & repair shop	m^2	300	8,000	2,400		
Motor pool	m^2	800	6,000	4,800		
Others	LS			1,200		
Sub-total				23,000		
1-b. Temporary work						
Improvement of road	km	50	160,000	8,000	600	30,000
Access Road	km	30	300,000	9,000	1,000	30,000
Temporary bridge	No.	20	3,000,000	60,000	3,000	60,000
Others	LS			40,000		60,000
Sub-total				117,000		180,000
1-c. Survey cost						
Canal survey	LS			50,000		
Others	LS			5,000		
Sub-total				55,000		
T o t a l				195,000		180,000
2. Irrigation work						
2-a. Pulau Gamber and Swadaya area				44,050		6,520
2-b. S.Buluh area				540,460		107,120
2-c. Timbang Deli area				30,490		1,610
2-d. Perbaungan area				437,340		58,150
2-e. Sumber Rejo area				186,190		19,150
2-f. Bendang area				84,020		10,050
2-g. Singosari area				95,350		7,350
2-h. Ramonia area				119,210		8,930
T o t a l				1,537,110		218,880
2-a. Pulau Gamber and Swadaya area						
(1) Intake and settling basin						
Excavation by machinery	m^3	316	134	42	1.04	329
by manpower(A)	m^3	211	288	61		-
by manpower(B)	m^3	526	541	285		-
Embankment by machinery	m^3	190	428	81	0.61	116
by manpower(A)	m^3	126	366	46		-
by manpower(B)	m^3	316	660	209		-

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
Reinforced concrete	m^3	183	21,704	3,972	2.31	423
Form	m^2	915	9,233	8,448		-
Reinforcement bar	ton	12.8	376,930	4,825		-
Others	LS			1,791		87
Sub-total				19,760		955
(2) Canal						
Excavation by machinery	m^3	3,997	134	536	1.04	4,157
by manpower(A)	m^3	2,665	288	768		-
by manpower(B)	m^3	6,661	541	3,604		-
Embankment by machinery	m^3	737	428	315	0.61	450
by manpower(A)	m^3	491	366	180		-
by manpower(B)	m^3	1,228	660	810		-
Others	LS			627		461
Sub-total				6,840		5,068
(3) Related structure						
Secondary diversion work	No.	2	5,100,000	10,200	137	274
Drop	No.	1	2,800,000	2,800	83	83
Syphon	No.	1	2,860,000	2,860	91	91
Others	LS			1,590		49
Sub-total				17,450		497
T o t a l				44,050		6,520
2-b. S.Buluh area						
(1) Intake and settling basin						
Excavation by machinery	m^3	1,228	134	165	1.04	1,277
by manpower(A)	m^3	819	288	236		-
by manpower(B)	m^3	2,046	541	1,107		-
Embankment by machinery	m^3	246	428	105	0.61	150
by manpower(A)	m^3	164	366	60		-
by manpower(B)	m^3	411	660	271		-
Reinforced concrete	m^3	407	21,704	8,834	2.31	940
Form	m^2	2,035	9,233	18,789		-
Reinforcement bar	ton	28.5	376,930	10,743		-
Others	LS			4,030		237
Sub-total				44,340		2,604
(2) Canal						
Excavation by machinery	m^3	49,744	134	6,666	1.04	51,734
by manpower(A)	m^2	50,523	288	14,551		-
by manpower(B)	m^3	74,226	541	40,156		-
Embankment by machinery	m^3	43,660	428	18,686	0.61	26,633
by manpower(A)	m^3	39,196	366	14,346		-
by manpower(B)	m^3	67,719	660	44,695		-
Lining concrete	m^3	4,497	18,231	81,985	2.31	10,388
Others	LS			22,105		8,876
Sub-total				243,190		97,631
(3) Related structure						
Main diversion work	No.	2	7,650,000	15,300	207	414
Secondary diversion work	No.	16	5,100,000	81,600	137	2,192

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
Drop	No.	10	2,800,000	28,000	83	830
Aqueduct	No.	6	1,860,000	11,160	54	324
Syphon	No.	13	2,860,000	37,180	91	1,183
Conduit	No.	1	1,900,000	1,900	54	54
Bridge	No.	4	8,450,000	33,800	183	732
Check gate	No.	3	7,000,000	21,000	174	522
Others	LS			22,990		634
Sub-total				252,930		6,885
T o t a l				540,460		107,120
2-c. Timbang Deli						
(1) Intake and settling basin						
Excavation by machinery	m^3	190	134	25	1.04	198
by manpower(A)	m^3	127	288	37		-
by manpower(B)	m^3	317	541	171		-
Embankment by machinery	m^3	159	428	68	0.61	97
by manpower(A)	m^3	106	366	39		-
by manpower(B)	m^3	264	660	174		-
Reinforced concrete	m^3	204	21,704	4,428	2.31	471
Form	m^2	1,020	9,233	9,418		-
Reinforcement bar	ton	14.3	376,930	5,390		-
Gate	m^2	1.1	2,000,000	2,200		-
Others	LS			2,200		77
Sub-total				24,150		843
(2) Canal						
Excavation by machinery	m^3	540	134	72	1.04	562
by manpower(A)	m^3	360	288	104		-
by manpower(B)	m^3	900	541	437		-
Others	LS			67		55
Sub-total				730		617
(3) Related structure						
Main diversion work	No.	1	5,100,000	5,100	137	137
Others	LS			510		13
Sub-total				5,610		150
T o t a l				30,490		1,610
2-d. Perbaungan area						
(1) Intake and settling basin						
Excavation by machinery	m^3	851	134	114	1.04	885
by manpower(A)	m^3	568	288	164		-
by manpower(B)	m^3	1,419	541	768		-
Embankment by machinery	m^3	290	428	124	0.61	177
by manpower(A)	m^3	193	366	71		-
by manpower(B)	m^3	484	660	319		-
Reinforced concrete	m^3	593	21,704	12,870	2.31	1,370
Form	m^2	2,965	9,233	27,376		-
Reinforcement bar	ton	41.5	376,930	15,643		-
Others	LS			5,741		243
Sub-total				63,190		2,675

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
(2) Canal						
Excavation by machinery	m^3	32,430	134	4,346	1.04	33,727
by manpower(A)	m^3	58,448	288	16,833		-
by manpower(B)	m^3	35,633	541	19,277		-
Embankment by machinery	m^3	11,597	428	4,964	0.61	7,074
by manpower(A)	m^3	21,454	366	7,852		-
by manpower(B)	m^3	12,465	660	8,227		-
Lining concrete	m^3	990	18,231	18,049	2.31	2,287
Others	LS			7,952		4,309
Sub-total				87,500		47,397
(3) Related structure						
Main diversion work	No.	3	7,650,000	22,950	207	621
Secondary diversion work	No.	16	5,100,000	81,600	137	2,192
Drop	No.	19	2,800,000	53,200	83	1,577
Aqueduct	No.	11	1,860,000	20,460	54	594
Syphon	No.	18	2,860,000	51,480	91	1,638
Bridge	No.	2	8,450,000	16,900	183	366
Check gate	No.	2	7,000,000	14,000	174	348
Others	LS			26,060		742
Sub-total				286,650		8,078
T o t a l				437,340		58,150
2-e. Sumber Rejo area						
(1) Intake and settling basin						
Excavation by machinery	m^3	485	134	65	1.04	504
by manpower(A)	m^3	324	288	93		-
by manpower(B)	m^3	809	541	438		-
Embankment by machinery	m^3	229	428	98	0.61	140
by manpower(A)	m^3	153	366	56		-
by manpower(B)	m^3	381	660	251		-
Reinforced concrete	m^3	394	21,704	8,551	2.31	910
Form	m^2	1,970	9,233	18,189		-
Reinforcement bar	ton	27.6	376,930	10,403		-
Gate	m^2	4.3	2,000,000	8,600		-
Others	LS			4,676		155
Sub-total				51,420		1,709
(2) Canal						
Excavation by machinery	m^3	9,275	134	1,243	1.04	9,646
by manpower(A)	m^3	16,134	288	4,647		-
by manpower(B)	m^3	10,481	541	5,670		-
Embankment by machinery	m^3	4,267	428	1,826	0.61	2,603
by manpower(A)	m^3	7,257	366	2,656		-
by manpower(B)	m^3	4,904	660	3,237		-
Lining concrete	m^3	369	18,231	6,727	2.31	852
Others	LS			2,604		1,310
Sub-total				28,610		14,411
(3) Related structure						
Main diversion work	No.	1	7,650,000	7,650	207	207

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
Secondary diversion work	No.	10	5,100,000	51,000	137	1,370
Drop	No.	3	2,800,000	8,400	83	249
Aqueduct	No.	2	1,860,000	3,720	54	108
Syphon	No.	9	2,860,000	25,740	91	819
Others	LS			9,650		277
Sub-total				106,160		3,030
T o t a l				186,190		19,150
2-f. Bendang area						
(1) Intake and settling basin						
Excavation by machinery	m^3	265	134	36	1.04	276
by manpower(A)	m^3	177	288	51		-
by manpower(B)	m^3	442	541	239		-
Embankment by machinery	m^3	144	428	62	0.61	88
by manpower(A)	m^3	96	366	35		-
by manpower(B)	m^3	240	660	158		-
Reinforced concrete	m^3	194	21,704	4,211	2.31	448
Form	m^2	970	9,233	8,956		-
Reinforcement bar	ton	13.6	376,930	5,126		-
Others	LS			1,886		81
Sub-total				20,760		893
(2) Canal						
Excavation by machinery	m^3	5,516	134	739	1.04	5,737
by manpower(A)	m^3	7,455	288	2,147		-
by manpower(B)	m^3	7,304	541	3,951		-
Embankment by machinery	m^3	2,089	428	894	0.61	1,274
by manpower(A)	m^3	3,065	366	1,122		-
by manpower(B)	m^3	2,644	660	1,745		-
Others	LS			1,062		701
Sub-total				11,660		7,712
(3) Related structure						
Main diversion work	No.	1	7,650,000	7,650	207	207
Secondary diversion work	No.	3	5,100,000	15,300	137	411
Drop	No.	1	2,800,000	2,800	83	83
Aqueduct	No.	3	1,860,000	5,580	54	162
Syphon	No.	3	2,860,000	8,580	91	273
Check gate	No.	1	7,000,000	7,000	174	174
Others	LS			4,690		135
Sub-total				51,600		1,445
T o t a l				84,020		10,050
2-g. Singosari area						
(1) Intake and settling basin						
Excavation by machinery	m^3	114	134	15	1.04	119
by manpower(A)	m^3	76	288	22		-
by manpower(B)	m^3	191	541	103		-
Embankment by machinery	m^3	92	428	39	0.61	56
by manpower(A)	m^3	62	366	23		-

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3 Rp	US$	US$
Embankment by manpower(B)	m^3	154	660	102		-
Reinforced concrete	m^3	146	21,704	3,169	2.31	337
Form	m^2	730	9,233	6,740		-
Reinforcement bar	ton	10.2	376,930	3,845		-
Gate	m^2	2	2,000,000	4,000		-
Others	LS			1,802		53
Sub-total				19,860		565
(2) Canal						
Excavation by machinery	m^3	2,342	134	314	1.04	2,436
by manpower(A)	m^3	3,768	288	1,085		-
by manpower(B)	m^3	2,800	541	1,515		-
Embankment by machinery	m^3	1,780	428	762	0.61	1,086
by manpower(A)	m^3	2,705	366	990		-
by manpower(B)	m^3	2,208	660	1,457		-
Lining concrete	m^3	458	18,231	8,350	2.31	1,058
Others	LS			1,447		460
Sub-total				15,920		5,040
(3) Related structure						
Main diversion work	No.	1	7,650,000	7,650	207	207
Secondary diversion work	No.	3	5,100,000	15,300	137	411
Drop	No.	2	2,800,000	5,600	83	166
Aqueduct	No.	3	1,860,000	5,580	54	162
Syphon	No.	7	2,860,000	20,020	91	637
Others	LS			5,420		162
Sub-total				59,570		1,745
T o t a l				95,350		7,350
2-h. Ramonia area						
(1) Intake and settling basin						
Excavation by machinery	m^3	222	134	30	1.04	231
by manpower(A)	m^3	148	288	43		-
by manpower(B)	m^3	369	541	200		-
Embankment by machinery	m^3	145	428	62	0.61	88
by manpower(A)	m^3	97	366	36		-
by manpower(B)	m^3	242	660	160		-
Reinforced concrete	m^3	156	21,704	3,386	2.31	360
Form	m^2	780	9,233	7,202		-
Reinforcement bar	ton	10.9	376,930	4,109		-
Others	LS			1,522		69
Sub-total				16,750		747
(2) Canal						
Excavation by machinery	m^3	2,678	134	359	1.04	2,785
by manpower(A)	m^3	5,357	288	1,543		-
by manpower(B)	m^3	2,678	541	1,449		-
Embankment by machinery	m^3	3,718	428	1,591	0.61	2,268
by manpower(A)	m^3	7,437	366	2,722		-
by manpower(B)	m^3	3,718	660	2,454		-
Others	LS			1,012		505
Sub-total				11,130		5,558

Description	Unit	Quantity	Local Currency Unit Price	Local Currency Cost	Foreign Currency Unit Price	Foreign Currency Cost
			Rp	x 10^3Rp	US$	US$
(3) Related structure						
Main diversion work	No.	1	7,650,000	7,650	207	207
Secondary diversion work	No.	7	5,100,000	35,700	137	959
Drop	No.	2	2,800,000	5,600	83	166
Aqueduct	No.	5	1,860,000	9,300	54	270
Syphon	No.	8	2,860,000	22,880	91	728
Conduit	No.	1	1,900,000	1,900	54	54
Others	LS			8,300		241
Sub-total				91,330		2,625
T o t a l				119,210		8,930
3. Drainage work						
3-a. Pantai Labu				67,810		380
3-b. S.Denai				57,450		53,990
3-c. S.Perbaungan				165,420		274,360
3-d. Kwala Lama				51,240		124,310
3-e. Lubuk Dendang				36,660		59,330
3-f. S.Baru				25,400		41,030
3-g. Canal S.Buluh				413,170		686,800
3-h. S.Buluh				133,080		160,570
3-i. S.Teluk Mengkudu				147,980		93,780
3-j. S.Pavdo				206,930		88,790
T o t a l				1,305,140		1,583,340
3-a. Pantai Labu						
(1) Secondary canal						
Excavation by manpower(A)	m^3	112,000	396	44,352		-
Others	LS			4,438		-
Sub-total				48,790		-
(2) Related structure						
Flap gate	No.	1	6,910,000	6,910	100	100
Bridge(B)	No.	1	7,720,000	7,720	190	190
Others	LS			4,390		90
Sub-total				19,020		380
T o t a l				67,810		380
3-b. S.Denai						
(1) Main canal						
Excavation by machinery(B)	m^3	31,000	134	4,154	1.04	32,240
by machinery(C)	m^3	10,000	204	2,040	1.65	16,500
by manpower(A)	m^3	25,000	396	9,900		-
by manpower(B)	m^3	10,000	696	6,960		-
Others	LS			2,306		4,870
Sub-total				25,360		53,610
(2) Secondary canal						
Excavation by manpower(A)	m^3	30,000	396	11,880		-
Others	LS			1,190		-
Sub-total				13,070		-

Description	Unit	Quantity	Local Currency Unit Price	Local Currency Cost	Foreign Currency Unit Price	Foreign Currency Cost
			Rp	x 10^3 Rp	US$	US$
(3) Related structure						
Flap gate	No.	1	6,910,000	6,910	100	100
Bridge(B)	No.	1	7,720,000	7,720	190	190
Others	LS			4,390		90
Sub-total				19,020		380
T o t a l				57,450		53,990
3-c. S.Perbaungan						
(1) Main canal						
Excavation by machinery(A)	m^3	110,000	134	14,740	1.00	110,000
by machinery(C)	m^3	84,000	204	17,136	1.65	138,600
by manpower(A)	m^3	78,000	396	30,888		-
by manpower(B)	m^3	34,000	696	23,664		-
Others	LS			8,642		24,860
Sub-total				95,070		273,460
(2) Secondary canal						
Excavation by manpower(A)	m^3	46,000	396	18,216		-
Others	LS			1,824		-
Sub-total				20,040		-
(3) Related structure						
Drop	No.	6	2,860,000	17,160	50	300
Flap gate	No.	2	6,910,000	13,820	100	200
Bridge(B)	No.	1	7,720,000	7,720	190	190
Others	LS			11,610		210
Sub-total				50,310		900
T o t a l				165,420		274,360
3-d. Kwala Lama						
(1) Main canal						
Excavation by machinery(B)	m^3	69,000	134	9,246	1.04	71,760
by machinery(C)	m^3	25,000	204	5,100	1.65	41,250
by manpower(A)	m^3	43,000	396	17,028		-
by manpower(B)	m^3	19,000	696	13,224		-
Others	LS			4,462		11,300
Sub-total				49,060		124,310
(2) Secondary canal						
Excavation by manpower(A)	m^3	5,000	396	1,980		-
Others	LS			200		-
Sub-total				2,180		-
T o t a l				51,240		124,310
3-e. Lubuk Dendang						
(1) Main canal						
Excavation by machinery(B)	m^3	36,000	134	4,824	1.04	37,440
by machinery(C)	m^3	10,000	204	2,040	1.65	16,500
by manpower(A)	m^3	21,500	396	8,514		-
by manpower(B)	m^3	9,500	696	6,612		-
Others	LS			2,200		5,390
Sub-total				24,190		59,330

Description	Unit	Quantity	Local Currency Unit Price	Local Currency Cost	Foreign Currency Unit Price	Foreign Currency Cost
			Rp	x 10^3Rp	US$	US$
(2) Secondary canal						
Excavation by manpower(A)	m^3	22,000	396	8,712		-
Others	LS			878		-
Sub-total				9,590		-
(3) Collector drain						
Excavation by manpower(A)	m^3	6,600	396	2,614		-
Others	LS			266		-
Sub-total				2,880		-
T o t a l				36,660		59,330
3-f. S.Baru						
(1) Main canal						
Excavation by machinery(B)	m^3	20,000	134	2,680	1.04	20,800
by machinery(C)	m^3	10,000	204	2,040	1.65	16,500
by manpower(A)	m^3	17,500	396	6,930		-
by manpower(B)	m^3	7,500	696	5,220		-
Others	LS			1,690		3,730
Sub-total				18,560		41,030
(2) Secondary canal						
Excavation by manpower(A)	m^3	13,000	396	5,148		-
Others	LS			512		-
Sub-total				5,660		-
(3) Collector drain						
Excavation by manpower(A)	m^3	2,700	396	1,069		-
Others	LS			111		-
Sub-total				1,180		-
T o t a l				25,400		41,030
3-g. Canal S.Buluh						
(1) Main canal						
Excavation by machinery(A)	m^3	230,000	134	30,820	1.00	230,000
by machinery(B)	m^3	123,000	134	16,482	1.04	127,920
by machinery(C)	m^3	160,000	204	32,640	1.65	264,000
by manpower(A)	m^3	221,000	396	87,516		-
by manpower(B)	m^3	95,000	696	66,120		-
Others	LS			23,362		62,190
Sub-total				256,940		684,110
(2) Secondary canal						
Excavation by manpower(A)	m^3	26,000	396	10,296		-
Others	LS			1,034		-
Sub-total				11,330		-
(3) Collector drain						
Excavation by manpower(A)	m^3	20,600	396	8,158		-
Others	LS			822		-
Sub-total				8,980		-
(4) Related structure						
Drop	No.	24	2,860,000	68,640	50	1,200

