Table 8.6 MATERIAL UNIT PRICES

Item	Unit	Unit Price (Rp.)
1. Cement & Concrete Admixture		
1) Portland cement	ton	100,000
2) White cement	"	215,000
3) Water Reducing Agent	kg.	1,750
2. Aggregates & Stones		
1) Sand	m^3	6,500
2) Gravel	"	7,500
3) Masonry stone	"	6,000
4) Cobble & rubble stone	"	8,000
5) Red cement	"	11,000
3. Steel Materials		
1) Reinforcement bar (Round)	ton	500,000
2) Reinforcement bar (Deformed)	ton	550,000
3) Structural steel	ton	650,000
4) Steel plate	"	530,000
5) Steel pipe		
Ø 300 mm x 6.0 m	m	33,000
Ø 150 mm x 6.0 m	"	9,300
Ø 65 mm x 6.0 m	"	2,000
6) Steel sheet pile		
Type-II, L = 3 m	sheet	76,000
Type-II, L = 2m	"	50,000
Type-III, L = 8m	"	252,000
7) Spiral vent pipe, Ø700-800 mm	m	35,000
8) Gas pipe		
Ø 1"	m	1,300
Ø 2"	"	3,300
Ø 3"	"	6,000
9) Galvanized pipe		
Ø 1"	m	3,000

Ø 2"	m	4,000
Ø 3"	"	6,000
Ø 4"	m	7,500
Ø 8"	"	20,000
10) Binding wire (Ø0.9 - 3.2 mm)	kg	1,000
11) Nail	"	900
12) Channel, angle	ton	620,000
13) Gabion mattress		
1.5m x 3.0m x 0.5m	pc.	38,000
1.0m x 2.0m x 0.3m	"	12,000
14) Gabion cylinder		
Ø 600 mm	m	5,200
Ø 450 mm	"	3,800
15) Metal form, 300 x 1,500 mm	pc.	40,000
16) Pipe support	"	26,000
17) Rail, 22 kg/m	ton	1,000,000
18) Anchor cap, Ø 60mm , t = 1.2	kg	400
4. Wooden Materials		
1) Teak (Class - I), Plank	m^3	700,000
, square	"	600,000
, Log	"	250,000
2) Kamper (Class-II) Plank	"	225,000
, square	"	200,000
, Log	"	200,000
3) Meranti (Class-III), Plank, square & log	"	160,000
4) Keruwing (Class-IV) Plank, square & log	"	150,000
5) Plywood, water proof 900 x 1,800 x 12 mm	sheet	9,000

5.	Concrete pipe, Ø 200 mm	m	1,600
	, Ø 500 "	"	6,500
	, Ø 1,000 mm	"	20,000
6.	PVC Products		
	1) PVC Pipe, Ø 1"	m	2,000
	, Ø 3"	"	3,600
	, Ø 8"	"	10,000
	2) PVC Water stop, 250 mm	m	11,800
	, 150 mm	"	10,600
7.	Fuel & Lubricant		
	1) Light oil	ℓ	242
	2) Gasoline	"	385
	3) Engine oil	"	1,100
	4) Hydraulic oil	"	2,000
	5) Grease	kg.	2,000
	6) Kerosene	ℓ	125
8.	Gas		
	1) Oxygen gas	cylinder	30,000
	2) Acetylene gas	"	16,000
	3) Propane gas	Kg	350
9.	Explosives & Accessories		
	1) Dynamite	kg	5,000
	2) Detonator w/leg 2.4 m	pc.	2,000
	3) An-Fo powder	kg.	2,000
	4) Fuse, 500 m roll	m	600
	5) Blasting machine	set	550,000
10.	Bit & Rod		
	1) Cross bit, Ø 36 mm	pc.	32,000
	2) , Ø 65 mm	"	49,000
	3) Insert bit, 22 mm, 1,4 m	"	64,700
	4) Taper rod, 22mm, 1,4 m	"	40,000
	5) Metal bit, 46mm.	"	17,000
	, 66mm	"	26,000