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			RP	x 10^3Rp	US$	US$
Bridge(A)	No.	1	15,350,000	15,350	370	370
" (B)	No.	2	7,720,000	15,440	190	380
" (D)	No.	1	5,120,000	5,120	120	120
Others	LS			31,370		620
Sub-total				135,920		2,690
T o t a l				413,170		686,800
3-h. S.Buluh						
(1) Main canal						
Excavation by machinery(A)	m^3	19,000	134	2,546	1.00	19,000
by machinery(B)	m^3	15,000	134	2,010	1.04	15,600
by machinery(C)	m^3	67,000	204	13,668	1.65	110,550
by manpower(A)	m^3	72,000	396	28,512		-
by manpower(B)	m^3	32,000	696	22,272		-
Others	LS			6,912		14,520
Sub-total				75,920		159,670
(2) Secondary canal						
Excavation by manpower(A)	m^3	6,000	396	2,376		-
Others	LS			244		-
Sub-total				2,620		-
(3) Collector drain						
Excavation by manpower(A)	m^3	9,700	396	3,841		-
Others	LS			389		-
Sub-total				4,230		-
(4) Related structure						
Drop	No.	6	2,860,000	17,160	50	300
Flap gate	No.	2	6,910,000	13,820	100	200
Bridge(B)	No.	1	7,720,000	7,720	190	190
Others	LS			11,610		210
Sub-total				50,310		900
T o t a l				133,080		160,570
3-i. S.Teluk Mengkudu						
(1) Main canal						
Excavation by machinery(A)	m^3	33,000	134	4,422	1.00	33,000
by machinery(C)	m^3	31,000	204	6,324	1.65	51,150
by manpower(A)	m^3	51,500	396	20,394		-
by manpower(B)	m^3	22,500	696	15,660		-
Others	LS			4,680		8,420
Sub-total				51,480		92,570
(2) Secondary canal						
Excavation by manpower(A)	m^3	72,000	396	28,512		-
Others	LS			2,858		-
Sub-total				31,370		-
(3) Collector drain						
Excavation by manpower(A)	m^3	15,600	396	6,178		-
Others	LS			622		-
Sub-total				6,800		-

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10³Rp	US$	US$
(4) Related structure						
Drop	No.	1	2,860,000	2,860	50	50
Flap gate	No.	2	6,910,000	13,820	100	200
Bridge(A)	No.	1	15,350,000	15,350	370	370
" (B)	No.	1	7,720,000	7,720	190	190
" (D)	No.	1	5,120,000	5,120	120	120
Others	LS			13,460		280
Sub-total				58,330		1,210
T o t a l				147,980		93,780
3-j. S.Pavdo						
(1) Main canal						
Excavation by machinery(B)	m^3	12,000	134	1,608	1.04	12,480
by machinery(C)	m^3	40,000	204	8,160	1.65	66,000
by manpower(A)	m^3	4,000	396	1,584		-
by manpower(B)	m^3	2,000	696	1,392		-
Others	LS			1,276		7,850
Sub-total				14,020		86,330
(2) Secondary canal						
Excavation by manpower(A)	m^3	167,000	396	66,132		-
Others	LS			6,618		-
Sub-total				72,750		-
(3) Collector drain						
Excavation by manpower(A)	m^3	14,800	396	5,861		-
Others	LS			589		-
Sub-total				6,450		-
(4) Related structure						
Drop	No.	2	2,860,000	5,720	50	100
Flap gate	No.	3	6,910,000	20,730	100	300
Bridge(A)	No.	2	15,350,000	30,700	370	740
" (B)	No.	1	7,720,000	7,720	190	190
" (C)	No.	2	11,300,000	22,600	280	560
Others	LS			26,240		570
Sub-total				113,710		2,460
T o t a l				206,930		88,790
4. On-farm work						
4-a. Pulau Gamber and Swadaya area				56,000		-
4-b. S.Buluh area				406,000		-
4-c. Timbang Deli area				18,500		-
4-d. Perbaungan area				419,000		-
4-e. Sumber Rejo area				213,000		-
4-f. Bendang area				111,000		-
4-g. Singosari area				58,000		-
4-h. Ramonia area				106,000		-
T o t a l				1,387,500		-

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3Rp	US$	US$
4-a. Pulau Gamber & Swadaya area						
Farm ditch	m	24,000	400	9,600		
Farm drain	m	24,000	800	19,200		
Farm road	m	18,000	1,200	21,600		
Miscellaneous	LS			5,600		
T o t a l				56,000		-
4-b. S.Buluh area						
Farm ditch	m	176,000	400	70,400		
Farm drain	m	176,000	800	140,800		
Farm road	m	132,000	1,200	158,400		
Miscellaneous	LS			36,400		
T o t a l				406,000		-
4-c. Timbang Deli area						
Farm ditch	m	8,000	400	3,200		
Farm drain	m	8,000	800	6,400		
Farm road	m	6,000	1,200	7,200		
Miscellaneous	LS			1,700		
T o t a l				18,500		-
4-d. Perbaungan area						
Farm ditch	m	181,000	400	72,400		
Farm drain	m	181,000	800	144,800		
Farm road	m	135,750	1,200	162,900		
Miscellaneous	LS			38,900		
T o t a l				419,000		-
4-e. Sumber Rejo area						
Farm ditch	m	92,000	400	36,800		
Farm drain	m	92,000	800	73,600		
Farm road	m	69,000	1,200	82,800		
Miscellaneous	LS			19,800		
T o t a l				213,000		-
4-f. Bendang area						
Farm ditch	m	48,000	400	19,200		
Farm drain	m	48,000	800	38,400		
Farm road	m	36,000	1,200	43,200		
Miscellaneous	LS			10,200		
T o t a l				111,000		-
4-g. Singosari area						
Farm ditch	m	25,000	400	10,000		
Farm drain	m	25,000	800	20,000		
Farm road	m	18,750	1,200	22,500		
Miscellaneous	LS			5,500		
T o t a l				58,000		-

Description	Unit	Quantity	Local Currency		Foreign Currency	
			Unit Price	Cost	Unit Price	Cost
			Rp	x 10^3 Rp	US$	US$
4-h. Ramonia area						
Farm ditch	m	46,000	400	18,400		
Farm drain	m	46,000	800	36,800		
Farm road	m	34,500	1,200	41,400		
Miscellaneous	LS			9,400		
T o t a l				106,000		-

Table 5-4-7 Annual Field Cost for Irrigation/Drainage Component
(Equipment-Lending System; 7-Year Plan)

1977-price

Description	1 1978/79		2 1979/80		3 1980/81		4 1981/82		5 1982/83		6 1983/84		7 1984/85		Total	
	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.
	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$	$\times 10^3$Rp	US$
I. Civil work																
1. Preparatory work	-	-	13,650	12,600	87,750	81,000	23,400	21,600	23,400	21,600	23,400	21,600	23,400	21,600	195,000	180,000
2. Irrigation work	-	-	-	-	305,400	28,080	273,850	35,950	291,560	38,770	360,310	71,410	305,990	44,670	1,537,110	218,880
3. Drainage work	-	-	-	-	157,636	299,740	195,404	324,090	183,046	318,420	373,759	388,540	395,295	252,550	1,305,140	1,583,340
4. On-farm work	-	-	-	-	319,000	-	306,670	-	279,330	-	270,670	-	211,830	-	1,387,500	-
5. Miscellaneous work work	-	-	1,237	1,924	78,863	62,442	72,474	58,291	70,481	57,856	93,221	73,551	84,914	48,696	401,190	302,760
Sub-total	-	-	14,887	14,524	948,649	471,262	871,798	439,931	847,817	436,646	1,121,360	555,101	1,021,429	367,516	4,825,940	2,284,980
II. Land Acquisition and compensation expenses	-	-	86,080	-	106,020	-	73,780	-	98,060	-	53,060	-	-	-	417,000	-
III. Engineering and administrative expenses	39,220	211,591	91,500	467,199	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	629,470	1,472,290
IV. Physical contingency	5,883	31,739	28,870	72,258	173,162	94,494	156,799	89,795	156,844	89,302	191,125	107,070	168,177	78,932	880,860	563,590
Total	45,103	243,330	221,337	553,981	1,327,581	724,456	1,202,127	688,426	1,202,471	684,648	1,465,295	820,871	1,289,356	605,148	6,753,270	4,320,860

Table 5-5-1 Cost of Equipment, Spare Parts and Others for Flood Control Component (Equipment-Lending System; 7-Year Plan)

1977-price

Equipment	Unit price ($)	Q'ty (nos.)	Amount ($)
I. Equipment and Spare parts			
1. Bulldozer, swamp w/winch, 15t class	87,137	5	435,685
2. Bulldozer, swamp w/winch, 12t class	66,390	4	265,560
3. Backhoe, swamp, 0.5 m^3	62,241	3	186,723
4. Attachment for above	-	1 lot	8,299
5. Amphibious dredger, w/pipe, 40 m^3/hr	373,444	2	746,888
6. Amphibious soft terrain excavator, 0.4 m^3	107,884	2	215,768
7. Attachment for above	-	1 lot	8,299
8. Dump truck, 4 x 4, 6t	18,672	18	336,096
9. Crawler type dump trailer, 4.5 m^3	10,374	2	20,748
10. Vibrating roller, 2.5t	11,203	6	67,218
11. Vibrating roller, 1t	6,224	8	49,792
12. Vibrating plate compactor for soil, 50 kg	830	15	12,450
13. Vibrating pile driver/extractor, 15 KW	12,864	1	12,864
14. Fuel tunker, 4 x 4, 4,000 ℓ	20,748	1	20,748
15. Service car, 4 x 4, 1t	8,299	2	16,598
16. Ordinary truck, 4.5 t	13,692	2	27,384
17. Diesel generator, 100 KVA	49,792	1	49,792
18. Diesel generator, 45 KVA	2,075	5	10,375
19. Chain saw, 500 mm	622	5	3,110
20. Tools for repair	-	LS	45,810
21. Miscellaneous	-	LS	762,062
(Sub-total for the above)		LS	(3,302,269)
22. Spare part	-	LS	987,684
(Sub-total for the above)			(4,289,953)
II. Materials			
23. Raingage and Water level gage		LS	29,046
24. Radio telephone, fix(3) movale(3)		LS	99,585
(Sub-total for the above)			(4,418,584)
25. Contingency			662,788
26. T o t a l			5,081,372

Note : Cost of local currency for spare parts is estimated at Rp. 157 million at the 1977 price excluding contingency.

: Salvage value of equipment after completion of the work is estimated at US$ 596,113.

Table 5-5-2 Cost of Equipment, Spare Parts for Irrigation/Drainage Component (Equipment-lending system 7-Year Plan)

1977-price

Description	Q'ty	Equipment		Spare part	
		Unit	Amount	F.C	L.C
		US$	US$	US$	x 10^3Rp
1. Dragline (0.6 m^3)	3	66,390	199,170	101,976	8,975
2. Attachment for the above	1 lot	-	8,299	2,656	702
3. Backhoe, Swamp (0.5 m^3)	3	62,241	186,723	95,601	8,415
4. Attachment for the above	1 lot	-	8,299	2,656	702
5. Amphibious Soft Terrain Excavator (0.4 m^3)	4	107,884	431,536	234,756	21,559
6. Bulldozer, Swamp (12t)	6	66,390	398,340	293,178	25,804
7. Dump Truck (6t)	4	18,672	74,688	43,020	3,786
8. Vibrating Roller (1t)	1	6,224	6,224	3,386	298
9. Vibrating Plate Compactor for Slope (50 kg)	5	830	4,150	1,860	164
10. Port Concrete Mixer (0.3 m^3)	3	9,959	29,877	13,386	1,178
11. Concrete Bibrator (ϕ 30 mm)	2	622	1,244	238	21
12. Fuel Tanker (4,000 ℓ)	1	20,748	20,748	9,295	818
13. Ordinary Truck (4.5t)	3	13,692	41,076	21,030	1,851
14. Service Car, 4 x 4, (1t)	2	8,299	16,598	9,030	948
15. Diesel Generator (45 KVA)	2	2,075	4,150	1,062	93
16. Chain Saw (ϕ 500 mm)	5	622	3,110	1,395	123
17. Crawler Type Dump Trailer (45 m^3)	3	10,374	31,122	13,944	1,227
18. Tools for Repair Shop	LS		29,307	-	-
19. Miscellaneous	LS		448,398	-	-
Sub-total			1,943,059	848,469	76,464
			(2,791,528)		
20. Contingency (15%)			291,459	127,270	11,470
T o t a l			2,234,518	975,739	87,934
			(3,210,257)		

Note : Salvage Value of equipment after completion of the works is estimated at US$ 582,530.

Table 5-6-1 Construction Cost for Flood Control Component (Equipment-lending System 7-Year Plan)

1977-price

Description	L.C.(1,000 Rp)	F.C.(US$)	Total(1,000 Rp)
Land	193,000		193,000
Civil works	1,309,229	4,418,584	3,142,941
Labor	496,541	-	496,541
Materials	655,643	128,631	709,025
Equipment	-	3,302,269	1,370,441
Spare parts	157,045	987,684	566,934
Engineering & administration	193,601	1,265,783	718,901
Contingency	254,375	852,657	608,227
T o t a l	1,950,205	6,537,024	4,663,069

Note : L.C. denotes local currency. F.C. denotes foreign currency.

The cost excludes price escalation during the construction period.

The salvage value of the equipment after the completion of works was estimated at US$596,113 at the 1977-price.

Engineering and administration include the amount of US$159,883 at the 1977-price required for procuring the instruments and cars.

Table 5-6-2 Construction Cost for Irrigation/Drainage Component (Equipment-lending System 7-Year Plan)

1977-price

Description	L.C.(1,000 Rp)	F.C.(US$)	Total(1,000 Rp)
1. Land Acquisition & Compensation	417,000	-	417,000
2. Civil Work	4,825,940	2,791,528	5,984,424
Labor	2,596,296	-	2,596,296
Material	2,153,180	-	2,153,180
Equipment	-	1,943,059	806,369
Spare part	76,464	848,469	428,579
3. Engineering & Administration	629,470	1,472,290	1,240,470
4. Contingency	880,860	639,572	1,146,283
5. T o t a l	6,753,270	4,903,390	8,788,177

Notes : L.C. denotes local currency. F.C. denotes foreign currency.

The cost excludes price escalation during the construction period.

Salvage value of the equipment after the completion of works was estimated at US$582,530 at the 1977-price.

Engineering and administration includes the amount of US$94,791 at the 1977-price required for procuring the instruments and cars.

Table 5-6-3 Annual Construction Cost for Flood Control Component
(Equipment-lending System 7-Year Plan)

1977-price Unit : Rp 1,000 for L.C.
US$ for F.C.

Description \ Year	1978/79		1979/80		1980/81		1981/82		1982/83		1983/84		1984/85		Total	
	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.
1. Land Acquisition and Compensation	-	-	47,995	-	49,016	-	-	-	42,889	-	53,100	-	-	-	193,000	-
2. Civil Work	-	-	-	660,454	114,084	2,770,446	218,532	246,921	234,637	246,921	356,676	246,921	385,300	246,921	1,309,229	4,418,584
a. Equipment	-	-	-	660,454	-	2,641,815	-	-	-	-	-	-	-	-	-	3,302,269
b. Spare part	-	-	-	-	-	-	39,261	246,921	39,261	246,921	39,261	246,921	39,262	246,921	157,045	987,684
c. Material	-	-	-	-	65,295	128,631	107,078	-	114,798	-	150,437	-	218,035	-	655,643	128,631
d. Labor	-	-	-	-	48,789	-	72,193	-	80,578	-	166,978	-	128,003	-	496,541	-
3. Engineering and administration	16,581	238,723	66,323	315,360	22,139	142,340	22,139	142,340	22,139	142,340	22,140	142,340	22,140	142,340	193,601	1,265,783
4. Contingency	2,487	35,808	17,148	146,372	27,786	436,918	36,101	58,389	44,950	58,389	64,787	58,389	61,116	58,390	254,375	852,655
5. T o t a l	19,068	274,531	131,466	1,122,186	213,025	3,349,704	276,772	447,650	344,615	447,650	496,703	447,650	468,556	447,651	1,950,205	6,537,022
	132,998		597,173		1,603,152		462,547		530,390		682,478		654,331		4,663,069	10^3Rp

Notes : The cost excludes price escalation during the construction period.

Engineering and administration includes the amount of US$159,883 required for procuring the instruments and cars.

The salvage value of the equipment was estimated at US$596,113 at the 1977-price.

Table 5-6-4 Annual Construction Cost for Irrigation/Drainage Component
(Equipment-lending System 7-Year Plan)

1977-price Unit : Rp 1,000 for L.C.
US$ for F.C.

Description \ Year	1978/79		1979/80		1980/81		1981/82		1982/83		1983/84		1984/85		Total	
	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.
1. Land Acquisition and Compensation	-		86,080		106,020		73,780		98,060		53,060		-		417,000	
2. Civil Work			14,887	355,426	948,649	1,237,728	871,798	677,122	847,817	217,188	1,121,360	173,751	1,021,429	130,313	4,825,940	2,791,528
a. Equipment and Spare parts			538	355,426	15,783	1,237,728	14,897	677,122	15,209	217,188	17,871	173,751	12,166	130,313	76,464	2,791,528
b. Material			5,380		416,960		359,592		368,588		515,320		487,340		2,153,180	
c. Labor, etc.			8,969		515,906		497,309		464,020		588,169		521,923		2,596,296	
3. Engineering and administration	39,220	211,591	91,500	467,199	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	629,470	1,472,290
4. Contingency	5,883	31,739	28,870	123,394	173,162	209,464	156,799	125,373	156,844	56,383	191,125	49,867	168,177	43,352	880,860	639,572
5. T o t a l	45,103	243,330	221,337	946,019	1,327,581	1,605,892	1,202,127	961,195	1,202,471	432,271	1,465,295	382,318	1,289,356	332,365	6,753,270	4,903,390
	146,085		613,935		1,994,026		1,601,023		1,381,863		1,623,957		1,427,288		8,788,177	10^3Rp

Notes : The cost excludes price escalation during the construction period.

Engineering and administration include the amount of US$94,791 required for procuring the instruments and cars.

The salvage value of the equipment was estimated at US$582,530.

CHAPTER VI

COST ESTIMATE FOR SEVEN-YEAR PLAN
(FULL-CONTRACTING SYSTEM)

6.1. Composition of Construction Cost.

The construction cost of the project was estimated by dividing the project into the flood control component and the irrigation/drainage improvement component. The costs were calculated at the 1977-price and on the following assumptions.

a. Execution of the works are carried out by full-contracting system as mentioned in the previous paragraph 3.4.1.

b. The construction schedules are as mentioned in the previous paragraphs 3.3.3.(1) and 3.4.2.(1).

c. The civil works are carried out by contractors.

d. The major part of construction equipment and their spare parts required for the works are arranged by the contractors. Some existing equipment available for the works are lent to contractors by the Government and necessary spare parts for them and maintenance are made by the contractors during the period of use of them.

The construction cost is composed of costs required for land acquisition and compensation, cost for civil works (which are composed of depreciation cost and operation cost of construction equipment, cost for spare parts including for the existing equipment to be lent for this project by the Government, labor cost, material cost, cost for technicians), engineering & administration cost including that for foreign consultants and contingency.

The cost required for civil works was calculated by multiplying work quantity by unit cost. The work quantities have already been obtained as mentioned previously.

Unit costs were estimated on the basis of costs required for labor, materials, technicians for execution, depreciation cost of equipment (using CIF Belawan, life time and capacity), spare parts and operation cost of equipment.

Cost for land acquisition and compensation was estimated based on the unit prices required for similar works in this area.

Engineering and administration cost was assumed at about 20% of the cost for land acquisition & compensation and civil works.

The construction costs were classified into two components of local currency and foreign currency. The local currency component is composed of cost for land acquisition & compensation, domestic labor cost, cost for materials, cost for materials, cost for engineering and administration of the executing agency including costs for foreign consultants such as per diem and general expense in the site, other costs such as contractors' cost in the site and contingency. Construction materials except rain-gages, water-level gages and radio telephones were considered to be procured at local markets.

The foreign currency component comprizes the cost of construction equipment on the basis of depreciation estimated by use of CIF prices at Belawan and life time of equipment, cost for spare parts for construction equipment including spare parts for the existing equipment to be used for the project, cost for special materials such as observation instruments (rain gages, water-level gages) and communication instruments (radio telephones), cost for technicians for execution of the works, cost required for retaining foreign consultants including costs for procuring instruments for surveying and laboratory use and cars for detailed design & supervision and contingency. The costs for foreign consultants' services consists of those for remuneration and out-of-pocket expenses for the leader of consultants, surveying engineers, civil engineers, hydrologists, design engineers for river and irrigation/drainage, construction engineers, staffs for general affairs and other specialists.