6) Tube core barrel (S), 46 mm	pc.	74,000
(W), 66 mm	"	100,000
7) Diamond bit	Carat	44,000
8) Tri Cone bit	pc.	470,000
9) Core lifter	"	2,300
10) Rod, crawler drill, 3 m	"	190,000
11) Sleeve	"	47,000
12) Shank rod	"	108,000
13) Boring rod	"	39,000
11. Scaffolding		
1) Main frame	pc.	21,000
2) Horizontal frame	"	25,000
3) Cross brace	"	6,000
4) Coupling pin	"	1,300
5) Arm lock	"	1,000
6) Jack base	"	6,600
12. Others		
1) Electricity	kWh	71
2) Brick	1,000 pcs	17,000
3) Lime, plaster	kg.	60
4) Bamboo	pc.	1,000
5) Asphalt	kg.	350
6) Elastic filler, t = 10mm	m^2	9,000
7) Rubber plate , t = 10mm	"	160,000
8) Bentonite	kg.	570
9) Grass for sodding	m^2	300
10) Terasso tile, 30 x 30 cm	pc.	650
11) Paint on metal. ICI paint	kg.	3,100
12) Paint on timber. "	"	5,600
13) Sand bag	pc.	1,200
14) Form tie	pc.	450
15) Washer	"	400
16) Corn	"	400
17) Separator	"	500
18) Release agent	ℓ	200
19) Welding rod	kg.	1,500

Table 8.7 PERCENTAGE OF FOREIGN AND DOMESTIC CURRENCY COMPONENTS ON CONST. MATERIALS

F.C : Foreign currency
I.F.C : Indirect foreign currency
D.C : Domestic currency

(Unit : %)

Const. Materials	F.C	I.F.C	D.C
1. Cement & Concrete Admixture			
1) Portland cement	-	65.0	35.0
2) White cement	-	-	-
3) Water reducing agent	-	-	-
2. Aggregates & Stones			
1) Aggregates by plant	-	55.0	45.0
2) Sand	-	0	100.0
3) Gravel	-	0	100.0
4) Masonry stone	-	0	100.0
5) Cobble & rubble stone	-	0	100.0
6) Red cement	-	-	-
3. Steel Materials			
1) Re-bar, round	-	85.0	15.0
2) " , deformed	-	85.0	15.0
3) Structural steel	-	85.0	15.0
4) Steel plate	-	85.0	15.0
5) Steel pipe	-	85.0	15.0
6) Steel sheet pile	-	100.0	0
7) Spiral vent pipe	-	-	-
8) Gas pipe	-	85.0	15.0
9) Galvernaized pipe	-	85.0	15.0
10) Binding wire	-	85.0	15.0
11) Nail	-	85.0	15.0
12) Channel, angle	-	85.0	15.0
13) Gabion mattress	-	85.0	15.0
14) Gabion cylinder	-	85.0	15.0
15) Metal form	-	85.0	15.0
16) Pipe support	-	85.0	15.0
17) Rail, 22 kg/m	-	100.0	0
18) Anchor cap	-	85.0	15.0
4. Wooden Materials			
1) Teak((class-1), plank, square & log	-	18.0	82.0
2) Kamper (class-2) "	-	18.0	82.0
3) Meranti (class-3) "	-	18.0	82.0
4) Keruwing (class-4) "	-	18.0	82.0
5) Plywood, water proof	-	18.0	82.0
5. Concrete Pipe	-	-	-
6. PVC Products			

6. PVC Products			
1) PVC pipe	-	65.0	35.0
2) PVC water stop	-	85.0	15.0
7. Fuel & Lubricants			
1) Light 0 : 1	-	65.0	35.0
2) Gasoline	-	65.0	35.0
3) Engine 0 : 1	-	65.0	35.0
4) Hydraulic 0 : 1	-	65.0	35.0
5) Grease	-	65.0	35.0
6) Koresene	-	-	-
8. Gas			
1) Oxygen gas	-	-	-
2) Acetylene gas	-	-	-
3) Propan gas	-	-	-
9. Explosives & Accessories			
1) Dynamite	-	90.0	10.0
2) Detonator w/leg	-	90.0	10.0
3) An-Fo powder	-	90.0	10.0
4) Fuse	-	85.0	15.0
5) Blasting machine	-	100.0	0
10. Bit & Rod			
1) Cross bit	-	100.0	0
2) Insert bit	-	100.0	0
3) Taper rod	-	100.0	0
4) Metal bit	-	100.0	0
5) Tube core barrel	-	100.0	0
6) Diamond bit	-	100.0	0
7) Tri cone bit	-	100.0	0
8) Core lifter	-	100.0	0
9) Rod, crawler drill, 3m	-	100.0	0
10) Sleeve	-	100.0	0
11) Shank rod	-	100.0	0
12) Boring rod	-	100.0	0
11. Scaffolding	-	0	100.0
12. Others			
1) Electricity	-	-	-
2) Brick	-	0	100.0
3) Lime, plaster	-	-	-
4) Bamboo	-	0	100.0
5) Asphalt	-	50.0	50.0
6) Elastic filler	-	-	-
7) Rubber plate	-	-	-
8) Bentonite	-	-	-
9) Grass for sodding	-	0	100.0
10) Terasso tile	-	-	-
11) Paint on metal	-	50.0	50.0