The contingency was estimated at 15% of the sum of land cost and cost for civil works.

The conversion ratio of Rp to US$ and Japanese Yen used in the cost estimation are as follows.

Rp 415 = US$ 1 = ¥ 241

These were the average middle rate of conversion in Tokyo in December 1977.

6.2. Cost Estimate for Flood Control Component.

The construction cost was estimated by multiplying work quantity by unit cost in principle. The work quantities have already been obtained by the study mentioned previously. Unit costs were estimated on the basis of costs required for labor, materials, depreciation cost of equipment, spare parts, technicians for execution, operation of equipment including operator, fuel and consumables and profits & overhead of contractor.

The unit prices of labor and materials to be procured locally were estimated as shown in Table 5-1-1 and 5-1-2 at the 1977-price.

6.2.1. Unit Cost for Flood Control Works in Full-Contracting System.

In estimating unit costs, hourly depreciation costs of equipment, spare parts required during operation and unit operation cost of equipment were estimated as basic data. Hourly depreciation costs were estimated by applying prices in CIF Belawan Harbor at the 1977-price and life-time of equipment.

$$\text{Hourly depreciation} = \frac{\text{CIF Belawan} \times (1 - 0.1)}{\text{life-time of equipment}}$$

The cost for spare parts was estimated by applying experimental percentage to procurement cost of each equipment. The estimated hourly depreciation cost and percentage for spare parts for major equipment are shown in Table 6-2-1.

The unit operation costs of major equipment were estimated as shown in Table 6-2-2.

The unit costs for major different types of work were estimated by applying combined use of unit operation cost mentioned above. They are shown in Table 6-2-3. The unit costs include profits and overhead for contractor.

6.2.2. Construction Equipment Required for Flood Control Works.

For execution of the works, such existing equipment available for the works as shown in Table 3-1-1 are lent to contractors by the Government. In addition to the above-mentioned equipment, necessary equipment and spare parts including for the existing equipment available shall be arranged by the contractors. Required major construction equipment are estimated as shown in Table 6-2-4.

6.2.3. Construction Cost for Flood Control.

The construction cost for the flood control component in full contracting system was estimated at Rp 4,414,000,000 consisting of Rp 1,655,000,000 of local currency portion and US$ 6,648,000 (equivalent to Rp 2,759,000,000) of foreign currency portion at the 1977-price. The cost is shown in Tables 6-2-5 and 6-2-6.

As for land necessary for construction of low-water channel and levees, the usual way of land acquisition was proposed; however, for land necessary for the high-water channels, a way of compensation per unit area was proposed because it seems to be to avoid changeability of cost compared with the way of compensation per tree. The area of land to be acquired or compensated for the flood control works was estimated on the topographic map prepared in 1977 on a scale of 1/10,000. The area and cost for land acquisition and compensation are shown in the previous Tables 5-3-5 and 5-3-6. The unit prices for

land acquisition and compensation employed here are shown in the previous Table 5-3-7.

The construction cost for civil works was estimated by multiplying work quantity by the unit cost mentioned in Paragraph 6.2.1.

The cost for preparatory work of access roads, clearing and others are shown in Table 6-2-7.

The miscellaneous work of the civil works in Table 6-2-6 includes the costs for the following works at the 1977-price.

a. Construction of two rainfall observation stations.

L.C. = Rp 1,680,000
F.C. = US$ 7,884

b. Construction of 5 water-level observation stations.

L.C. = Rp 11,400,000
F.C. = US$ 21,162

c. Construction of 3 VHF radio stations and preparation of 3 mobil stations.

L.C. = Rp 8,000,000
F.C. = US$ 99,585

Total L.C. = Rp 21,080,000
F.C. = US$ 128,631

The cost for the engineering and administration includes the following costs at the 1977-price excluding price escalation.

a. The procuring cost of instruments for surveying and laboratory use :

US$ 83,000.-

b. The procuring cost of cars for carrying out detailed design and supervision :

US$ 76,883.-

2 jeeps of long chassis including spare parts : US$ 25,628.
5 jeeps of hard top including spare parts : US$ 51,255.

c. The cost for foreign consultants services : US$ 1,105,900.

The breakdown of construction cost for dredging, excavation, embankment, revetment, drain and sluice is shown in Table 6-2-8.

The whole stretch of the river for improvement was divided into 9 sections as shown in Table 6-2-9.

The annual construction cost for flood control component was estimated as shown in Tables 6-2-8 and 6-2-9 based on the sequence of the works described in the previous paragraph 3.3.3.(1). This is shown in Tables 6-2-10 and 6-2-11.

6.3. Cost Estimate for Irrigation/Drainage Improvement Component.

The Construction costs were estimated by multiplying work quantity by unit cost in principle. The work quantities have already been obtained by the study mentioned previously. Unit costs were estimated on the basis of costs required for labor, materials, depreciation of equipment, spare parts, technicians for execution, operation of equipment including operator, fuel and consumables and profits & overhead of contractor.

The unit prices of labor and materials to be procured locally were estimated at the same prices those for the flood control works mentioned in the previous paragraph 6.2.

6.3.1. Unit Cost for Irrigation/Drainage Improvement Works in Full-Contracting System.

In estimating unit costs, hourly depreciation cost of equipment, spare parts required during the operation and unit operation costs of equipment were estimated as basic data. The unit costs for major different types of works shown in Table 6-3-1 were estimated by combined use of unit operation cost shown in Table 6-2-2 based on the depreciation cost.

6.3.2. Construction Equipment Required for Irrigation/Drainage Improvement Works.

For execution of the works, the existing equipment, as shown in Table 3-1-1, for the works are lent to contractors by the Government. In addition to the above-mentioned equipment, necessary equipment and spare parts including the existing equipment available shall be arranged by the contractors. Required major construction equipment are estimated as shown in Table 6-3-2.

6.3.3. Construction Cost for Irrigation/Drainage Improvement.

The construction cost for the irrigation/drainage improvement component in full-contracting system was estimated at Rp 8,546,000,000 consisting of Rp 6,437,000,000 of local currency portion and US$ 5,083,000 (equivalent to Rp 2,127,000,000) of foreign currency portion at the 1977-price. The cost is summarized in Tables 6-3-3 and 6-3-4.

The cost required for land acquisition and compensation was estimated at the 1977-price by the same manner described in the previous paragraph 5.4.2. This is shown in Table 6-3-5.

The cost for engineering and administration includes the following costs excluding contingency and price escalation.

a. The cost for procuring instruments for surveying and laboratory use:

US$ 38,410.

b. The cost for procuring cars for carrying out detailed design and supervision:

US$ 56,381.

2 jeeps of long chassis including spare parts: US$ 25,628.

2 jeeps of hard top including spare parts : US$ 30,753.

c. The cost for foreign consultants' services : US$ 1,377,499.

The breakdown of the cost for civil work mentioned above is shown in Table 6-3-6.

The annual construction cost for irrigation/drainage component was estimated as shown Tables 6-3-7 and 6-3-8 based on the sequence of the works described in the previous paragraph 3.4.2.(1).

6.4. Operation, Maintenance and Replacement Cost.

The maintenance cost after the completion of the project for the flood control facilities including clearing works on the major beds and maintenance of low water channel by dredging was assumed at Rp 25,000,000 per year at the 1977-price. This amount is equivalent to about 0.5% of the field cost of the flood control component.

The operation and maintenance cost for the irrigation and drainage facilities after the completion of construction was assumed at Rp 88,000,000 at the 1977-price including those for operation and maintenance of the intakes, maintenance of the approach canals and settling basins by dredging, maintenance of the irrigation canals, operation and maintenance of the related irrigation structures, maintenance of the drainage canals, operation and maintenance of the related drainage structures, and maintenance of the farm ditches, the farm drains and the farm roads.

The amount of operation and maintenance cost in the irrigation and drainage sector during the construction period was assumed to be proportional to the area developed. The annual disbursement schedule of the operation and maintenance cost for the irrigation and drainage facilities is shown below.

Annual Disbursement Schedule of Operation and Maintenance Cost for Irrigation and Drainage Facilities

Unit: million Rp

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	After 1986/87
O.M. cost		21	43	61	76	88	88

The cost required for replacing the facilities for irrigation and drainage within the period of project life was assumed mainly for the gates. Their life year was assumed at 30 years. Since the civil works for the irrigation/drainage improvement are scheduled to be carried out for the period of 1980/81 to 1984/85 as shown in Table 5-4-2, replacement will be carried out over the five years extending from 2010/11 to 2014/15. The total amount of the cost for replacement was estimated at Rp 90,000,000.

There is no necessity for counting the second replacement because it is beyond the project life. The following table, therefore, shows the annual disbursement schedule of the replacement cost during the said five years.

Annual Disbursement Schedule of Replacement Cost

Unit: million Rp

	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Replacement Cost	30	14	13	13	20

Table 6-2-1 Hourly Depreciation Cost of Equipment and Spare Parts

Equipment (a)	1977-price CIF Belawan (1977-prices) (b) (US$)	Hourly depreciation cost (c) (US$/hr)	Spare parts (b) × % (%)	Life-time of equipment (hours)
Bulldozer, swamp-15 t	87,137	12.07	92	6,500
Bulldozer, swamp-12 t	66,390	9.19	92	6,500
Backhoe, swamp, 0.5 m^3	62,241	8.62	64	6,500
Dragline, swamp, 0.6 m	66,390	7.97	64	7,500
Amphibious dredger, w/pipe	373,444	28.01	68	12,000
Amphibious soft terrain excavator, 0.4 m^3	107,884	14.94	68	6,500
Dump truck, 4 × 4, 6 t	18,672	2.80	72	6,000
Vibrating roller, 2.5 t	11,203	1.68	68	6,000
Vibrating roller, 1 t	6,224	0.85	68	6,000
Vibrating plate compactor for soil, 50kg	830	0.12	56	6,000
Vibrating pile driver/extractor, 15 kw	12,864	1.40	68	8,000
Portable concrete mixer, 0.3 m	9,959	1.38	56	6,500

Notes: Spare parts are those which are required for a machine during its life time and include overhaul and minor repair.

Percentage (%) in the column of Spare parts is a ratio of cost for spare parts to the cost for purchase of a machine.

Table 6-2-2 Unit Operation Cost (Full-contracting System; 7-year Plan)

1977-price

Equipment	Hourly capacity (m^3/hr)	Unit operation cost L.C. Labor, etc (Rp/m^3)	L.C. Consumable material (Rp/m^3)	F.C. Equipment and spare part ($/$m^3$)	F.C. Technician ($/$m^3$)
1. Amphibious dredger	30	53	56	1,719	0.032
2. Amphibious soft terrain excavator	25	38	35	1,049	0.022
3. Bulldozer swamp-12t					
a. Long distance excavation	35	22	18	0.531	0.013
b. Short distance excavation	50	15	12	0.372	0.009
c. Spreading	70	11	9	0.266	0.007
4. Bulldozer swamp-15t					
a. Long distance excavation	35	22	24	0.697	0.013
b. Short distance excavation	50	15	17	0.488	0.009
c. Spreading	70	11	12	0.349	0.007
5. Backhoe, swamp, 0.5 m	30	18	18	0.492	0.011
6. Dragline	30	17	21	0.498	0.010
7. Drump truck,4×4, 6t					
a. L = 1 km	8	20	120	0.630	0.013
b. L = 3 km	5	32	192	1,008	0.020
c. L = 5 km	3.5	46	274	1,440	0.029
d. L = 10 km	2.5	64	384	2,016	0.040
8. Vibration roller 1t	13	36	28	0.115	0.022
9. Vibration roller 2.5t	20	24	28	0.148	0.015

Equipment	Hourly capacity (m^3/hr)	Unit operation cost			
		L.C.		F.C.	
		Labor, etc (Rp/m^3)	Consumable material (Rp/m^3)	Equipment and spare part ($/$m^3$)	Technician ($/$m^3$)
10. Vibration plate tamper	2.6	62	56	0.077	0.038
11. Vibration pile driver	3 pcs/hr	313 Rp/pcs	288 Rp/pcs	0.817 $/pcs	0.187 $/pcs
12. Excavation	-	440	50	-	0.265

Table 6-2-3 Unit Cost : Flood Control
(Full-Contracting System; 7-year Plan)

1977-price

Description	Unit	Unit cost L.C. (Rp/m^3)	Unit cost F.C. ($/$m^3$)	Unit cost Total (Rp/m^3)	Remarks
1. Dredging					
a. Amp. dredger (to emb. direct)	m^3	109	1,751	836	
b. Amp. dredger (to emb. by bull. backh. and DT-3km)	m^3	399	3,721	1,943	
c. Amp. dredger (to emb. by bull. backh. and DT-5km)	m^3	495	4,162	2,222	
d. Amp. dredger (to spoil bank by full, backh and DT-1km & bull)	m^3	337	3,651	1,852	
e. Amp. dredger (to spoil bank by bull)	m^3	131	2,066	988	
f. Amp. excavator (to emb. by bull.)	m^3	116	1,698	821	
g. Amp. excavator (to emb. by bull. backh and DT-1km)	m^3	279	2,656	1,381	
2. Excavation					
a. Bulldozer (to emb. direct)	m^3	43	0.627	303	
b. Bulldozer (to emb. by backh and DT-1km)	m^3	206	1,585	865	
c. Bulldozer (to emb. by backh and DT-3km)	m^3	290	1,970	1,108	
d. Bulldozer (to emb. by backh and DT-5km)	m^3	386	2,411	1,387	

Description	Unit	Unit cost L.C. (Rp/m^3)	F.C. ($/$m^3$)	Total (Rp/m^3)	Remarks
e. Bulldozer (to emb. by backh. and DT-10km)	m^3	514	2,998	1,758	
f. Bulldozer (to emb. by backh. and DT-1km & bull)	m^3	228	1,900	1,017	
3. Embankment					
a. Com. by V & T and sod.	m^3	228	0.285	346	
b. Com. by V & T & bull. for 1/2 of volume and sod.	m^3	240	0.443	424	
c. Comp. by V & T & bull and sod.	m^3	250	0.600	499	
d. Amp. dredger	m^3	349	2,194	1,260	
4. Revetment	m	26,600 Rp	6,774 $	29,411 Rp	
5. Drains	m^3	490	0.265	600	

Notes : a. b. c. d. e. f. are types of works.

Amp. Dredger	= Amphibious dredger
Emb.	= Embankment
Bull.	= Bulldozer
Backh	= Backhoe
DT-1 km	= Dump track 1 km
DT-3 km	= Dump track 3 km
DT-5 km	= Dump track 5 km
Amp. Excavator	= Amphibious terrain excavator
DT-10 km	= Dump track 10 km
Com.	= Compaction
V	= Vibration roller
T	= Vibration Tamper
Sod.	= Sodding

Table 6-2-4 Major Equipment Required for Flood Control Works (Full-contracting System, 7-year Plan)

Equipment	Q'ty(by contractor)	Q'ty(existing vailable)
Bullozer, swamp w/winch, 15t	5	0
Bulldozer, swamp w/winch, 12t	4	2 (1,493 hrs)
Bulldozer, swamp, 7t		3 (4,655 ")
Backhoe, swamp, 0.5 m^3	3	
Attachment for above backhoe, 0.6 m^3	1 lot	2 (4,687)
Amphibious dredger, w/pipe, 40 m^3/hr	2	1 (4,027)
Amphibious excavator, 0.4 m^3	2	
Attachment above dragline, 0.6 m^3	1 lot	1 (2,787)
Dump truck, 4 × 4, 6t	18	12 (10,866)
Hydraulic truck crane 10t		1 (5,285)
Crawler type dump trailer, 4.5 m^3	2	
Vibrating roller, 2.5t	6	
Vibrating roller, 1t	8	
Vibrating plate compactor for soil, 50 kg	15	
Vibrating pile driver	1	
Fuel tanker, 4 × 4, 4,000 ℓ	1	
Service car, 4 × 4, 1t	2	2 (2,091)
Diesel generator, 45 KVA	5	
Diesel generator, 100 KVA	1	
Chain saw, 500 mm	5	

Note : ( ) is remaining life time which is assumed in March 1980.

Table 6-2-5 Construction Cost for Flood Control (1)
(Full-contracting System, 7-year Plan)

1977-price

Description	L.C. (1000Rp)	F.C. (US$)	Total (1000Rp)
1. Land	193,000	-	193,000
2. Civil work	1,052,763	4,515,151	2,926,551
a. Labor, etc (including technician)	397,030	232,574	493,548
b. Materials	665,733	128,631	709,115
c. Depreciation of equipment	-	2,786,065	1,156,217
d. Spare parts	-	1,367,881	567,671
3. Engineering and administration	193,348	1,265,783	718,648
4. Contingency	215,867	867,140	575,730
Total	1,654,978	6,648,074	4,413,929

Notes: L.C. denotes local currency. F.C. denotes foreign currency.

The cost does not include price escalation during the construction period.

F.C. of Materials is the cost required for rain gages, water-level gages and radio telephones.

F.C. of Labor is the cost for foreign technicians.

Engineering and administration include an amount of US$ 159,883 as the cost for procuring instruments and cars.

Table 6-2-6 Construction Cost for Flood Control (2)
(Full-contracting System, 7-year Plan)

1977-price

Description	Q'ty of work Unit	Q'ty	Unit cost L.C. (Rp)	Unit cost F.C (US$)	Cost L.C. (10^3Rp)	Cost F.C. (US$)	Cost Total (10^3Rp)
1. Land acquisition and compensation		L.S.			193,000	-	193,000
2. Civil work					1,052,763	4,515,151	2,926,551
a. Preparatory		L.S.			237,565	496,031	443,418
b. Dredging	m^3	733,000	(166)	(2.14)	121,551	1,567,232	771,953
c. Excavation	m^3	934,700	(134)	(1.15)	124,901	1,077,620	527,114
d. Embankment	m^3	1,338,600	(254)	(0.64)	339,500	863,312	697,774
e. Revetment	m	1,800	26,600	6.77	47,880	12,193	52,940
f. Drains	m^3	135,000	490	0.27	66,147	35,781	80,996
g. Sluice		L.S.			26,000	45,643	44,942
h. Miscellaneous					115,367	354,610	262,530
3. Engineering and administration					193,348	1,265,783	718,648
Instrument for survey and laboratory use					-	83,000	34,445
Cars					-	76,883	31,906
Engineering and others					215,867	867,140	575,730
Total					1,654,978	6,648,074	4,413,929

Notes: L.C. denotes local currency. F.C. denotes foreign currency.

The cost does not include price escalation during the construction period.

Table 6-2-7 Cost of Preparatory Works for Flood Control
(Full-contracting System, 7-year plan)

1977-price

Description	Estimated cost		
	L.C.(1,000Rp)	F.C.(US$)	Total(1,000Rp)
1. Access road	147,936	308,887	276,124
2. Clearing	78,587	164,090	146,685
3. Others	11,042	23,054	20,609
4. Total	237,565	496,031	443,418

Table 6-2-8 Breakdown of Cost of Civil Work for Flood Control
(Full-contracting System; 7-year Plan)

1977-price

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp)	L.C. Amount (1,000Rp)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
1. Dredging works							
-12.25K ∿ -11.25K	m^3	46,400		5,058		81,244	
1-a	"	46,400	109	5,058	1.751	81,244	
-11.25K ∿ -7.5K	m^3	146,100		16,258		253,211	
1-a	"	96,100	109	10,458	1.751	168,311	
1-f	"	50,000	116	5,800	1.698	84,900	
-7.5K ∿ -2.5K	m^3	309,800		65,908		778,767	
1-a	"	96,200	109	10,486	1.751	168,446	
1-b	"	102,200	399	40,829	3.721	380,169	
1-e	"	111,400	131	14,593	2.066	230,152	
-2.5K ∿ 0.0K	m^3	76,100		11,556		152,706	
1-a	"	58,000	109	6,326	1.751	101,548	
1-d	"	3,100	337	1,045	3.651	11,318	
1-g	"	15,000	279	4,185	2.656	39,840	
0.0K ∿ 10.0K	m^3	0		0		0	
10.0K ∿ 15.0K	m^3	104,400		17,231		213,927	
1-a	"	70,000	109	7,630	1.751	122,561	
1-g	"	34,400	279	9,601	2.656	91,366	
15.0K ∿ 19.0K	m^3	44,600		4,929		77,572	
1-a	"	34,600	109	3,771	1.751	60,592	
1-f	"	10,000	116	1,160	1.698	16,980	
19.0K ∿ 22.65K	m^3	0		0		0	
Pulau Gambar	m^3	5,600		611		9,804	
1-a	"	5,600	109	610	1.751	9,804	
Total	m^3	733,000		121,551		1,567,231	
2. Excavation							
-12.25K ∿ -11.25K	m^3	0		0		0	
-11.25K ∿ -7.5K	m^3	99,700		4,279		62,532	
2-a	"	99,700	43	4,279	0.627	62,532	

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp)	L.C. Amount (1000Rp)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
-7.5K ∿ -2.5K	m^3	180,000		17,241		162,276	
2-a	"	152,300	43	6,549	0.627	95,491	
2-d	"	27,700	386	10,692	2.411	66,785	
-2.5K ∿ 0.0K	m^3	68,700		4,080		50,845	
2-a	"	62,600	43	2,689	0.627	39,255	
2-f	"	6,100	228	1,391	1.900	11,590	
0.0K ∿ 10.0K	m^3	202,400		29,778		258,435	
2-a	"	79,200	43	3,406	0.627	49,658	
2-b	"	80,000	206	16,522	1.585	126,697	
2-f	"	43,200	228	9,850	1.900	82,080	
10.0K ∿ 15.0K	m^3	320,800		53,387		429,282	
2-a	"	155,400	43	6,682	0.627	97,436	
2-c	"	99,100	290	28,786	1.970	195,116	
2-e	"	9,800	514	5,037	2.998	29,380	
2-f	"	56,500	228	12,882	1.900	107,350	
15.0K ∿ 19.0K	m^3	63,100		16,136		114,249	
2-b	"	26,000	206	5,356	1.585	41,210	
2-c	"	37,100	290	10,780	1.970	73,039	
19.0K ∿ 22.65K	m^3	0		0		0	
Pulau Gambar	m^3	0		0		0	
Total	m^3	934,700		124,901		1,077,619	
3. Embankment							
-12.25K ∿ -11.25K	m^3	203,800		63,462		319,264	
3-a	"	6,900	228	1,573	0.285	1,967	
3-b	"	42,200	240	10,128	0.443	18,695	
3-c	"	25,200	250	6,300	0.600	15,120	
3-d	"	129,500	349	45,461	2.194	283,482	
-11.25K ∿ -7.5K	m^3	316,400		75,623		132,302	
3-a	"	136,100	228	31,031	0.285	38,789	
3-b	"	87,400	240	20,976	0.443	38,718	
3-c	"	92,900	250	23,616	0.600	54,795	

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp)	L.C. Amount (1000Rp)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
-7.5K ∿ -2.5K	m^3	195,900		45,591		64,349	
3-a	"	138,400	228	31,791	0.285	38,876	
3-b	"	57,500	240	13,800	0.443	25,473	
-2.5K ∿ 0.0K	m^3	70,500		17,717		42,082	
3-c	"	70,500	250	17,717	0.600	42,082	
0.0K ∿ 10.0K	m^3	144,700		36,361		86,371	
3-c	"	144,700	250	36,361	0.600	86,371	
10.0K ∿ 15.0K	m^3	205,300		50,553		107,338	
3-a	"	32,700	228	7,456	0.285	9,320	
3-b	"	31,300	240	7,512	0.443	13,866	
3-c	"	141,300	250	35,585	0.600	84,152	
15.0K ∿ 19.0K	m^3	64,200		15,617		30,513	
3-a	"	9,100	228	2,075	0.285	2,594	
3-b	"	31,500	240	7,560	0.443	13,955	
3-c	"	23,600	250	5,982	0.600	13,964	
19.0K ∿ 22.65K	m^3	42,600		10,705		25,428	
3-c	"	42,600	250	10,705	0.600	25,428	
Pulau Gambar	m^3	95,200		23,871		55,665	
3-b	"	5,100	240	1,224	0.443	2,259	
3-c	"	90,100	250	22,647	0.600	53,406	
Total	m^3	1,338,600		339,500		863,312	
4. Revetment							
-12.25K ∿ -11.25K	m	0	26,600	0	6.774	0	
-11.25K ∿ -7.5K	m	0	26,600	0	6.774	0	
-7.5K ∿ -2.5K	m	600	26,600	15,960	6.774	4,065	
-2.5K ∿ 0.0K	m	600	26,600	15,960	6.774	4,064	
0.0K ∿ 10.0K	m	0	26,600	0	6.774	0	
10.0K ∿ 15.0K	m	300	26,600	7,980	6.774	2,032	
15.0K ∿ 19.0K	m	0	26,600	0	6.774	0	
19.0K ∿ 22.65K	m	300	26,600	7,980	6.774	2,032	
Pulau Gambar	m	0	26,600	0	6.774	0	
Total	m	1,800		47,880		12,193	

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp)	L.C. Amount (1000Rp)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
5. Drains							
-12.25K ∿ -11.25K	m^3	7,600	490	3,724	0.265	2,014	
-11.25K ∿ -7.5K	m^3	22,800	490	11,171	0.265	6,043	
-7.5K ∿ -2.5K	m^3	29,200	490	14,307	0.265	7,739	
-2.5K ∿ 0.0K	m^3	16,400	490	8,036	0.265	4,347	
0.0K ∿ 10.0K	m^3	59,000	490	28,909	0.265	15,638	
10.0K ∿ 15.0K	m^3	0	490	0	0.265	0	
15.0K ∿ 19.0K	m^3	0	490	0	0.265	0	
19.0K ∿ 22.65K	m^3	0	490	0	0.265	0	
Pulau Gambar	m^3	0	490	0	0.265	0	
Total	m^3	135,000		66,147		35,781	
6. Sluice							
-12.25K ∿ -11.25K				0		0	
-11.25K ∿ -7.5K				0		0	
-7.5K ∿ -2.5K				0		0	
-2.5K ∿ 0.0K				0		0	
0.0K ∿ 10.0K				0		0	
10.0K ∿ 15.0K				0		0	
15.0K ∿ 19.0K				0		0	
19.0K ∿ 22.65K				0		0	
Pulau Gambar	ℓ.s.			22.800		53.354	
Total				22.800		53.354	

Table 6-2-9 Construction Cost for Flood Control for Divided Sections
(Full-contracting System; 7-year Plan)

1977-price

Work item	Q'ty of work Unit	Q'ty	Unit price L.C. (Rp.)	F.C. ($)	Amount L.C. (10^3Rp.)	F.C. ($)	Total (10^3Rp.)
Section: -12.25K to -11.25K							
1. Land acquisition & compen.	-	-	-	-	13,275	0	
2. Civil works	-	-	-	-	105,855	507,153	
a. Preparation	ℓ.s.	-	-	-	24,318	58,622	
b. Dredging	m^3	46,400	109	1.75	5,058	81,244	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	203,800	311	1.57	63,462	319,263	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	7,600	490	0.27	3,724	2,014	
g. Sluice	ℓ.s.	-	-	-	0	0	
h. Miscellaneous	ℓ.s.	-	-	-	9,293	46,010	
3. Engineering and administration	ℓ.s.	-	-	-	18,490	142,176	
4. Contingency (15%)	ℓ.s.	-	-	-	20,643	97,399	
5. Total	-	-	-	-	158,263	746,728	
Section: -11.25K to -7.5K							
1. Land acquisition & compen.	-	-	-	-	42,889	0	
2. Civil works	-	-	-	-	156,621	588,663	
a. Preparation	ℓ.s.	-	-	-	35,541	81,169	
b. Dredging	m^3	146,100	111	1.73	16,258	253,211	
c. Excavation	m^3	99,700	43	0.63	4,279	62,532	
d. Embankment	m^3	316,400	239	0.42	75,623	132,303	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	22,800	490	0.27	11,171	6,043	
g. Sluice	ℓ.s.	-	-	-	0	0	
h. Miscellaneous	ℓ.s.	-	-	-	13,749	53,405	
3. Engineering and administration	ℓ.s.	-	-	-	30,965	165,027	
4. Contingency (15%)	ℓ.s.	-	-	-	34,571	113,054	
5. Total	-	-	-	-	265,046	866,744	
Section: -7.5K to -2.5K							
1. Land acquisition & compen.	-	-	-	-	47,995	0	
2. Civil works	-	-	-	-	236,854	1,272,428	
a. Preparation	ℓ.s.	-	-	-	57,053	139,792	
b. Dredging	m^3	309,800	213	2.51	65,908	778,768	
c. Excavation	m^3	108,000	160	1.50	17,241	162,276	
d. Embankment	m^3	195,900	233	0.33	45,591	64,349	
e. Revetment	m	600	26,600	6.78	15,960	4,065	
f. Drains	m^3	29,200	490	0.27	14,307	7,739	
g. Sluice	ℓ.s.	-	-	-	0	0	
h. Miscellaneous	ℓ.s.	-	-	-	20,794	115,439	
3. Engineering and administration	ℓ.s.	-	-	-	44,209	356,713	
4. Contingency (15%)	ℓ.s.	-	-	-	49,359	244,371	
5. Total	-	-	-	-	378,417	1,873,512	
Section: -2.5K to 0.0K							
1. Land acquisition & compen.	-	-	-	-	0	0	
2. Civil works	-	-	-	-	87,475	328,984	
a. Preparation	ℓ.s.	-	-	-	22,447	45,094	
b. Dredging	m^3	76,100	152	2.01	11,556	152,706	
c. Excavation	m^3	68,700	59	0.74	4,080	50,845	
d. Embankment	m^3	70,500	251	0.60	17,717	42,082	
e. Revetment	m	600	26,600	6.77	15,960	4,064	
f. Drains	m^3	16,400	490	0.27	8,036	4,347	
g. Sluice	ℓ.s.	-	-	-	0	0	
h. Miscellaneous	ℓ.s.	-	-	-	7,679	29,846	
3. Engineering and administration	ℓ.s.	-	-	-	13,577	92,228	
4. Contingency (15%)	ℓ.s.	-	-	-	15,158	63,182	
5. Total	-	-	-	-	116,210	484,394	

(to be continued)

Work item	Q'ty of work Unit	Q'ty	Unit price L.C. (Rp.)	F.C. ($)	Amount L.C. (10 Rp.)	F.C. ($)	Total (10^3Rp.)
Section: 0.0K to 10.0K							
1. Land acquisition & compen.	-	-	-	-	0	0	
2. Civil works	-	-	-	-	134,954	441,043	
a. Preparation	l.s.	-	-	-	28,059	40,585	
b. Dredging	m^3	0	0	0	0	0	
c. Excavation	m^3	202,400	147	1.28	29,778	258,436	
d. Embankment	m^3	144,700	251	0.60	36,361	86,371	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	59,000	490	0.27	28,909	15,638	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	11,847	40,013	
3. Engineering and administration	l.s.	-	-	-	20,945	123,643	
4. Contingency (15%)	l.s.	-	-	-	23,385	84,703	
5. Total	-	-	-	-	179,284	649,389	
Section: 10.0K to 15.0K							
1. Land acquisition & compen.	-	-	-	-	49,016	0	
2. Civil works	-	-	-	-	170,288	897,098	
a. Preparation	l.s.	-	-	-	26,188	63,131	
b. Dredging	m^3	104,400	165	2.05	17,231	213,927	
c. Excavation	m^3	320,800	166	1.34	53,387	429,282	
d. Embankment	m^3	205,300	246	0.52	50,553	107,338	
e. Revetment	m	300	26,600	6.77	7,980	2,032	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	14,949	81,388	
3. Engineering and administration	l.s.	-	-	-	34,037	251,493	
4. Contingency (15%)	l.s.	-	-	-	38,001	172,289	
5. Total	-	-	-	-	291,342	1,320,880	
Section: 15.0K to 19.0K							
1. Land acquisition & compen.	-	-	-	-	27,571	0	
2. Civil works	-	-	-	-	50,465	269,314	
a. Preparation	l.s.	-	-	-	9,353	22,547	
b. Dredging	m^3	44,600	111	1.74	4,929	77,572	
c. Excavation	m^3	63,100	256	1.81	16,136	114,249	
d. Embankment	m^3	64,200	243	0.48	15,617	30,513	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	4,430	24,433	
3. Engineering and administration	l.s.	-	-	-	12,112	75,500	
4. Contingency (15%)	l.s.	-	-	-	13,522	51,722	
5. Total	-	-	-	-	103,670	396,536	
Section: 19.0K to 22.65K							
1. Land acquisition & compen.	-	-	-	-	7,148	0	
2. Civil works	-	-	-	-	31,761	50,036	
a. Preparation	l.s.	-	-	-	10,288	18,037	
b. Dredging	m^3	0	0	0	0	0	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	42,600	251	0.60	10,705	25,428	
e. Revetment	m	300	26,600	6.77	7,980	2,032	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	2,788	4,539	
3. Engineering and administration	l.s.	-	-	-	6,039	14,027	
4. Contingency (15%)	l.s.	-	-	-	6,742	9,609	
5. Total	-	-	-	-	51,690	73,672	

(to be continued)

Work item	Q'ty of work		Unit price		Amount		
	Unit	Q'ty	L.C. (Rp.)	F.C. ($)	L.C. (10^3Rp.)	F.C. ($)	Total (10^3Rp.)
Section: Pulau Gambar							
1. Land acquisition & compen.	-	-	-	-	5,106	0	
2. Civil works	-	-	-	-	78,490	160,432	
a. Preparation	l.s.	-	-	-	24,318	27,054	
b. Dredging	m^3	5,600	109	1.75	611	9,804	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	95,200	251	585	23,871	55,665	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	22,800	53,354	
h. Miscellaneous	l.s.	-	-	-	6,890	14,555	
3. Engineering and administration	l.s.	-	-	-	12,974	44,976	
4. Contingency (15%)	l.s.	-	-	-	14,486	30,811	
5. Total	-	-	-	-	111,056	236,219	

Table 6-2-10 Annual Construction Cost for Flood Control Component (1)
(Full-contracting System; 7-year Plan)

1977-price

Description	1st 1978/79		2nd 1979/80		3rd 1980/81		4th 1981/82		5th 1982/83		6th 1983/84		7th 1984/75		Total	
	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)
1. Land acquisition and compensation	0	0	47,995	0	49,016	0	0	0	42,889	0	53,100	0	0	0	193,000	0
2. Civil work	0	0	0	0	104,314	745,041	164,817	920,869	179,243	912,736	283,973	987,792	320,416	948,713	1,052,763	4,515,151
a. Equipment	0	0	0	0	0	398,102	0	594,949	0	586,860	0	610,060	0	596,093	0	2,786,065
b. Spare parts	0	0	0	0	0	195,457	0	292,104	0	288,133	0	299,522	0	292,665	0	1,367,881
c. Consumable materials	0	0	0	0	65,304	128,631	107,093	0	114,813	0	150,458	0	218,065	0	655,733	128,631
d. Labor, etc including technician	0	0	0	0	39,010	22,851	57,724	33,816	64,430	37,743	133,515	78,209	102,351	59,955	397,030	232,574
3. Engineering and administration	16,559	238,723	66,236	315,360	22,110	142,340	22,110	142,340	22,111	142,340	22,111	142,340	22,111	142,340	193,348	1,265,783
4. Contingency	2,484	35,809	17,135	47,304	26,316	133,107	28,039	159,481	36,636	158,261	53,878	169,520	51,379	163,658	215,867	867,140
5. Total	19,043	274,532	131,366	362,664	201,756	1,020,488	214,966	1,222,690	280,879	1,213,337	413,062	1,299,652	393,906	1,254,711	1,654,978	6,648,074
	132,974		281,872		625,259		722,382		784,414		952,417		914,611		4,413,929	$\times 10^3$Rp

Notes: The cost does not include price escalation during the construction period.

Engineering and administration include an amount of US$ 159,883 as the cost for procuring instruments and cars.

Table 6-2-11 Annual Construction Cost for Flood Control Component (2)
(Full-contracting System; 7-year Plan)

1977-price

Description	1st 1978/79		2nd 1979/80		3rd 1980/81		4th 1981/82		5th 1982/83		6th 1983/84		7th 1984/85		Total	
	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)
1. Land acquisition and compensation	0	0	47,995	0	49,016	0	0	0	42,889	0	53,100	0	0	0	193,000	0
2. Civil work	0	0	0	0	104,314	745,041	164,817	920,869	179,243	912,736	283,973	987,792	320,416	948,713	1,052,763	4,515,151
a. Preparatory work	0	0	0	0	23,632	70,336	38,437	105,098	41,338	103,898	56,661	110,038	77,497	106,661	237,565	496,031
b. Dredging	0	0	0	0	32,955	389,384	38,696	460,693	23,044	295,324	16,258	253,211	10,598	168,620	121,551	1,567,232
c. Excavation	0	0	0	0	8,621	81,139	26,415	224,231	39,672	337,033	34,057	320,968	16,136	114,249	124,901	1,077,620
d. Embankment	0	0	0	0	22,795	32,174	39,647	67,954	51,419	113,641	111,984	218,673	113,655	430,870	339,500	863,312
e. Revetment	0	0	0	0	0	0	0	0	0	0	0	0	47,880	12,193	47,880	12,193
f. Drains	0	0	0	0	7,153	3,869	7,154	3,870	8,036	4,347	40,080	21,681	3,724	2,014	66,147	35,781
g. Sluice	0	0	0	0	0	0	0	0	0	0	0	0	22,800	53,354	22,800	53,354
h. Miscellaneous	0	0	0	0	9,158	168,139	14,468	59,023	15,734	58,493	24,933	63,221	28,126	60,752	92,419	409,628
3. Engineering and administration	16,559	238,723	66,236	315,360	22,110	142,340	22,110	142,340	22,111	142,340	22,111	142,340	22,111	142,340	193,348	1,265,783
4. Contingency	2,484	35,809	17,135	47,304	26,316	133,107	28,039	159,481	36,636	158,261	53,878	169,520	51,379	163,658	215,867	867,140
5. Total	19,043	274,532	131,366	362,664	201,756	1,020,488	214,966	1,222,690	280,879	1,213,337	413,062	1,299,652	393,906	1,254,711	1,654,978	6,648,074

Table 6-3-1 Unit cost of Irrigation/Drainage Improvement Works (Full-contracting System; 7-year Plan)

1977-price

Item	Unit	Unit Cost L.C.	Unit Cost F.C.	Remarks
1. Irrigation canal				
a. Excavation by machinery	m^3	84	1.16	Bachhoe ($0.5m^3$), swamp bulldozer (12t)
b. Excavation by man-power (A)	m^3	246	0.10	
c. Excavation by man-power (B)	m^3	466	0.18	
d. Embankment by machinery	m^3	357	0.78	Dump Truck (6t), vibrating roller (1t), vibrating plate compactor (50kg)
e. Embankment by man-power (A)	m^3	328	0.09	
f. Embankment by man-power (B)	m^3	588	0.17	
2. Drains				
a. Excavation by machinery (A)	m^3	88	1.11	Dragline ($0.6m^3$), swamp bulldozer (12t)
b. Excavation by machinery (B)	m^3	84	1.16	Backhoe ($0.5m^3$), swamp bulldozer (12t)
c. Excavation by machinery (C)	m^3	129	1.83	Amphibious excavator ($0.4m^3$), swamp bulldozer (12t)
d. Excavation by man-power (A)	m^3	325	0.17	
e. Excavation by man-power (B)	m^3	580	0.28	
3. Reinforced concrete	m^3	21,517	2.76	Port concrete mixer ($0.3m^3$), concrete vibrator (30ϕmm)
4. Plain concrete	m^3	18,044	2.76	Port concrete mixer ($0.3m^3$), concrete vibrator (30ϕmm)
5. Form	m^2	9,054	0.43	
6. Reinforcement bar	ton	375,311	3.90	
7. Stone masonry	m^3	23,829	1.68	

Table 6-3-2 Major Equipment Required for Irrigation/ Drainage Improvement Works (Full-contracting System, 7-year Plan)

Equipment	Q'ty by Contractor	Q'ty (existing available)
1. Dragline, 0.6 m^3	3	
2. Attachment for the above	1 lot	
3. Backhoe, swamp (0.5 m^3)	3	
4. Attachment for the above	1 lot	
5. Amphibious soft terrain excavator, (0.4 m^3)	4	
6. Bulldozer, swamp (12t)	6	
7. Dump truck, 4 × 4, (6t)	4	
8. Vibrating roller (1t)	1	
9. Vibrating plate compactor for slope (50 kg)	5	
10. Portable concrete mixer (0.3 m^3)	3	
11. Concrete vibrator (ϕ30 mm)	2	
12. Fuel tanker	1	
13. Ordinary truck	3	1 (1862)
14. Service car, 4 × 4, (1t)	2	1 (1505)
15. Diesel generator (45 KVA)	2	
16. Chain saw (ϕ500 mm)	5	
17. Crawlar type dump trailer (4.5 m^3)	3	
18. Grease car	-	1 (5400)

Note: ( ) is remaining life time which is assumed in March 1980.