12) Paint on timber	–	50.0	50.0
13) Sand bag	–	0	100.0
14) Form tie	–	–	–
15) Washer	–	–	–
16) Separator	–	85.0	15.0
17) Release agent	–	–	–
18) Welding rod	–	–	–

Table 8.8 UNIT COST OF MAJOR WORKS

(Flood Control & Drainage Improvement)

		Unit	Foreign (US$)	Indirect Foreign (US$)	Domestic (Rp)
1.	Dredging				
	Lower Widas	m^3	1.158	0.164	746
	Upper Widas & Lower Ulo		1.358	0.193	874
	Kedungsoko		1.237	0.175	796
2.	Excavation				
	H.W. Channel		0.513	0.108	272
3.	Embankment		1.004	0.500	786
4.	Embankment, Heightening		0.904	0.450	707
5.	Backfill of Old Channel		0.798	0.223	457
6.	Land Reclamation		0.544	0.223	370
7.	Wet Masonry				
	W.M	m^3	0.0	0.233	10,083
	Gabion	m^3	0.0	6.988	16,101
8.	Bridge Highway		40	341	517
	National	m^2	21	163	206
	Provincial	m^2	20	87	132
	Rural	m^2	26	194	292
	Footpath	m^2	10	51	66
	Bridge Railway	m	169	1,541	1,526
9.	Drainage Culvert				
	Type I		3,799	12,472	19,683,000
	Type II		5,807	30,742	40,149,000
	Type III		6,330	44,841	57,814,000
10.	Drainage Sluice				
	Type I		3,799.0	15,685.0	20,098,000
	Type II		5,807.0	45,022.0	41,997,000
11.	Siphon, Kuncir	No	32,582.0	62,417.0	95,791.0
	F.D. Channel	No	40,278.0	70,319.0	115,346,000
	Ulo	No	27,161.0	55,969.0	80,329.0
12.	Drop Structure	No	7,357.0	6,636.0	18,693,000
13.	Drainage Sluice				
	Widas		29,382.0	321,380.0	297,179,000
	Ulo		12,573	139,666,000	136,497,000
	K. Soko		22,279.0	124,333.0	167,211,000
14.	Side Overflow Weir	m	23.7	397.7	747,200
15.	Diversion Weir		110,954.0	266,723.0	393,100,000
16.	Irrigation Head Works				
	Tiripan		35,112.0	394,229.0	393,919.0
	Malangsaki		18,144.0	615,640.0	541,212.0
	Kranat		13,108.0	158,523.0	196,567.0
	Kapas		18,687.0	286,971.0	265,430,000
17.	Drainage Channel	m^3	1.237	0.1756	796
18.	Al Canal Levee	m^3	0.904	0.450	707

Table 8.9 BILL OF QUANTITY DAM & IRRIGATION SCHEME (1/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency (Rp.)	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
I.	Kedungwarak Weir								
I.1	Prepaparatory works								
	1. Improvement, Access road	-	L.S	-	1.36	-	1.36	-	2,000
	2. Improvement, Bridge	-	L.S	-	13.63	-	13.63	-	20,000
	Sub-Total				(14.99)		(14.99)	-	(22,000)
I.2	Civil works								
	1. Excavation weathered rock	m^3	20,300	1.68	34.10	1.27	25.78	1,750	35,525
	2. Earthfill dam	"	1,600	1.35	2.16	1.02	1.63	1,400	2,240
	3. Concrete w/re-bore form	"	9,000	18.18	163.62	68.18	613.62	45,000	405,000
	4. Backfill, still basin	"	4,700	0.67	3.15	0.51	2.40	700	3,290
	5. Masonry, dam	"	600	5.45	3.27	8.18	4.91	15,000	9,000
	6. Rock riprap	"	250	1.91	0.48	1.91	0.48	2,800	700
	7. Grouting crutain	m	1,000	14.55	14.55	36.36	36.36	24,000	24,000
	8. Metal works	t	1.5	909.09	1.36	2,272.73	3.41	1,500,000	2,250
	9. Exca, relocation road	m^3	14,800	0.84	12.43	0.64	9.47	875	12,950
	10. Embank, relocation road	"	2,700	1.01	2.73	0.76	2.05	1,050	2,835
	11. Bridges, relocation road	m^2	250	23.16	5.79	192.6	48.15	428,000	107,000
	12. Miscellaneous works	-	L.S	-	-	-	-	-	90,779
	10% of DC for 1.2								
	Sub-Total				243.64		748.26	604.79	
	Total				258.63		763.24	626.79	