Table 6-3-3 Construction Cost for Irrigation/Drainage (1)
(Full-contracting System, 7-year Plan)

1977-price

Description	L.C. (1,000Rp)	F.C. (US$)	Total (1,000Rp)
1. Land acquisition and compensation	417,000	-	417,000
2. Civil work	4,551,030	2,947,350	5,774,180
a. Labor, etc including technicians	2,397,850	478,120	2,596,270
b. Materials	2,153,180	-	2,153,180
c. Equipment	-	1,554,447	645,095
d. Spare parts	-	914,783	379,635
3. Engineering and administration	629,470	1,472,290	1,240,470
4. Contingency	839,630	662,950	1,114,754
Total	6,437,130	5,082,590	8,546,404

Notes: L.C. denotes local currency F.C. denotes foreign currency.

The cost does not include price escalation during the construction period.

Engineering and administration include an amount of US$ 94,791 as the cost for procuring instruments and cars.

Table 6-3-4 Construction Cost for Irrigation/Drainage (2)
(Full-contracting System)

1977-price

Item	Local Currency (10^3Rp)	Foreign Currency (US$)	Total (10^3Rp)
1. Land acquisition and compensation expenses	417,000	-	417,000
2. Civil work	4,551,030	2,947,350	5,774,180
a. Preparatory work	195,000	180,000	269,700
b. Irrigation work	1,480,060	356,320	1,627,933
c. Drainage work	1,103,340	2,069,590	1,962,220
d. On-farm work	1,387,500	-	1,387,500
e. Miscellaneous work	385,130	341,440	526,827
3. Engineering and administrative expenses	629,470	1,472,290	1,240,470
4. Contingency	839,630	662,950	1,114,754
Total	6,437,130	5,082,590	8,546,404

Notes: The cost does not include price escalation during the construction period.

Engineering and administration include an amount of US$ 94,791 as the cost for procuring instruments and cars.

Table 6-3-5 Cost for Land Acquisition and Compensation (Irrigation/Drainage)

1977-price

Name of Area	Irrigated Area		Rainfed Area		Plantation Area		Swampy Are		Oil palm		Rubber		House	Others	Total
	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	Area (ha)	Cost (10^3Rp)	No.	Cost (10^3Rp)	No.	Cost (10^3Rp)	(10^3Rp)	(10^3Rp)	(10^3Rp)
1. Irrigation work															
a. Pulau Gamber and Swadaya area	1.8	900	-	-	-	-	-	-	-	-	-	-	-	-	900
b. S. Buluh area	2.0	1000	20.7	6,210	10.9	5,450	-	-	2,894	18,090	1,860	4,190	-	-	34,940
c. Timbang Deli area	0.6	300	-	-	-	-	-	-	-	-	-	-	-	-	300
d. Perbaungan area	6.7	3,350	12.3	3,690	2.3	1,150	-	-	631	3,940	360	810	-	-	12,940
e. Sumbar Rejo area	2.5	1,250	5.8	1,740	1.0	500	-	-	371	2,320	-	-	-	-	5,810
f. Bendung area	2.3	1,150	1.6	480	-	-	-	-	-	-	-	-	-	-	1,630
g. Singosari area	0.6	300	2.2	660	1.3	650	-	-	482	3,010	-	-	-	-	4,620
h. Ramonia area	2.5	1,250	1.3	390											1,640
Sub total	19.0	9,500	43.9	13,170	15.5	7,750	-	-	4,378	27,360	2,220	5,000	-	-	62,780
2. Drainage work															
a. S. Perbaungan	11.6	5,800	22.0	6,600	-	-	3.4	340	-	-	-	-	33,860	14,120	60,720
b. Canal S. Buluh	25.4	12,700	50.0	15,000	38.0	19,000	7.6	760	5,100	31,880	14,500	32,630	4,670	35,340	151,980
c. S. Buluh	5.1	2,550	8.0	2,400	2.1	1,050	8.3	830	300	1,880	780	1,760	4,140	4,430	19,040
d. S. Teluk Mengkudu	6.8	3,400	11.0	3,300	-	-	-	-	-	-	-	-	970	2,330	10,000
e. S. Pavdo		0	4.4	1,320	-	-	-	-	-	-	-	-	19,140	6,200	26,660
f. S. Denai, Paluk Babi	4.0	2,000	7.7	2,310	3.3	1,650	1.5	150	1,220	7,630	-	-	-	4,170	17,910
g. Kwala Lama, Pematang Kasih	8.0	4,000	16.3	4,890	6.8	3,400	3.1	310	2,520	15,750	-	-	-	8,590	36,940
h. S. Sijenggi, L. Sabah	4.0	2,000	7.7	2,310	3.3	1,650	1.5	150	1,220	7,630	-	-	-	4,170	17,910
i. S. Baru, S. Mayang	3.0	1,500	5.5	1,650	2.4	1,200	1.1	110	890	5,560	-	-	-	3,040	13,060
Sub total	67.9	33,950	132.6	39,780	55.9	27,950	26.5	2,650	11,250	70,330	15,280	34,390	62,780	82,390	354,220
Total	86.9	43,450	176.5	52,950	71.4	35,700	26.5	2,650	15,628	97,690	17,500	39,390	62,780	82,390	417,000

Table 6-3-6 Breakdown of Construction Cost for Civil Work for Irrigation/ Drainage Improvement (Full-contracting System; 7-year Plan)

1977-price

Description	Unit	Quantity	Local curreny		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
1. Preparatory work							
1-a. Office and quarters				23,000		-	
1-b. Temporary work				117,000		180,000	
1-c. Survey cost				55,000		-	
Total				195,000		180,000	
1-a. Office and quarters							
Branch office	m^2	200	20,000	4,000			
Guest house	m^2	120	30,000	3,600			
Staff house	m^2	350	20,000	7,000			
Ware house & Repair shop	m^2	300	8,000	2,400			
Motor pool	m^2	800	6,000	4,800			
Others	L.S			1,200			
Sub-total				23,000			
1-b. Temporary work							
Improvement of road	km	50	160,000	8,000	600	30,000	
Access road	km	30	300,000	9,000	1,000	30,000	
Temporary bridge	No	20	3,000,000	60,000	3,000	60,000	
Others	L.S			40,000		60,000	
Sub-total				117,000		180,000	
1-c. Survey cost							
Canal survey	L.S			50,000			
Others	L.S			5,000			
Sub-total				55,000			
2. Irrigation work							
2-a. Pulau Gamber and Swadaya area				42,410		10,460	
2-b. S. Buluh area				514,150		170,520	
2-c. Tinbang Deli area				29,840		3,170	
2-d. Perbaungan area				422,400		94,140	
2-e. Sumber Rejo area				180,590		32,650	
2-f. Bendang area				81,280		16,650	
2-g. Singosari area				93,120		12,720	
2-h. Ramonia area				116,270		16,010	
Total				1,480,060		356,320	
2-a. Pulau Gamber and Swadaya area							
(1) Intake and settling basin							
Excavation by machinery	m^3	316	84	27	1.16	367	
by man-power(A)	m^3	211	246	52	0.10	21	
by man-power(B)	m^3	526	466	245	0.18	95	
Embankment by machinery	m^3	190	357	68	0.78	148	
by man-power(A)	m^3	126	328	41	0.09	11	
by man-power(B)	m^3	316	588	186	0.17	54	
Reinforced concrete	m^3	183	21,517	3,938	2.76	505	
Form	m^2	915	9,054	8,284	0.43	393	
Reinforcement bar	ton	12.8	375,311	4,804	3.90	50	
Others	L.S			1,765		166	
Sub-total				19,410		1,810	
(2) Canal							
Excavation by machinery	m^3	3,977	84	336	1.16	4,637	
by man-power(A)	m^3	2,665	246	656	0.10	267	
by man-power(B)	m^3	6,661	466	3,104	0.18	1,199	
Embankment by machinery	m^3	737	357	263	0.78	575	
by man-power(A)	m^3	491	328	161	0.09	44	
by man-power(B)	m^3	1,228	588	722	0.17	209	
Other	L.S			528		699	
Sub-total				5,770		7,630	
(3) Related structure							
Secondary diversion work	No.	2	5,030,000	10,060	287	574	
Drop	No.	1	2,760,000	2,760	164	164	
Syphon	No.	1	2,820,000	2,820	175	175	
Others	L.S			1,590		107	
Sub-total				17,230		1,020	
Total				42,410		10,460	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
2-b. S. Buluh area							
(1) Intake and settling basin							
Excavation by machinery	m^3	1,228	84	103	1.16	1,424	
by man-power(A)	m^3	819	246	201	0.10	82	
by man-power(B)	m^3	2,046	466	953	0.18	368	
Embankment by machiner	m^3	246	357	88	0.78	192	
by man-power(A)	m^3	164	328	54	0.09	15	
by man-power(B)	m^3	411	588	242	0.17	70	
Reinforced concrete	m^3	407	21,517	8,757	2.76	1,123	
Form	m^2	2,035	9,054	18,425	0.43	875	
Reinforcement bar	ton	28.5	375,311	10,696	3.90	111	
Others	L.S			3,951		430	
Sub-total				43,470		4,690	
(2) Canal							
Excavation by machiner	m^3	49,744	84	4,178	1.16	57,703	
by man-power(A)	m^3	50,523	246	12,429	0.10	5,052	
by man-power(B)	m^3	74,226	466	34,589	0.18	13,361	
Embankment by machinery	m^3	43,660	357	15,587	0.78	34,055	
by man-power(A)	m^3	39,196	328	12,856	0.09	3,528	
by man-power(B)	m^3	67,719	588	39,819	0.17	11,512	
Lining concrete	m^3	4,497	18,044	81,144	2.76	12,412	
Others	L.S			20,058		13,767	
Sub-total				220,660		151,390	
(3) Related structure							
Main diversion work	No.	2	7,550,000	15,100	432	864	
Secondary diversion work	No.	16	5,030,000	80,480	287	4,592	
Drop	No.	10	2,760,000	27,600	164	1,640	
Aqueduct	No.	6	1,830,000	10,980	125	750	
Syphon	No.	13	2,820,000	36,660	175	2,275	
Conduit	No.	1	1,870,000	1,870	125	125	
Bridge	No.	4	8,350,000	33,400	424	1,696	
Check gate	No.	3	6,910,000	20,730	386	1,158	
Others	L.S			23,200		1,340	
Sub-total				250,020		14,440	
Total				514,150		170,520	
2-c. Timbang Deli							
(1) Intake and settling basin							
Excavation by machinery	m^3	190	84	16	1.16	220	
by man-power(A)	m^3	127	246	31	0.10	13	
by man-power(B)	m^3	317	466	148	0.18	57	
Embankment by machinery	m^3	159	357	57	0.78	124	
by man-power(A)	m^3	106	328	35	0.09	10	
by man-power(B)	m^3	264	588	155	0.17	45	
Reinforced concrete	m^3	204	21,517	4,389	2.76	563	
Form	m^2	1,020	9,054	9,235	0.43	439	
Reinforcement bar	ton	14.3	375,311	5,367	3.90	56	
Gate	m^2	1.1	1,911,078	2,102	214.27	236	
Others	L.S			2,155		177	
Sub-total				23,690		1,940	
(2) Canal							
Excavation by machinery	m^3	540	84	45	1.16	626	
by man-power(A)	m^3	360	246	89	0.10	36	
by man-power(B)	m^3	900	466	419	0.18	162	
Others	L.S			57		86	
Sub-total				610		910	
(3) Related structure							
Main diversion work	No.	1	5,030,000	5,030	287	287	
Others	L.S			510		33	
Sub-total				5,540		320	
Total				29,840		3,170	
2-d. Perbaungan area							
(1) Intake and settling basin							
Excavation by machinery	m^3	851	84	71	1.16	987	
by man-power(A)	m^3	568	246	140	0.10	57	
by man-power(B)	m^3	1,419	466	661	0.18	255	
Embankment by machinery	m^3	290	357	104	0.78	226	
by man-power(A)	m^3	193	328	63	0.09	17	
by man-power(B)	m^3	484	588	285	0.17	82	
Reinforced concrete	m^3	593	21,517	12,760	2.76	1,637	
Form	m^2	2,965	9,054	26,845	0.43	1,275	
Reinforcement bar	ton	41.5	375,311	15,575	3.90	162	
Others	L.S			5,656		472	
Sub-total				62,160		5,170	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3 Rp)	Unit price (US$)	Cost (US$)	
(2) Canal							
Excavation by machinery	m^3	32,430	84	2,724	1.16	37,619	
by man-power(A)	m^3	58,448	246	14,378	0.10	5,845	
by-man-power(B)	m^3	35,633	466	16,605	0.18	6,414	
Embankment by machinery	m^3	11,597	357	4,140	0.78	9,046	
by man-power(A)	m^3	21,454	328	7,037	0.09	1,931	
by man-power(B)	m^3	12,465	588	7,329	0.17	2,119	
Lining concrete	m^3	990	18,044	17,864	2.76	2,732	
Others	L.S			7,013		6,574	
Sub-total				77,090		72,280	
(3) Related structure							
Main diversion work	No.	1	7,550,000	22,650	432	1,296	
Secondary diversion work	No.	16	5,030,000	80,480	287	4,592	
Drop	No.	19	2,760,000	52,440	164	3,116	
Aqueduct	No.	11	1,830,000	20,130	125	1,375	
Syphon	No.	18	2,820,000	50,760	175	3,150	
Bridge	No.	2	8,350,000	16,700	424	848	
Check gate	No.	2	6,910,000	13,820	386	772	
Others	L.S			26,170		1,541	
Sub-total				283,150		16,690	
Total				422,400		94,140	
2-e. Sumber Rejo area							
(1) Intake and settling basin							
Excavation by machinery	m^3	485	84	41	1.16	563	
by man-power(A)	m^3	324	246	80	0.10	32	
by man-power(B)	m^3	809	466	377	0.18	146	
Embankment by machinery	m^3	229	357	82	0.78	179	
by man-power(A)	m^3	153	328	50	0.09	14	
by man-power(B)	m^3	381	588	224	0.17	65	
Reinforced concrete	m^3	394	21,517	8,478	2.76	1,087	
Form	m^2	1,970	9,054	17,836	0.43	847	
Reinforcement bar	ton	27.6	375,311	10,359	3.90	108	
Gate	m^2	4.3	1,911,078	8,218	214.27	921	
Others	L.S			4,575		398	
Sub-total				50,320		4,360	
(2) Canal							
Excavation by machinery	m^3	9,275	84	779	1.16	10,759	
by man-power(A)	m^3	16,134	246	3,969	0.10	1,613	
by man-power(B)	m^3	10,481	466	4,884	0.18	1,887	
Embankment by machinery	m^3	4,267	357	1,523	0.78	3,328	
by man-power(A)	m^3	7,257	328	2,380	0.09	653	
by man-power(B)	m^3	4,904	588	2,884	0.17	834	
Lining concrete	m^3	369	18,044	6,658	2.76	1,018	
Others	L.S			2,313		2,008	
Sub-total				25,390		22,100	
(3) Related structure							
Main diversion work	No.	1	7,550,000	7,550	432	432	
Secondary diversion work	No.	10	5,030,000	50,300	287	2,870	
Drop	No.	3	2,760,000	8,280	164	492	
Aqueduct	No.	2	1,830,000	3,660	125	250	
Syphon	No.	9	2,820,000	25,380	175	1,575	
Others	L.S			9,710		571	
Sub-total				104,880		6,190	
Total				180,590		32,650	
2-f. Bendang area							
(1) Intake and settling basin							
Excavation by machinery	m^3	265	84	22	1.16	307	
by man-power(A)	m^3	177	246	44	0.10	18	
by man-power(B)	m^3	442	466	206	0.18	80	
Embankment by machinery	m^3	144	357	51	0.78	112	
by man-power(A)	m^3	96	328	31	0.09	9	
by man-power(B)	m^3	240	588	141	0.17	41	
Reinforced concrete	m^3	194	21,517	4,174	2.76	535	
Form	m^2	970	9,054	8,782	0.43	417	
Reinforcement bar	ton	13.6	375,311	5,104	3.90	53	
Others	L.S			1,855		158	
Sub-total				20,410		1,730	
(2) Canal							
Excavation by machinery	m^3	5,516	84	463	1.16	6,399	
by man-power(A)	m^3	7,455	246	1,834	0.10	746	
by man-power(B)	m^3	7,304	466	3,404	0.18	1,315	
Embankment by machinery	m^3	2,087	357	746	0.78	1.629	
by man-power(A)	m^3	3,065	328	1,005	0.09	276	
by man-power(B)	m^3	2,644	588	1,555	0.17	449	
Others	L.S			903		1,086	
Sub-total				9,910		11,900	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
(3) Related structure							
Main diversion work	No.	1	7,550,000	7,550	432	432	
Secondary diversion work	No.	3	5,030,000	15,090	287	861	
Drop	No.	1	2,760,000	2,760	164	164	
Aqueduct	No.	3	1,830,000	5,490	125	375	
Syphon	No.	3	2,820,000	8,460	175	525	
Check gate	No.	1	6,910,000	6,910	386	386	
Others	L.S			4,700		277	
Sub-total				50,960		3,020	
Total				81,280		16,650	
2-g. Singosari area							
(1) Intake and settling basin							
Excavation by machinery	m^3	114	84	10	1.16	132	
by man-power(A)	m^3	76	246	19	0.10	8	
by man-power(B)	m^3	191	466	89	0.18	34	
Embankment by machinery	m^3	92	357	33	0.78	72	
by man-power(A)	m^3	62	328	20	0.09	6	
by man-power(B)	m^3	154	588	91	0.17	26	
Reinforced concrete	m^3	146	21,517	3,141	2.76	403	
Form	m^2	730	9,054	6,609	0.43	314	
Reinforcement bar	ton	10.2	375,311	3,828	3.90	40	
Gate	m^2	2	1,911,078	3,822	214.27	429	
Others	L.S			1,768		146	
Sub-total				19,430		1,610	
(2) Canal							
Excavation by machinery	m^3	2,342	84	197	1.16	2,717	
by man-power(A)	m^3	3,768	246	927	0.10	377	
by manpower(B)	m^3	2,800	466	1,305	0.18	504	
Embankment by machinery	m^3	1,780	357	635	0.78	1,388	
by man-power(A)	m^3	2,705	328	887	0.09	243	
by man-power(B)	m^3	2,208	588	1,298	0.17	375	
Lining concrete	m^3	458	18,044	8,264	2.76	1,264	
Others	L.S		1,347			692	
Sub-total			14,860			7,560	
(3) Related structure							
Main diversion work	No.	1	7,550,000	7,550	432	432	
Secondary diversion work	No.	3	5,030,000	15,090	287	861	
Drop	No.	2	2,760,000	5,520	164	328	
Aqueduct	No.	3	1,830,000	5,490	125	375	
Syphon	No.	7	2,820,000	19,740	175	1,225	
Others	L.S			5,440		329	
Sub-total				58,830		3,550	
Total				93,120		12,720	
2-h. Ramonia area							
(1) Intake and settling basin							
Excavation by machinery	m^3	222	84	19	1.16	258	
by man-power(A)	m^3	148	246	36	0.10	15	
by man-power(B)	m^3	369	466	172	0.18	66	
Embankment by machinery	m^3	145	357	52	0.78	113	
by man-power(A)	m^3	97	328	32	0.09	9	
by man-power(B)	m^3	242	588	142	0.17	41	
Reinforced concrete	m^3	156	21,517	3,357	2.76	431	
Form	m^2	780	9,054	7,062	0.43	335	
Reinforcement bar	ton	10.9	375,311	4,091	3.90	43	
Others	L.S			1,497		129	
Sub-total				16,460		1,440	
(2) Canal							
Excavation by machinery	m^3	2,678	84	225	1.16	3,106	
by man-power(A)	m^3	5,357	246	1,318	0.10	536	
by man-power(B)	m^3	2,678	466	1,248	0.18	482	
Embankment by machinery	m^3	3,718	357	1,327	0.78	2,900	
by man-power(A)	m^3	7,437	328	2,439	0.09	669	
by man-power(B)	m^3	3,718	588	2,186	0.17	632	
Others	L.S			877		835	
Sub-total				9,620		9,160	
(3) Related structure							
Main diversion work	No.	1	7,550,000	7,550	432	432	
Secondary diversion work	No.	7	5,030,000	35,210	287	2,009	
Drop	No.	2	2,760,000	5,520	164	328	
Aqueduct	No.	5	1,830,000	9,150	125	625	
Syphon	No.	8	2,820,000	22,560	175	1,400	
Conduit	No.	1	1,870,000	1,870	125	125	
Others	L.S			8,330		491	
Sub-total				90,190		5,410	
Total				116,270		16,010	

(to be continued)

Description	Unit	Quantity	Local currency Unit price (Rp)	Local currency Cost (10^3Rp)	Foreign currency Unit price (US$)	Foreign currency Cost (US$)	Remarks
3. Drainage work							
3-a. Pantai Labu				58,490		22,840	
3-b. S. Denai				48,760		74,930	
3-c. S. Perbaungan				137,380		341,920	
3-d. Kwala Lama				39,230		153,250	
3-e. Lubuh Dendang				28,740		78,410	
3-f. S. Baru				19,930		54,210	
3-g. Canal S. Butuh				344,640		851,930	
3-h. S. Buluh				113,260		208,330	
3-i. S. Teluk Mengkudu				128,210		141,410	
3-j. S. Pavda				184,700		142,360	
Total				1,103,340		2,069,590	
3-a. Pantai Labu							
(1) Secondary canal							
Excavation by manpower(A)	m^3	112,000	325	36,400	0.17	19,040	
Others	L.S			3,640		1,900	
Sub-total				40,040		20,940	
(2) Related structure							
Flap gate	No.	1	6,660,000	6,660	702	702	
Bridge(B)	No.	1	7,490,000	7,490	744	744	
Others	L.S			4,300		454	
Sub-total				18,450		1,900	
Total				58,490		22,840	
3-b. S. Denai							
(1) Main canal							
Excavation by machinery(B)	m^3	31,000	84	2,604	1.16	35,960	
by machinery(C)	m^3	10,000	129	1,290	1.83	18,300	
by man-power(A)	m^3	25,000	325	8,125	0.17	4,250	
by man-power(B)	m^3	10,000	580	5,800	0.28	2,800	
Others	L.S			1,781		6,130	
Sub-total				19,600		67,440	
(2) Secondary canal							
Excavation by man-power(A)	m^3	30,000	325	9,750	0.17	5,100	
Others	L.S			980		510	
Sub-total				10,730		5,610	
(3) Related structure							
Flap gate	No.	1	6,660,000	6,660	702	702	
Bridge(B)	No.	1	7,490,000	7,490	744	744	
Others	L.S			4,280		434	
Sub-total				18,430		1,880	
Total				48,760		74,930	
3-c. S. Perbaungan							
(1) Main canal							
Excavation by machinery(A)	m^3	110,000	88	9,680	1.11	122,100	
by machinery(C)	m^3	84,000	129	10,836	1.83	153,720	
by man-power(A)	m^3	78,000	325	25,350	0.17	13,260	
by man-power(B)	m^3	34,000	580	19,720	0.28	9,520	
Others	L.S			6,564		29,860	
Sub-total				72,150		328,460	
(2) Secondary canal							
Excavation by man-power(A)	m^3	46,000	325	14,950	0.17	7,820	
Others	L.S			1,500		790	
Sub-total				16,450		8,610	
(3) Related structure							
Drop	No.	6	2,770,000	16,620	262	1,572	
Flap gate	No.	2	6,660,000	13,320	702	1,404	
Bridge(B)	No.	1	7,490,000	7,490	744	744	
Others	L.S			11,350		1,130	
Sub-total				48,780		4,850	
Total				137,380		341,920	
3-d. Kwala Lama							
(1) Main canal							
Excavation by machinery(B)	m^3	69,000	84	5,796	1.16	80,040	
by machinery(C)	m^3	25,000	129	3,225	1.83	45,750	
by man-power(A)	m^3	43,000	325	13,975	0.17	7,310	
by man-power(B)	m^3	19,000	580	11,020	0.28	5,320	
Others	L.S			3,424		13,890	
Sub-total				37,440		152,310	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
(2) Secondary canal							
Excavation by man-power(A)	m^3	5,000	325	1,625	0.17	850	
Others	L.S			165		90	
Sub-total				1,790		940	
Total				39,230		153,250	
3-e. Lubuk Dendang							
(1) Main canal							
Excavation by machinery(B)	m^3	36,000	84	3,024	1.16	41,760	
by machinery(C)	m^3	10,000	129	1,290	1.83	18,300	
by man-power(A)	m^3	21,500	325	6,988	0.17	3,655	
by man-power(B)	m^3	9,500	580	5,510	0.28	2,660	
Others	L.S			1,698		6,675	
Sub-total				18,510		73,050	
(2) Secondary canal							
Excavation by man-power(A)	m^3	22,000	325	7,150	0.17	3,740	
Others	L.S			720		380	
Sub-total				7,870		4,120	
(3) Collector drain							
Excavation by man-power(A)	m^3	6,600	325	2,145	0.17	1,122	
Others	L.S			215		118	
Sub-total				2,360		1,240	
Total				28,740		78,410	
3-f. S. Baru							
(1) Main canal							
Excavation by machinery(B)	m^3	20,000	84	1,680	1.16	23,200	
by machinery(C)	m^3	10,000	129	1,290	1.83	18,300	
by man-power(A)	m^3	17,500	325	5,688	0.17	2,975	
by man-power(B)	m^3	7,500	580	4,350	0.28	2,100	
Others	L.S			1,302		4,695	
Sub-total				14,310		51,270	
(2) Secondary canal							
Excavation by man-power(A)	m^3	13,000	325	4,225	0.17	2,210	
Others	L.S			425		220	
Sub-total				4,650		2,430	
(3) Collector drain							
Excavation by man-power(A)	m^3	2,700	325	878	0.17	459	
Others	L.S			92		51	
Sub-total				970		510	
Total				19,930		54,210	
3-g. Canal S. Buluh							
(1) Main canal							
Excavation by machinery(A)	m^3	230,000	88	20,240	1.11	255,300	
by machinery(B)	m^3	123,000	84	10,332	1.16	142,680	
by machinery(C)	m^3	160,000	129	20,640	1.83	292,800	
by man-power(A)	m^3	221,000	325	71,825	0.17	37,570	
by man-power(B)	m^3	95,000	580	55,100	0.28	26,600	
Others	L.S			17,813		75,500	
Sub-total				195,950		830,450	
(2) Secondary canal							
Excavation by man-power(A)	m^3	26,000	325	8,450	0.17	4,420	
Others	L.S			850		450	
Sub-total				9,300		4,870	
(3) Collector drain							
Excavation by man-power(A)	m^3	20,600	325	6,695	0.17	3,502	
Others	L.S			675		358	
Sub-total				7,370		3,860	
(4) Related structure							
Drop	No.	24	2,770,000	66,480	262	6,288	
Bridge(A)	No.	1	14,880,000	14,880	1,502	1,502	
" (B)	No.	2	7,490,000	14,980	744	1,488	
" (D)	No.	1	4,960,000	4,960	505	505	
Others	L.S			30,720		2,967	
Sub-total				132,020		12,750	
Total				344,640		851,930	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
3-h. S. Buluh							
(1) Main canal							
Excavation by machinery(A)	m^3	19,000	88	1,672	1.11	21,090	
by machinery(B)	m^3	15,000	84	1,260	1.16	17,400	
by machinery(C)	m^3	67,000	129	8,643	1.83	122,610	
by man-power(A)	m^3	72,000	325	23,400	0.17	12,240	
by man-power(B)	m^3	37,000	580	18,560	0.28	8,960	
Others	L.S			5,355		18,230	
Sub-total				58,890		200,530	
(2) Secondary canal							
Excavation by man-power(A)	m^3	6,000	325	1,950	0.17	1,020	
Others	L.S			200		110	
Sub-total				2,150		1,130	
(3) Collector drain							
Excavation by man-power(A)	m^3	9,700	325	3,153	0.17	1,649	
Others	L.S			317		171	
Sub-total				3,470		1,820	
(4) Related structure							
Drop	No.	6	2,770,000	16,620	262	1,572	
Flap gate	No.	2	6,660,000	13,320	702	1,404	
Bridge(B)	No.	1	7,490,000	7,490	744	744	
Others	L.S			11,320		1,130	
Sub-total				48,750		4,850	
Total				113,260		208,330	
3-i. S. Teluk Mengkudu							
(1) Main canal							
Excavation by machinery(A)	m^3	33,000	88	2,904	1.11	36,630	
by machinery(C)	m^3	31,000	129	3,999	1.83	56,730	
by man-power(A)	m^3	51,500	325	16,738	0.17	8,755	
by man-power(B)	m^3	22,500	580	13,050	0.28	6,300	
Others	L.S			3,669		10,845	
Sub-total				40,360		119,260	
(2) Secondary canal							
Excavation by man-power(A)	m^3	72,000	325	23,400	0.17	12,240	
Others	L.S			2,340		1,230	
Sub-total				25,740		13,470	
(3) Collector drain							
Excavation by man-power(A)	m^3	15,600	325	5,070	0.17	2,652	
Others	L.S			510		268	
Sub-total				5,580		2,920	
(4) Related structure							
Drop	No.	1	2,770,000	2,770	262	262	
Flap gate	No.	2	6,660,000	13,320	702	1,404	
Bridge(A)	No.	1	14,880,000	14,880	1,502	1,502	
" (B)	No.	1	7,490,000	7,490	744	744	
" (D)	No.	1	4,960,000	4,960	505	505	
Others	L.S			13,110		1,343	
Sub-total				56,530		5,760	
Total				128,210		141,410	
3-j. S. Pavdo							
(1) Main canal							
Excavation by machinery(B)	m^3	12,000	84	1,008	1.16	13,920	
by machinery(C)	m^3	40,000	129	5,160	1.83	73,200	
by man-power(A)	m^3	4,000	325	1,300	0.17	680	
by man-power(B)	m^3	2,000	580	1,160	0.28	560	
Others	L.S			862		8,840	
Sub-total				9,490		97,200	
(2) Secondary canal							
Excavation by man-power(A)	m^3	167,000	325	54,275	0.17	28,390	
Others	L.S			5,435		2,840	
Sub-total				59,710		31,230	
(3) Collector drain							
Excavation by man-power(A)	m^3	14,800	325	4,810	0.17	2,516	
Others	L.S			480		254	
Sub-total				5,290		2,770	

(to be continued)

Description	Unit	Quantity	Local currency		Foreign currency		Remarks
			Unit price (Rp)	Cost (10^3Rp)	Unit price (US$)	Cost (US$)	
(4) Related structure							
Drop	No.	2	2,770,000	5,540	262	524	
Flap gate	No.	3	6,660,000	19,980	702	2,106	
Bridge(A)	No.	2	14,880,000	29,760	1,502	3,004	
" (B)	No.	1	7,490,000	7,490	744	744	
" (C)	No.	2	10,960,000	21,920	1,099	2,198	
Others	L.S			25,520		2,584	
Sub-total				110,210		11,160	
Total				184,700		142,360	
4. On-farm work							
4-a. Pulau Gamber and Swadaya area				56,000		-	
4-b. S. Buluh area				406,000		-	
4-c. Timbang Deli area				18,500		-	
4-d. Perbaungan area				419,000		-	
4-e. Sumber Rejo area				213,000		-	
4-f. Bendang area				111,000		-	
4-g. Singosari area				58,000		-	
4-h. Ramonia area				106,000		-	
Total				1,387,500		-	
4-a. Pulau Gamber & Swadaya area							
Farm ditch	m	24,000	400	9,600			
Farm drain	m	24,000	800	19,200			
Farm road	m	18,000	1,200	21,600			
Miscellaneous	L.S			5,600			
Total				56,000			
4-b. S. Buluh area							
Farm dtich	m	176,000	400	70,400			
Farm drain	m	176,000	800	140,800			
Farm road	m	132,000	1,200	158,400			
Miscellaneous	L.S			36,400			
Total				406,000			
4-c. Timbang Deli area							
Farm ditch	m	8,000	400	3,200			
Farm drain	m	8,000	800	6,400			
Farm road	m	6,000	1,200	7,200			
Miscellaneous	L.S			1,700			
Total				18,500			
4-d. Perbaungan area							
Farm ditch	m	181,000	400	72,400			
Farm drain	m	181,000	800	144,800			
Farm road	m	135,750	1,200	162,900			
Miscellaneous	L.S			38,900			
Total				419,000			
4-e. Sumber Rejo area							
Farm ditch	m	92,000	400	36,800			
Farm drain	m	92,000	800	73,600			
Farm road	m	69,000	1,200	82,800			
Miscellaneous	L.S			19,800			
Total				213,000			
4-f. Bendang area							
Farm ditch	m	48,000	400	19,200			
Farm drain	m	48,000	800	38,400			
Farm road	m	36,000	1,200	43,200			
Miscellaneous	L.S			10,200			
Total				111,000			
4-g. Singosari area							
Farm ditch	m	25,000	400	10,000			
Farm drain	m	25,000	800	20,000			
Farm road	m	18,750	1,200	22,500			
Miscellaneous	L.S			5,500			
Total				58,000			
4-h. Ramonia area							
Farm ditch	m	46,000	400	18,400			
Farm drain	m	46,000	800	36,800			
Farm road	m	34,500	1,200	41,400			
Miscellaneous	L.S			9,400			
Total				106,000			

Table 6-3-7 Annual Construction Cost for Irrigation/Drainage Component (1)
(Full-contracting System; 7-year Plan)

1977-price

Description	1978/79		1979/80		1980/81		1981/82		1982/83		1983/84		1984/85		Total	
	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)
1. Land acquisition and compensation expenses	0	0	86,080	0	106,020	0	73,780	0	0	98,060	53,060	0	0	0	417,000	0
2. Civil work	0	0	14,348	15,820	908,144	567,029	822,659	557,530	802,063	545,979	1,048,187	732,082	955,629	528,910	4,551,030	2,947,350
a. Preparatory work	0	0	13,650	12,600	87,750	81,000	23,400	21,600	23,400	21,600	23,400	21,600	23,400	21,600	195,000	180,000
b. Irrigation work	0	0	0	0	296,860	48,660	264,490	58,490	281,600	62,760	342,770	113,680	294,340	72,730	1,480,060	356,320
c. Drainage work	0	0	0	0	127,586	371,936	158,395	413,078	149,773	398,598	322,504	512,512	345,082	373,466	1,103,340	2,069,590
d. On-farm work	0	0	0	0	319,000	0	306,670	0	279,330	0	270,670	0	211,830	0	1,387,500	0
e. Miscellaneous work	0	0	698	3,220	76,948	65,433	69,704	64,362	67,960	63,021	88,843	84,290	80,977	61,114	385,130	341,440
3. Engineering and and administrative expenses	39,220	211,591	91,500	467,199	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	629,470	1,472,290
4. Contingency	5,883	31,739	28,790	72,453	167,088	108,860	149,429	107,435	149,982	105,703	180,150	133,618	158,308	103,142	839,630	662,950
Total	45,103	243,330	220,718	555,472	1,281,002	834,589	1,145,618	823,665	1,149,855	810,382	1,381,147	1,024,400	1,213,687	790,752	6,437,130	5,082,590

Table 6-3-8 Annual Construction Cost for Irrigation/Drainage Component (2)
(Full-contracting System; 7-year Plan)

unit: L.C. = 1,000Rp
F.C. = US$

	1978/79		1979/80		1980/81		1981/82		1982/83		1983/84		1984/85		Total	
	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.
1. Land acquisition and compensation	-	-	86,080	-	106,020	-	73,780	-	98,060	-	53,060	-	-	-	417,000	-
2. Civil work	-	-	14,348	15,820	908,144	567,029	822,659	557,530	802,063	545,979	1,048,187	732,082	955,629	528,910	4,551,030	2,947,350
a. Equipment and spare parts	-	-	-	15,820	-	509,293	-	475,827	-	473,294	-	598,164	-	396,832	-	2,469,230
b. Material	-	-	5,380	-	416,960	-	359,592	-	368,588	-	515,320	-	487,340	-	2,153,180	-
c. Labor etc and technician	-	-	8,968	-	491,184	57,736	463,067	81,703	483,475	72,685	532,867	133,918	468,289	132,078	2,397,850	478,120
3. Engineering and administration	39,220	211,591	91,500	467,199	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	99,750	158,700	629,470	1,472,290
4. Contingency	5,883	31,739	28,790	72,453	167,088	108,860	149,429	107,435	149,982	105,703	180,150	133,618	158,308	103,142	839,630	662,950
5. Total	45,103	243,330	220,718	555,472	1,281,002	834,389	1,145,618	823,665	1,149,855	810,382	1,381,147	1,024,400	1,213,687	790,752	6,437,130	5,082,590
	146,085		451,239		1,627,356		1,487,439		1,486,164		1,806,273		1,541,848		8,546,404	10^3Rp

Notes: The cost does not include price escalation during the construction period.

The cost for engineering and administration includes an amount of US$ 94,791 as the cost for procuring instruments and cars.

CHAPTER VII

COST ESTIMATE FOR FIVE-YEAR PLAN (EQUIPMENT-LENDING SYSTEM)

7.1. Difference from Seven-Year Plan Based on Equipment-Lending System.

The cost estimate of the five-year construction plan based on the equipment-lending system is different in the following points from the seven-year construction plan.

a. This plan is based on the five-year construction schedule mentioned in 3.3.3.(2) of Chapter III.

b. Net operation hour of equipment for dredging works was assumed at 15 hr in a day.

c. The equipment, spare parts and others required for flood control works were planned taking account of the existing equipment available for the works. They are shown in Table 7-1-1. Those for irrigation/drainage improvement works were planned taking account of the existing equipment available for the works. They are shown in Table 7-1-2.

7.2. Construction Cost.

The composition of construction cost, unit costs, unit price for land, depreciation cost of equipment and other ways for estimation of costs are the same as those described in Chapter V.

The field cost for the flood control component was estimated at Rp 4,343,000,000 consisting of Rp 1,950,000,000 of local currency portion and US$ 5,767,000 (equivalent to Rp 2,393,000,000) of foreign currency portion as shown in Table 7-2-1 and Table 7-2-2. The whole stretch of the river for improvement was divided into 9 sections. The field cost for each of the sections is shown in Table 7-2-3. The annual field costs were estimated as shown in Table 7-2-4 based on the construction schedule described in the previous paragraph 3.3.2.(2).

The item of miscellaneous in Tables 7-2-3 and 7-2-4 includes the cost for two raingage stations, five water-level stations and six communication stations as described in the previous paragraph 5.3.2.