Table 8.9 BILL OF QUANTITY FOR DAM & IRRIGATION SCHEME (2/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency (Rp.)	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
II.	Trans Basin Tunnel								
II.1	Preparatory works								
	1. Access roads w/bridges	-	L.S	-	4.09	-	4.09	-	6,000
	2. Power, water & air supply	-	L.S	-	32.73	-	32.73	-	18,000
	3. Other temporary facilities	-	L.S		8.18	-	8.18	-	12,000
	Sub-Total				45.00		45.00		36,000
II.2	Civil works								
	1. Excavation, common, open	m^3	53,000	1.18	62.54	0.89	47.17	1,225	64,925
	2. Excavation, tunnel	"	7,400	18.18	134.53	14.55	107.67	4,000	29,600
	3. Concrete, tunnel	"	2,650	36.36	96.35	29.09	77.09	8,000	21,200
	4. Concrete, w/re-bar & form, open	"	700	18.18	12.73	68.18	47.73	45,000	31,500
	5. Support	t	190	90.91	17.27	636.36	120.91	200,000	38,000
	6. Re-bar	"	130	82.73	10.75	579.09	75.28	182,000	23,660
	7. Form	m^2	250	9.09	2.27	63.64	15.91	20,000	5,000
	8. Backfill grout	m^3	200	27.27	5.45	68.18	13.64	45,000	9,000
	9. Metal works	t	15	909.09	13.64	2,272.73	34.09	1,500,000	22,500
	10. Miscellaneous works	-	L.S	-	-	-	-	-	49,077
	20% of DC for II-2								
	Sub-Total				355.53		539.5		294,462
	Total				400.53		584.5		330,462

Table 8.9 BILL OF QUANTITY FOR DAM & IRRIGATION SCHEME (3/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency (Rp.)	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
III.	Ketandan dam								
III.1	Preparatory works								
1.	Access, New & Improvement	-	L.S	-	68.18	-	68.18	-	100,000
2.	Temporary buildings	-	L.S	-	9.09	-	27.27	-	60,000
3.	Power, Air & Water supply	-	L.S	-	72.73	-	72.73	-	40,000
4.	Communication	-	L.S	-	2.73	-	2.73		4,000
5.	Plant installation	-	L.S	-	4.55	-	13.64	-	30,000
6.	Preparatory work, others	-	L.S	-	40.91	-	40.91	-	60,000
	Sub-Total				198.19		225.46		294,000
III.2	Civil works								
	(Diversion works)								
1.	Excavation, ipen, w/rock	m^3	6,300	1.68	10.58	1.27	8.00	1,750	11,025
2.	Excavation, tunnel	"	2,000	18.18	36.36	14.55	29.10	4,000	8,000
3.	Concrete tunnel	"	750	68.18	51.14	54.55	40.91	15,000	11,250
4.	Concrete, w/re-bar & form open	"	50	18.18	0.91	68.18	3.41	45,000	2,250
5.	Support, tunnel	t_2	36	90.91	3.27	636.36	22.91	200,000	7,200
6.	Form, tunnel	m^2	130	9.09	1.18	63.64	8.27	20,000	2,600
7.	Backfill grout	m^3	100	27.27	2.73	68.18	6.82	45,000	4,500
	Sub-Total				107.08		120.56		46,825
	(Main Dam)								
8.	Exca. weathered rock	m^3	355,000	1.51	536.05	1.15	408.25	1,575	559,125
9.	Embankment earth including coffee dams	"	423,000	1.38	583.74	1.60	676.80	820	346,860
10.	Filter	"	27,000	1.85	49.95	2.15	58.05	1,100	29,700
11.	Rock Riprap	"	58,400	2.35	137.24	2.74	160.02	1,400	81,760
	Sub-Total				1,306.08		1,303.12		1,017,445