The field cost for the irrigation/drainage improvement component was estimated at Rp 8,499,000,000 consisting of Rp 6,753,000,000 of local currency portion and US$ 4,206,000 (equivalent Rp 1,746,000,000) of foreign currency portion as shown in

Table 7-2-5. Breakdown of the field cost for land acquisition & compensation and civil work are the same as those described in 5.4 of Chapter V. The annual field cost is shown in Table 7-2-6.

In conclusion, the construction costs for both the compenents of flood control and irrigation/drainage improvement are summarized in Tables 7-2-7 and 7-2-8. The costs exclude the cost for price escalation during the construction period.

The costs for the equipment and spare parts mentioned in Table 7-1-1 were estimated at US$ 4,628,439 or Rp 1,920,802,000 based on the 1977-price and CIF Belawan. These are shown in Table 7-2-9. The cost for spare parts to be procured by local currency was estimated at Rp 156,823,000. The salvage value of the construction equipment was estimated at US$ 985,435 or Rp 408,956,000 based on the 1977-price.

The cost for materials in foreign currency portion for the flood control component includes the following costs.

a. cost for procuring raingages and water-level gages:

US$ 29,046.

b. cost for procuring VHF radio telephones (3 of fixed stations and 3 of movable stations):

US$ 99,585.

The cost for engineering and administration in foreign currency portion for the flood control component includes the following costs.

a. cost for procuring instruments for surveying and laboratory use:

US$ 83,000.

b. cost for procuring cars for carrying out detailed designs and supervision:

US$ 76,883.

The annual construction cost is shown in Table 7-2-10 excluding the cost for price escalation during the construction period.

The costs for the equipment and spare parts mentioned in Table 7-1-2 were estimated at US$ 2,963,938 or Rp 1,230,034,000 based on the 1977-price and CIF Belawan. These are shown in Table 7-2-11. The cost for spare parts to be procured by local currency was estimated at Rp 76,464,000. The salvage value of the construction equipment was estimated at US$ 780,800 or Rp 324,032,000 based on the 1977-price.

Construction Cost for Irrigation/Drainage Component,
(1977-prices)
(Equipment-Lending System, 5-Year Plan)

Description	L.C. 10^3Rp	F.C. US$	Total 10^3Rp
1. Land	17,000	-	417,000
2. Civil Work	4,825,940	2,963,938	6,055,974
Labor, etc.	2,596,296	-	2,596,296
Materials	2,153,180	-	2,153,180
Equipment	-	2,055,851	853,178
Spare part	76,464	908,087	453,320
3. Engineering & Administration	629,470	1,372,510	1,199,062
4. Contingency	880,860	650,462	1,150,802
5. Total	6,753,270	4,986,910	8,822,838

Note: The costs exclude the cost for price escalation during construction period.

The cost for engineering and administration in foreign currency portion for the irrigation/drainage component includes the following costs as the cost for materials.

a. Cost for procuring the instruments required for surveying and laboratory use:

US$ 38,410.

b. Cost for procuring the cars required for carrying out detailed design and supervision:

US$ 56,381.

Annual construction cost for the irrigation/drainage component is shown in Table 7-2-12. The cost does not include price escalation during the construction period.

7.3. Operation, Maintenance and Replacement Cost.

The maintenance cost for the flood control facilities after the completion of the project, including clearing works on the major beds, maintenance of low water channel by dredging and operation and maintenance of sluice, was assumed at Rp 25,000,000 per year at the 1977-price.

The operation and maintenance cost for the irrigation and

drainage facilities after the completion of construction was assumed at Rp 88,000,000 at the 1977-price including those for operation and maintenance of the intakes, maintenance of the approach canals and settling basins by dredging, maintenance of the irrigation canals, operation and maintenance of the related irrigation structures, maintenance of the drainage canals, operation and maintenance of the related drainage structures, and maintenance of the farm ditches, the farm drains and the farm roads.

The amount of operation and maintenance cost in the irrigation and drainage sector during the construction period was assumed to be proportional to the area developed. The annual disbursement schedule of the operation and maintenance cost for the irrigation and drainage facilities is shown below.

Annual Disbursement Schedule of Operation and Maintenance Cost for Irrigation and Drainage Facilities

Unit: Million Rp

	1980/81	1981/82	1982/83	1983/84	after 1983/84
O.M. cost		35	68	88	88

The cost required for replacing the facilities for irrigation and drainage within the period of project life was assumed mainly for gates. Their life year was assumed at 30 years. Since the civil works for the irrigation/drainage improvement are planned to be carried out for the period of 1980/81 to 1982/83 as shown in Fig.7-2-12, replacement will be carried out over the five years extending from 2010/11 to 2012/13. The total amount of cost required for replacement was estimated at Rp 90,000,000. As there is no necessity for counting the second replacement by reason that it is beyond the period of project life, the annual disbursement schedule of the replacement cost during the said five years will be as follows.

Annual Disbursement Schedule of Replacement Cost

Unit: Million Rp

	2010/11	2011/12	2012/13
Replacement cost	33	28	29

Table 7-1-1 Construction Equipment, Spare Parts and Others (Flood Control, 5-year Plan)

No.	Machinery		Required Q'ty	Existing	New Q'ty
I. Equipment					
1.	Bulldozer, swamp w/winch	15 t class	5	0	5
2.	Bulldozer, swamp w/winch	12 t class	6	1(2×0.5)	5
3.	Bulldozer, swamp	7 t	3	3	0
4.	Backhoe, swamp type	0.5 m^3	5	0	5
5.	Attachment for the above				1 lot
6.	Backhoe ordinary type	0.6 m^3	2	2	0
7.	Dragline ordinary type	0.6 "	1	1	0
8.	Amphibious dredger, w/pipe	40 m^3/hr	3	1	2
9.	Amphibious soft terrain excavator,	0.4 m^3	2	0	2
10.	Attachment for the above				1 lot
11.	Dump truck, 4 × 4	6 t	24	1(12×0.15)	23
12.	Crawler type dump trailer,	4.5 m^3	3	0	3
13.	Vibrating roller	2.5 t	6	0	6
14.	" "	1 t	8	0	8
15.	Vibrating plate compactor for slope,	50kg	15	0	15
16.	Vibrating pile driver/ extractor,	15 kw	2	0	2
17.	Truck crane	10 t	1	1	0
18.	Fuel tanker, 4 × 4	4,000 liter	1	0	1
19.	Grease car,	5 t	1	1	0
20.	Service car, 4 × 4	1 t	4	2	2
21.	Ordinary truck	4.5 t	4	2	2
22.	Submergible pump, w/hose	80 mm	10	10	0
23.	Diesel generator	100 KVA	1	0	1
24.	" "	45 "	6	1	5
25.	" "	35 "	1	1	0
26.	Chain saw,	500 mm	5	0	5
27.	Tools for repair				LS
28.	Spare parts				LS
29.	Miscellaneous				LS
II. Material					
30.	Surveying and laboratory instrument				LS
31.	Rain gage and water level gage				LS
32.	Radio telephone (3 fix and 3 movable)		6	0	6

Note: Two (2) jeeps of long chassis and five (5) jeeps of hard top are included in the cost for the engineering and administration.

Table 7-1-2 Construction Equipment and Others
(Irrigation/Drainage, 5-year Plan)

No.	Machinery		Required Q'ty	Existing Q'ty	New Q'ty
1.	Dragline	0.6 m^3	3	0	3
2.	Attachment for the above		1 lot	-	1 lot
3.	Backhoe, swamp type	0.5 m^3	3	0	3
4.	Attachment for the above		1 lot	-	1 lot
5.	Amphibious soft terrain excavator,	0.4 m^3	4	0	4
6.	Bulldozer, swamp	12 t	7	0	7
7.	Dump truck, 4 × 4	6 t	5	0	5
8.	Vibrating roller	1 t	1	0	1
9.	Vibrating plate compactor for slope,	50 kg	5	0	5
10.	Portable concrete mixer	0.3 m^3	3	0	3
11.	Concrete vibrator	30 ϕmm	2	0	2
12.	Fuel tanker,	4000 liter	1	0	1
13.	Grease car		1	1	0
14.	Ordinary truck	4.5 t	4	1	3
15.	Service car	1 t	3	1	2
16.	Diesel generator	45 KVA	2	0	2
17.	Chain saw	500 ϕmm	5	0	5
18.	Crawler type dump trailer	4.5 m^3	3	0	3
19.	Truck crane		1	1	0
20.	Spare parts				L.S
21.	Tools for repair shop				L.S
22.	Miscellaneous				L.S

Note: Two(2) jeeps of long chassis and five(5) jeeps of hard top are included in the cost of the engineering and administration.

Table 7-2-1 Field Cost for Flood Control
(Equipment-lending System; 5-year Plan)

1977-price

Work item	Q'ty of work		Unit price		Amount		
	Unit	Q'ty	L.C. (Rp.)	F.C. ($)	L.C. (10^3Rp.)	F.C. ($)	Total (10^3Rp.)
1. Land acquisition	m^2				193,000	-	193,000
2. Civil works	-	-	-	-	1,309,252	3,900,170	2,927,822
a. Preparation	ℓ.s.	-	-	-	259,872	442,280	443,418
b. Dredging	m^3	733,000	257	1.92	188,310	1,407,273	772,328
c. Excavation	m^3	934,700	188	1.02	175,687	956,321	572,560
d. Embankment	m^3	1,338,600	309	0.51	414,023	684,540	698,107
e. Revetment	m	1,800	27	5.31	48,974	9,558	52,941
f. Drains	m^3	135,000	600	0	80,997	0	80,997
g. Sluice	ℓ.s.	-	-	-	26,000	45,643	44,942
h. Miscellaneous	ℓ.s.	-	-	-	115,389	354,555	262,529
3. Engineering and administration	ℓ.s.	-	-	-	193,601	1,114,383	656,070
4. Contingency (15%)	ℓ.s.	-	-	-	254,378	752,182	566,534
5. Total	-	-	-	-	1,950,231	5,766,735	4,343,426

Table 7-2-2 Breakdown of Field Cost for Flood Control
(Equipment-lending System; 5-year Plan)

1977-price

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp.)	L.C. Amount (1000Rp.)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
1. Dredging works							
-12.25K∿-11.25K	m^3	46,400		8,411		73,220	
1-a	"	46,400	181	8,411	1.578	73,220	
-11.25K∿-7.5K	m^3	146,100		27,097		227,196	
1-a	"	96,100	181	17,397	1.578	151,646	
1-f	"	50,000	194	9,700	1.511	75,550	
-7.5K ∿-2.5K	m^3	309,800		99,180		699,075	
1-a	"	96,200	181	17,412	1.578	151,804	
1-b	"	102,200	548	57,371	3.334	340,735	
1-e	"	111,400	219	24,397	1.854	206,536	
-2.5K ∿ 0.0K	m^3	76,100		18,025		137,214	
1-a		58,000	181	10,511	1.578	91,524	
1-d		3,100	498	1,544	3.266	10,125	
1-g		15,000	398	5,970	2.371	35,565	
0.0K ∿ 10.0K	m^3	0		0		0	
10.0K ∿ 15.0K	m^3	104,400		26,374		192,022	
1-a		70,000	181	12,670	1.578	110,460	
1-g		34,400	398	13,704	2.371	81,562	
15.0K ∿ 19.0K	m^3	44,600		8,208		69,709	
1-a		34,600	181	6,268	1,578	54,599	
1-f		10,000	194	1,940	1.511	15,110	
19.0K ∿ 22.65K	m^3	0		0		0	
Pulau Gambar	m^3	5,600		1,015		8,837	
1-a		5,600	181	1,015	1.578	8,837	
Total		733,000		188,310		1,407,273	
2. Excavation works							
-12.25K∿-11.25K	m^3	0		0		0	
-11.25K∿-7.5K	m^3	99,700		7,417		55,034	
2-a		99,700	74	7,417	0.552	55,034	
-7.5K ∿-2.5K	m^3	180,000		25,051		143,597	
2-a	"	152,300	74	11,270	0.552	84,070	
2-d	"	27,700	495	13,781	2,149	59,527	
-2.5K ∿ 0.0K	m^3	68,700		6,588		44,852	
2-a	"	62,600	74	4,654	0.552	34,555	
2-f	"	6,100	317	1,934	1.685	10,297	
0.0K ∿ 10.0K	m^3	202,400		41,864		229,600	
2-a	"	79,200	74	5,861	0.552	43,718	
2-b	"	80,000	279	22,309	1.412	112,960	
2-f	"	43,200	317	13,694	1.688	72,922	
10.0K ∿ 15.0K	m^3	320,800		73,439		381,378	
2-a	"	155,400	74	11,500	0.552	85,781	
2-c	"	99,100	380	37,656	1.756	174,020	
2-e	"	9,800	650	6,370	2.674	26,205	
2-f	"	56,500	317	17,911	1.688	95,372	

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp.)	L.C. Amount (1000Rp.)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
15.0K ∿ 19.0K	m^3	63,100		21,330		101,860	
2-b	"	26,000	279	7,254	1.412	36,712	
2-c	"	37,100	380	14,076	1.756	65,148	
19.0K ∿ 22.65K	m^3	0		0		0	
Pulau Gambar	m^3	0		0		0	
Total	m^3	934,700		175,687		956,321	
3. Embankment works							
-12.25K∿-11.25	m^3	203,800		82,587		273,519	
3-a	"	6,900	268	1,849	0.189	1,304	
3-b	"	42,200	289	12,196	0.327	13,799	
3-c	"	25,200	306	7,711	0.465	11,718	
3-d	"	129,500	470	60,831	1.905	246,698	
-11.25K∿-7.5K	m^3	316,400		90,108		97,502	
3-a	"	136,100	268	36,422	0.189	25,723	
3-b	"	87,400	289	25,259	0.327	28,580	
3-c	"	92,900	306	28,427	0.465	43,199	
-7.5K ∿-2.5K	m^3	195,900		53,681		44,961	
3-a	"	138,400	268	37,063	0.189	26,158	
3-b	"	57,500	289	16,618	0.327	18,803	
-2.5K ∿ 0.0K	m^3	70,500		21,565		32,783	
3-c	"	70,500	306	21,565	0.465	32,783	
0.0K ∿10.0K	m^3	144,700		44,258		67,286	
3-c	"	144,700	306	44,258	0.465	67,286	
10.0K ∿15.0K	m^3	205,300		61,014		82,120	
3-a	"	32,700	268	8,764	0.189	6,180	
3-b	"	31,300	289	9,046	0.327	10,235	
3-c	"	141,300	306	43,204	0.465	65,705	
15.0K ∿19.0K	m^3	64,200		18,705		22,995	
3-a	"	9,100	268	2,439	0.189	1,720	
3-b	"	31,500	289	9,089	0.327	10,301	
3-c	"	23,600	306	7,222	0.465	10,974	
19.0K ∿22.65K	m^3	42,600		13,030		19,809	
3-c	"	42,600	306	13,030	0.465	19,809	
Pulau Gambar	m^3	95,200		29,030		43,565	
3-b	"	5,100	289	1,474	0.327	1,668	
3-c		90,100	306	27,556	0.465	41,897	
Total		1,338,600		414,023		684,540	
4. Revetment works							
-12.25K∿-11.25K	m	0	27,208	0	5.310	0	
-11.25K∿-7.5K	m	0	27,208	0	5.310	0	
-7.5K ∿-2.5K	m	600	27,208	16,325	5.310	3,186	
-2.5K ∿ 0.0K	m	600	27,208	16,325	5,310	3,186	
0.0K ∿10.0K	m	0	27,208	0	5,310	0	
10.0K ∿15.0K	m	300	27,208	8,162	5,310	1,593	
15.0K ∿19.0K	m	0	27,208	0	5,310	0	
19.0K ∿22.65K	m	300	27,208	8,162	5,310	1,593	
Pulau Gambar	m	0	27,208	0	5,310	0	
Total	m	1,800		48,974		9,558	

Section and type of work	Quantity Unit	Quantity Q'ty	L.C. Unit cost (Rp.)	L.C. Amount (1000Rp.)	F.C. Unit cost ($)	F.C. Amount ($)	Remarks
. Drainage channel							
-12.25K∿-11.25K	m^3	7,600	600	4,560	0	0	
-11.25K∿-7.5K	m^3	22,800	600	13,679	0	0	
-7.5K ∿-2.5K	m^3	29,200	600	17,519	0	0	
-2.5K ∿ 0.0K	m^3	16,400	600	9,840	0	0	
0.0K ∿ 10.0K	m^3	59,000	600	35,399	0	0	
10.0K ∿ 15.0K	m^3	0	600	0	0	0	
15.0K ∿ 19.0K	m^3	0	600	0	0	0	
19.0K ∿ 22.65	m^3	0	600	0	0	0	
Pulau Gambar	m^3	0		0		0	
Total	m^3	135,000		80,997		0	
. Sluice							
-12.25K∿-11.25K				0		0	
-11.25K∿-7.5K				0		0	
-7.5K ∿-2.5K				0		0	
-2.5K ∿ 0.0K				0		0	
0.0K ∿ 10.0K				0		0	
10.0K ∿ 15.0K				0		0	
15.0K ∿ 19.0K				0		0	
19.0K ∿ 22.65K				0		0	
Pulau Gambar	ℓ.s.			26,000		45,643	
Total				26,000		45,643	

Table 7-2-3 Field Cost fof Flood Control for Divided Sections
(Equipment-lending System; 5-year Plan)

1977-price

Work item	Q'ty of work		Unit price		Amount		
	Unit	Q'ty	L.C. (Rp.)	F.C. ($)	L.C. (10^3Rp.)	F.C. ($)	Total (10^3Rp.)
Section: -12.25K to -11.25K							
1. Land acquisition & compen.	-	-	-	-	13,275	0	
2. Civil works	-	-	-	-	133,966	438,909	
a. Preparation	l.s.	-	-	-	26,601	52,270	
b. Dredging	m^3	46,400	181	1.58	8,411	73,220	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	203,800	405	1.34	82,587	273,519	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	7,600	600	0	4,560	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	11,807	39,900	
3. Engineering and administration	l.s.	-	-	-	18,973	125,408	
4. Contingency (15%)	l.s.	-	-	-	24,932	84,647	
5. Total	-	-	-	-	191,146	648,964	
Section: -11.25K to -7.5K							
1. Land acquisition & compen.	-	-	-	-	42,889	0	
2. Civil works	-	-	-	-	194,304	497,316	
a. Preparation	l.s.	-	-	-	38,878	72,374	
b. Dredging	m^3	146,100	185	1.56	27,097	227,196	
c. Excavation	m^3	99,700	74	0.55	7,417	55,034	
d. Embankment	m^3	316,400	285	0.31	90,108	97,502	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	22,800	600	0	13,679	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	17,125	45,210	
3. Engineering and administration	l.s.	-	-	-	30,568	142,096	
4. Contingency (15%)	l.s.	-	-	-	40,164	95,912	
5. Total	-	-	-	-	307,925	735,324	
Section: -7.5K to -2.5K							
1. Land acquisition & compen.	-	-	-	-	47,995	0	
2. Civil works	-	-	-	-	300,665	1,117,007	
a. Preparation	l.s.	-	-	-	62,411	124,643	
b. Dredging	m^3	309,800	320	2.26	99,180	699,075	
c. Excavation	m^3	180,000	139	0.80	25,051	143,597	
d. Embankment	m^3	195,900	274	0.23	53,681	44,961	
e. Revetment	m	600	27,208	5.31	16,325	3,186	
f. Drains	m^3	29,200	600		17,519	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	26,498	101,545	
3. Engineering and administration	l.s.	-	-	-	44,934	319,15	
4. Contingency (15%)	l.s.	-	-	-	59,038	215,424	
5. Total	-	-	-	-	452,632	1,651,589	
Section: -2.5K to 0.0K							
1. Land acquisition & compen.	-	-	-	-	0	0	
2. Civil works	-	-	-	-	106,263	284,067	
a. Preparation	l.s.	-	-	-	24,555	40,208	
b. Dredging	m^3	76,100	237	1.80	18,025	137,214	
c. Excavation	m^3	68,700	96	0.65	6,588	44,852	
d. Embankment	m^3	70,500	306	0.47	21,565	32,783	
e. Revetment	m	600	27,208	5.31	16,325	3,186	
f. Drains	m^3	16,400	600	0	9,840	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	9,365	25,824	
3. Engineering and administration	l.s.	-	-	-	13,695	81,166	
4. Contingency (15%)	l.s.	-	-	-	17,994	54,785	
5. Total	-	-	-	-	137,952	420,018	
Section: 0.0K to 10.0K							
1. Land acquisition & compen.	-	-	-	-	0	0	
2. Civil works	-	-	-	-	166,927	366,380	
a. Preparation	l.s.	-	-	-	30,694	36,187	
b. Dredging	m^3	0	0	0	0	0	
c. Excavation	m^3	202,400	207	1.13	41,864	229,600	
d. Embankment	m^3	144,700	306	0.47	44,258	67,286	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	59,000	600	0	35,399	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	14,712	33,307	