(continued)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency (Rp.)	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
	(Spilway)								
12.	Excavation, w/rock	m^3	54,800	1.68	92.06	1.27	69.60	1,750	95,900
13.	Concrete including form & re-bar	"	10,100	18.18	183.62	68.18	688.62	45,000	454,500
14.	Backfill	"	5,500	0.67	3.69	0.51	2.81	700	3,850
	Sub-Total				279.37		761.03		554,250
	(Intake Structure)								
15.	Excavation w-rock	"	900	1.68	1.51	1.27	1.14	1,750	1,575
16.	Concrete includ. re-bar & form	"	580	36.36	21.09	90.91	52.73	60,000	34,800
17.	Plug concrete	"	160	14.55	2.33	36.36	5.82	24,000	3,840
18.	Metal Works	t	53	909.09	48.18	2,272.73	120.45	1,500,000	79,500
	Sub-Total				73.11		180.14		119,715
	(Micro Power Facilities)								
19.	Excavation tunnel	m^3	340	38.64	13.14	30.91	10.51	8,500	2,890
20.	Excavation, open	"	2,400	1.68	4.03	1.27	3.05	1,750	4,200
21.	Concrete tunnel w/re-bar & form	"	130	54.55	7.09	136.36	17.73	90,000	11,700
22.	Concrete, open, w/re-bar & form	"	20	36.36	0.73	90.91	1.82	60,000	1,200
23.	Power, Equipment, Auxiliry & building	set	1	-	218.18	-	27.27	-	30,000
24.	Metal works	t	1	727.27	0.73	1,818.18	1.82	1,200,000	1,200
	Sub-Total				243.90		62.20		51,190
25.	Miscellaneous works 10% of DC for III-2	-	L.S	-	-	-	-	-	178,900
	Sub-Total			2,010.44		2,427.05			1,968,325
	Total			2,40,863		2,652.51			2,262,325

Table 8.9 BILL OF QUANTITY FOR DAM & IRRIGATION SCHEME (4/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency (Rp.)	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
IV	Bangle Headworks								
IV-1	Preparatory works								
	1. Access, improvement	L.S		-	5.45	-	5.45	-	8,000
	2. Temporary buildings	L.S		-	1.36	-	4.09	-	9,000
	3. Power supply	L.S		-	7.27	-	7.27	-	4,000
	Sub-Total				14.08		16.81		21,000
IV-2	Civil works								
	1. Excavation, common	m^3	7,800	1.18	9.20	0.89	6.94	1,225	9,555
	2. Embankment	"	1,200	1.35	1.62	1.02	1.22	1,400	1,680
	3. Masonry	"	2,200	5.45	11.99	8.18	18.00	15,000	33,000
	4. Concrete w/form & re-bar	"	7	18.18	0.13	90.91	0.64	80,000	560
	5. Sod facing	m^2	700	0.03	0.02	0.05	0.04	210	147
	6. Gravel metalling	m^3	500	1.35	0.68	1.56	0.78	800	400
	7. Miscellaneous Works 10% of DC for IV-2	L.S							4,530
	Sub-Total			23.60		27.62			49,872
	Total			37.72		44.43			70,872