(to be continued)

Work item	Q'ty of work		Unit price		Amount		
	Unit	Q'ty	L.C. (Rp.)	F.C. ($)	L.C. (10^3Rp.)	F.C. ($)	Total (10^3Rp.)
3. Engineering and administration	l.s.	-	-	-	21,513	104,685	
4. Contingency (15%)	l.s.	-	-	-	28,266	70,660	
5. Total	-	-	-	-	216,706	541,725	
Section: 10.0K to 15.0K							
1. Land acquisition & compen.	-	-	-	-	49,016	0	
2. Civil works	-	-	-	-	216,736	784,742	
a. Preparation	l.s.	-	-	-	28,647	56,290	
b. Dredging	m^3	104,400	253	1.84	26,374	192,022	
c. Excavation	m^3	320,800	229	1.19	73,437	381,378	
d. Embankment	m^3	205,300	297	0.40	61,014	82,120	
e. Revetment	m	300	27,207	5.31	8,162	1,593	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	19,102	71,339	
3. Engineering and administration	l.s.	-	-	-	34,249	224,222	
4. Contingency (15%)	l.s.	-	-	-	45,000	151,344	
5. Total	-	-	-	-	345,001	1,160,308	
Section: 15.0K to 19.0K							
1. Land acquisition & compen.	-	-	-	-	27,571	0	
2. Civil works	-	-	-	-	64,175	236,134	
a. Preparation	l.s.	-	-	-	10,231	20,104	
b. Dredging	m^3	44,600	184	1.56	8,208	69,709	
c. Excavation	m^3	63,100	338	1.61	21,330	101,860	
d. Embankment	m^3	64,200	292	0.36	18,750	22,995	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	5,656	21,466	
3. Engineering and administration	l.s.	-	-	-	11,824	67,470	
4. Contingency (15%)	l.s.	-	-	-	15,536	45,541	
5. Total	-	-	-	-	119,106	349,145	
Section: 19.0K to 22.65K							
1. Land acquisition & compen.	-	-	-	-	7,148	0	
2. Civil works	-	-	-	-	35,582	41,232	
a. Preparation	l.s.	-	-	-	11,254	16,082	
b. Dredging	m^3	0	0	0	0	0	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	42,600	306	0.47	13,030	19,809	
e. Revetment	m	300	27,207	5.31	8,162	1,593	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	0	0	
h. Miscellaneous	l.s.	-	-	-	3,136	3,748	
3. Engineering and administration	l.s.	-	-	-	5,507	11,781	
4. Contingency (15%)	.s.	-	-	-	7,236	7,952	
5. Total	-	-	-	-	55,473	60,965	
Section: Pulau Gamber							
1. Land acquisition & compen.	-	-	-	-	5,106	0	
2. Civil works	-	-	-	-	90,634	134,383	
a. Preparation	l.s.	-	-	-	26,601	24,122	
b. Dredging	m^3	5,600	181	1.58	1,015	8,837	
c. Excavation	m^3	0	0	0	0	0	
d. Embankment	m^3	95,200	305	0.46	29,030	43,565	
e. Revetment	m	0	0	0	0	0	
f. Drains	m^3	0	0	0	0	0	
g. Sluice	l.s.	-	-	-	26,000	45,643	
h. Miscellaneous	l.s.	-	-	-	7,988	12,216	
3. Engineering and administration	l.s.	-	-	-	12,338	38,397	
4. Contingency (15%)	l.s.	-	-	-	16,212	25,917	
5. Total	-	-	-	-	124,290	198,697	

Table 7-2-4 Annual Field Cost for Flood Control Component
(Equipmemt-lending System; 5-year Plan)

1977-price

Description	1st (1978/79)		2nd (1979/80)		3rd (1980/81)		4th (1981/82)		5th (1982/83)		Total	
	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)
1. Land acquistion	0	0	47,995	0	42,889	0	102,116	0	0	0	193,000	0
2. Civil work	0	0	0	0	284,513	1,205,639	451,531	1,106,742	573,208	1,587,789	1,309,252	3,900,170
a. Preparation	0	0	0	0	62,655	124,643	93,975	148,769	103,242	168,868	259,872	442,280
b. Dredging	0	0	0	0	99,179	699,075	45,123	364,410	44,008	343,788	188,310	1,407,273
c. Excavation	0	0	0	0	25,051	143,597	55,869	329,486	94,767	483,238	175,687	956,321
d. Embankment	0	0	0	0	53,681	44,961	155,932	197,571	204,410	442,008	414,023	684,540
e. Revetment	0	0	0	0	0	0	0	0	48,974	9,558	48,974	9,558
f. Drains	0	0	0	0	17,519	0	58,918	0	4,560	0	80,997	0
g. Sluice	0	0	0	0	0	0	0	0	26,000	45,643	26,000	45,643
h. Miscellaneous	0	0	0	0	26,428	193,363	41,714	66,506	47,247	94,686	115,389	354,555
3. Engineering and administration	16,581	238,723	66,323	315,360	36,899	186,766	36,899	186,767	36,899	186,767	193,601	1,114,383
4. Contingency	2,487	35,808	17,148	47,304	54,645	208,861	88,582	194,026	91,516	266,183	254,378	752,182
5. Total	19,068	274,531	131,466	362,664	418,946	1,601,266	679,128	1,487,535	701,623	2,040,739	1,950,231	5,766,735

Table 7-2-5 Field Cost for Irrigation/Drainage Improvement
(Equipment-lending System; 5-year Plan)

1977-price

Work item	Local currency (1,000 Rp)	Foreign currency (US$)	Total (1,000 Rp)
1. Land acquisition and compensation expenses	417,000	-	417,000
2. Civil work	4,825,940	2,284,980	5,774,206
a. Preparatory work	195,000	180,000	269,700
b. Irrigation work	1,537,110	218,880	1,627,945
c. Drainage work	1,305,140	1,583,340	1,962,226
d. On-farm work	1,387,500	-	1,387,500
e. Miscellaneous work	401,190	302,760	526,835
3. Engineering and administrative expenses	629,470	1,372,510	1,199,062
4. Contingency	880,860	548,620	1,108,537
Total	6,753,270	4,206,110	8,498,805

Table 7-2-6 Annual Field Cost for Irrigation/Drainage Component
(Equipment-lending System; 5-year Plan)

1977-price

Description	1978/79		1979/80		1980/81		1981/82		1982/83		Total	
	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)
1. Land acquisition and compensation expenses	0	0	156,520	0	176,570	0	83,910	0	0	0	417,000	0
2. Civil work	0	0	21,267	20,750	1,518,180	799,724	1,715,480	825,169	1,571,013	639,337	4,825,940	2,284,980
a. Preparatory work	0	0	19,500	18,000	102,500	96,000	36,500	33,000	36,500	33,000	195,000	180,000
b. Irrigation work	0	0	0	0	433,470	44,650	617,490	93,860	486,150	80,370	1,537,110	218,880
c. Drainage work	0	0	0	0	370,040	553,110	364,527	588,975	570,573	441,255	1,305,140	1,583,340
d. On-farm work	0	0	0	0	486,000	0	554,330	0	347,170	0	1,387,500	0
e. Miscellaneous work	0	0	1,767	2,750	126,170	105,964	142,633	109,334	130,620	84,712	401,190	302,760
3. Engineering and administrative expenses	39,220	211,591	91,500	467,199	166,250	231,240	166,250	231,240	166,250	231,240	629,470	1,372,510
4. Contingency	5,883	31,739	40,393	73,191	279,150	154,644	294,846	158,460	260,588	130,586	880,860	548,620
5. Total	45,103	243,330	309,680	561,140	2,140,150	1,185,608	2,260,486	1,214,869	1,997,851	1,001,163	6,753,270	4,206,110

Table 7-2-7 Construction Cost for Flood Control Component (Equipment-lending System; 5-year Plan)

1977-price

Description	L.C. (10^3Rp)	F.C. (US$)	Total (10^3Rp)
1. Land	193,000	-	193,000
2. Civil work	1,309,252	4,757,000	3,283,436
Labor, etc.	496,823	-	496,823
Materials	655,606	128,631	708,988
Equipment	-	3,701,980	1,536,322
Spare part	156,823	926,459	541,303
3. Engineering & administration	193,601	1,114,383	656,070
4. Contingency	254,378	880,718	619,876
5. Total	1,950,231	6,752,171	4,752,382

Note: The costs do not include price escalation during the construction period.

Table 7-2-8 Construction Cost for Irrigation/Drainage Component (Equipment-lending System; 5-year Plan)

1977-price

Description	L.C. (10^3 Rp)	F.C. (US$)	Total (10^3 Rp)
1. Land	417,000	-	417,000
2. Civil work	4,825,940	2,963,938	6,055,974
Labor, etc.	2,596,296	-	2,596,296
Materials	2,153,180	-	2,153,180
Equipment	-	2,055,851	853,178
Spare part	76,464	908,087	453,320
3. Engineering & administration	629,470	1,372,510	1,199,062
4. Contingency	880,860	650,462	1,150,802
5. Total	6,753,270	4,986,910	8,822,838

Note: The costs do not include price escalation during the construction period.

Table 7-2-9 Cost for Equipment, Spareparts and Others for Flood Control Component (Equipment-lending System; 5-year Plan)

1977-price

Description	Unit price ($)	Q'ty (Nos.)	Amount ($)
I. Equipment			
1. Bulldozer, swamp w/winch, 15t class	87,137	5	435,685
2. Bulldozer, swamp w/winch, 12t class	66,390	5	331,950
3. Backhoe, swamp, 0.5 m^3	62,241	5	311,205
4. Attachment for the above	-	1 lot	8,299
5. Amphibious dredger, w/pipe, 40 m^3/hr	373,444	2	746,888
6. Amphibious soft terrain excavator, 0.4 m^3/hr	107,884	2	215,768
7. Attachment for the above	-	1 lot	8,299
8. Dump truck, 4 × 4, 6t	18,672	23	429,456
9. Crawler type dump trailer, 4.5 m^3	10,374	3	31,122
10. Vibrating roller, 2.5t	11,203	6	67,218
11. Vibrating roller, 1t	6,224	8	49,792
12. Vibrating plate compactor for soil, 50 kg	830	15	12,450
13. Vibrating pile driver/extractor, 15 KW	12,864	2	25,728
14. Fuel tanker, 4 × 4, 4000ℓ	20,748	1	20,748
15. Service car, 4 × 4, 1t	8,299	2	16,598
16. Ordinary truck, 4.5t	13,692	2	27,384
17. Diesel generator, 100 KVA	49,792	1	49,792
18. Diesel generator, 45 KVA	2,075	5	10,375
19. Chain saw, 500 mm	622	5	3,110
20. Tools for repair	-	ℓ.s.	45,810
21. Miscellaneous	-	ℓ.s.	854,303
(Sub-total for above)			3,701,980
22. Spare part	-	ℓ.s.	926,459
Sub-total for above			(4,628,439)
II. Material			
23. Raingage and water level gage		ℓ.s.	29,046
24. Radio telephone, fixed(3), movable(3)		ℓ.s.	99,585
Sub-total for above			4,757,070
25. Contingency			713,560
26. Total			5,470,630

Notes: The cost for spare parts in local currency is estimated at Rp 157,000,000 at the 1977-price excluding contingency.
The salvage value of the equipment after the completion of the works is estimated at US$ 985,435.

Table 7-2-10 Annual Construction Cost for Flood Control Component
(Equipment-lending System; 5-year Plan)

1977-price

Description	1st (1978/79)		2nd (1979/80)		3rd (1980/81)		4th (1981/82)		5th (1982/83)		Total	
	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)	L.C. (10^3Rp)	F.C. ($)
1. Land acquisition and administration	0	0	47,995	0	42,889	0	102,116	0	0	0	193,000	0
2. Civil work	0	0	0	740,396	240,708	3,090,215	481,718	463,229	586,826	463,230	1,309,252	4,757,070
a. Equipment	0	0	0	740,396	0	2,961,584	0	0	0	0	0	3,701,980
b. Sparepart	0	0	0	0	0	0	78,411	463,229	78,412	463,230	156,823	926,459
c. Material	0	0	0	0	141,190	128,631	203,037	0	311,379	0	655,606	128,631
d. Labor, etc	0	0	0	0	99,518	0	200,270	0	197,035	0	496,823	0
3. Engineering & administration	16,581	238,723	66,323	315,360	36,899	186,766	36,899	186,767	36,899	186,767	193,601	1,114,383
4. Contingency	2,487	35,808	17,148	158,363	48,074	491,547	93,110	97,500	93,559	97,500	254,378	880,718
5. Total	19,068	274,531	131,466	1,214,119	368,570	3,768,528	713,843	747,496	717,284	747,497	1,950,231	6,752,171

Notes: The cost does not include price escalation during the construction period.
The salvage value of the equipment is estimated at US$ 985,435 at the 1977-price.

Table 7-2-11 Cost for Equipment and Spareparts for Irrigation/Drainage Component (Equipment-lending System; 5-year Plan)

1977-price

Description	Q'ty	Equipment		Sparepart	
		Unit (US$)	Amount (US$)	F.C. (US$)	L.C. (10^3Rp)
1. Dragline (0.6 m^3)	3	66,390	199,170	101,976	8,975
2. Attachment for the above	1 lot	-	8,299	2,656	702
3. Backhoe, swamp (0.5 m^3)	3	62,241	186,723	95,601	8,415
4. Attachment for the above	1 lot	-	8,299	2,656	702
5. Amphibious soft terrain excavator (0.4 m^3)	4	107,884	431,536	234,756	21,559
6. Bulldozer, swamp (12 t)	7	66,390	464,730	342,041	25,804
7. Dump truck (6 t)	5	18,672	93,360	53,775	3,786
8. Vibrating roller (1 t)	1	6,244	6,224	3,386	298
9. Vibrating plate compactor for slope (50 kg)	5	830	4,150	1,860	164
10. Port concrete mixer (0.3 m^3)	3	9,959	29,877	13,386	1,178
11. Concrete vibrator (ϕ30 mm)	2	622	1,244	238	21
12. Fuel tanker (4,000ℓ)	1	20,748	20,748	9,295	818
13. Ordinary truck (4.5 t)	3	13,692	41,076	21,030	1,851
14. Service car (1 t)	2	8,299	16,598	9,030	748
15. Diesel generator (45 KVA)	2	2,075	4,150	1,062	93
16. Chain saw (ϕ500 mm)	5	622	3,110	1,395	123
17. Crawler type dump trailer (4.5 m^3)	3	10,374	31,122	13,944	1,227
18. Tools for repair shop	L.S.		31,008	-	-
19. Miscellaneous	L.S.		474,427	-	-
Sub-total			2,055,851 (2,963,938)	908,087	76,464
20. Contingency (15%)			308,376	136,213	11,470
Total			2,364,227 (3,408,527)	1,044,300	87,934

Note: The salvage value of the equipment after the completion of the works is estimated at US$780,800.

Table 7-2-12 Annual Construction Cost for Irrigation/Drainage Component
(Equipment-lending System; 5-year Plan)

1977-price

Description	1978/79		1979/80		1980/81		1981/82		1982/1983		Total	
	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)	L.C. (10^3Rp)	F.C. (US$)
1. Land acquisition & compensation	-	-	156,520	-	176,570	-	83,910	-	-	-	417,000	-
2. Civil work	-	-	21,267	764,952	1,518,180	1,608,729	1,715,480	363,235	1,571,013	227,022	4,825,940	2,963,938
a. Equipment & spare part			768	764,952	26,570	1,608,729	28,296	363,235	20,830	227,022	76,464	2,963,938
b. Material		-	7,691	-	623,727	-	795,157	-	726,605	-	2,153,180	-
c. Labor, etc.		-	12,808	-	867,883	-	892,027	-	823,578	-	2,596,296	-
3. Engineering & administration	39,220	211,591	91,500	467,199	166,250	231,240	166,250	231,240	166,250	231,240	629,470	1,372,510
4. Contingency	5,883	31,739	40,393	184,821	279,150	275,994	294,846	89,170	260,588	68,738	880,860	650,462
5. Total	45,103	243,330	309,680	1,416,972	2,140,150	2,115,963	2,260,486	683,645	1,997,851	527,000	6,753,270	4,986,910
	146,085		897,723		3,018,275		2,544,199		2,216,556		8,822,838	

10^3Rp

Notes: The cost does not include price escalation during the construction period.

The cost for the engineering and administration includes an amount of US$ 94,791 as the cost for procuring instruments and cars.

The salvage value of the equipment is estimated at US$ 780,800 at the 1977-price.

CHAPTER VIII

COST ESTIMATE FOR FIVE-YEAR PLAN (FULL-CONTRACTING SYSTEM)

8.1. Difference from Seven-Year Plan based on Full-Contracting System.

The cost estimate for the five-year construction plan based on the full-contracting system is different in the following points from the seven-year construction plan.

a. This plan is based on the five-year construction schedule mentioned in 3.3.3,(2) and 3.4.2,(2) of Chapter III.

b. Net operation hour of equipment for dredging works was assumed at 15 hours in a day.

8.2. Construction Cost.

The composition of construction cost, unit costs, unit price for land, depreciation of equipment and other ways for estimation costs are the same as those described in Chapter V.

In conclusion, the construction costs for both the components of flood control and irrigation/drainage improvement are summarized in Tables 8-2-1, 8-2-2, 8-2-3 and 8-2-4. The costs exclude the cost for price escalation during the construction period.

In Table 8-2-1 (flood control), the breakdown of the cost for preparatory works is the same as that described in the paragraph 6.2 of Chapter VI. The breakdown of the cost for civil works in the flood control component, except the preparatory works, is shown in Table 8-2-5. The construction costs for flood control works for the divided sections of the river channel are shown in Table 8-2-6. The annual construction cost for the flood control component was estimated as shown in Tables 8-2-7 and 8-2-8 based on the construction schedule for the flood control works described in 3.3.3,(2) of Chapter III. The cost does not include price escalation during the construction period.

For estimating the cost of depreciation of equipment and cost for spare parts in the flood control component, the required equipment and others were planned as shown in Table 7-1-1 in Chapter VII.

The cost for miscellaneous works in the flood control component includes the following costs as those for materials.

a. Cost for the installation of two recording rain-gage stations

and five recording water-level gage stations:

Rp 13,080,000 in local currency.
US$ 29,046 in foreign currency.

b. Cost for the installation of six communication stations (3 fixed and 3 movable stations):

Rp 8,000,000 in local currency.
US$ 99,585 in foreign currency.

The cost for engineering and administration in foreign currency portion in the flood control component includes the following costs.

a. Cost for procuring the instruments required for surveying and laboratory:

US$ 83,000.

b. Cost for procuring the cars required for carrying out detailed design and supervision:

US$ 76,883.

For estimating the cost of depreciation of equipment and cost for spare parts in the irrigation/drainage improvement component, the required equipment and others were planned as shown in Table 7-1-2 in Chapter VII.

The cost for engineering and administration in foreign currency portion in the irrigation/drainage component includes the following costs as the cost for materials.

a. Cost for procuring the instruments required for surveying and laboratory:

US$ 38,410.

b. Cost for procuring the cars required for carrying out detailed design and supervision:

US$ 56,381.

The annual construction cost for the irrigation/drainage component was estimated as shown in Tables 8-2-9 and 8-2-10 based on the construction schedule described in 3.4.2,(2) of Chapter III. These costs do not include price escalation during the construction period.