Table 8.9 BILL OF QUANTITY FOR DAM & IRRIGATION SCHEME (5/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency Rp.	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
V	Canals & Structures								
V-1	Preparatory works								
	1. Improve, access roads & bridges	L.S		-	9.55	-	9.55	-	14,000
	2. Temporary buildings	L.S		-	1.36	-	4.09		9,000
	Sub-Total				10.91		13.64		23,000
V-2	Civil works (M.C & S.C with structure)								
	1. Clearing & Stripping	m^2	150,000	0.17	25.00	0.13	19.50	175	26,250
	2. Excavation, common	m^3	164,500	0.67	110.22	0.78	128.31	400	65,800
	3. Embankment	"	118,600	0.84	99.62	0.98	116.23	500	59,300
	4. Backfill	"	22,400	0.67	15.01	0.78	17.47	400	8,960
	5. Masonry	"	16,600	8.18	135.79	10.91	181.11	9,000	149,400
	6. Sod facing	m^2	206,900	0.03	6.21	0.05	10.35	210	43,449
	7. Concrete pipes	m	2,012	1.82	3.66	10.00	20.12	7,000	14,084
	8. Reinforced concrete (TC, QC, DC with/structures)	m^3	90	9.09	0.82	59.09	5.32	25,000	2,250
	Sub-Total				396.83		498.41		369,493
	9. Clearing & stripping	m^2	400,000	0.17	68.00	0.13	52.00	175	70,000
	10. Excavation, common	m^3	144,400	0.84	121.30	0.98	141.51	500	72,200
	11. Embankment	"	179,900	1.01	181.70	1.17	210.48	600	107,940
	12. Backfill	"	2,400	0.67	1.61	0.51	1.22	700	1,680
	13. Sod facing	m^2	765,500	0.03	22.97	0.05	38.28	210	160,755
	14. Concrete pipe	m	1,380	0.55	0.76	3.00	4.14	2,100	2,898
	15. Reinforced concrete	m^3	50	9.09	0.45	59.09	2.95	25,000	1,250
	16. Concrete panel for canal lining	m^2	103,500	0.27	27.95	1.64	169.74	900	93,150
	17. Mortar for lining	m^3	3,100	2.73	8.46	8.18	25.36	18,000	55,800
	18. Filter for lining (Inspection road)	"	5,200	0.55	2.86	1.64	8.53	3,600	18,720
	Sub-Total				436.06		654.21		584,393
	19. Clearing & stripping	m^2	50,000	0.17	8.50	0.13	6.50	175	8,750
	20. Embankment	m^3	54,400	0.84	45.70	0.98	53.31	500	27,200
	21. Gravel metalling	"	3,800	1.35	5.13	1.56	5.93	800	3,040
	22. Sod facing	m^2	61,300	0.03	1.84	0.05	3.07	210	12,873
	23. Excavation, drain	m^3	99,200	0.23	22.82	0.45	44.64	1,750	173,600
	24. Masonry	"	480	8.18	3.93	10.91	5.24	9,000	4,320
	Sub-Total				87.92		118.69		229,783
	25. Miscellaneous works 10% of DC for V-2	L.S							118,370
	Sub-Total				920.81		1,271.31		1,248,039
	Total				931.72		1,284.95		1,271,039

Table 8.9 BILL OF QUANTITY FOR DAM & IRRIGATION SCHEME (6/6)

Item No.	Cost Item	Unit	Quantity	Foreign Currency US$		Indirect Foreign Currency US$		Domestic Currency Rp.	
				Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)	Unit Cost	Amount (10^3)
VI	Ngluvu Pumping Station								
VI-1	Preparatory works	L.S		-	-	-	-	-	5,000
VI-2	No. 1 station ($Q=0.058\ m^3/sm$ H=24m, L=600m)								
	1. Civil work including erection	L.S		-	1.36	-	2.73	-	10,500
	2. Pumping equipment, pipes & auxiliaries w/building	L.S		-	27.27	-	21.82	-	6,000
VI-3	No. 2 station ($Q=0.114m^3/s$, H=25m, L=1,100m)								
	3. Civil works incl. erection	L.S		-	2.27	-	4.55	-	17,500
	4. Pumping equipment, pipes & auxiliaries w/building	L.S		-	40.91	-	32.73	-	9,000
	5. Miscellaneous (10% of DC vor VI-2 & 3)	L.S		-	-	-	-	-	4,800
	Total				71.81		61.83		52,800

Table 8.10 LIST OF MAJOR EQUIPMENT FOR DAM & IRRIGATION SCHEME

No.	Description	Capacity	Quantity
1.	Crushing plant	30 t/h	1
2.	Batcher plant	10 m3/h	1
3.	Bulldozer, w/ripper	30 t	2
4.	Bulldozer, w/ripper	20 t	5
5.	Bulldozer,	11 t	3
6.	Bulldozer, swamp	7 t	3
7.	Backhoe	0.6 m^3	5
8.	Backhoe, swamp	0.3 m^3	6
9.	Tractor shovel	1.0 m^3	7
10.	Tractor shovel	0.5 m^3	3
11.	Wheel loader	2.0 m^3	3
12.	Dump truck	10 t	15
13.	Dump truck	6 t	10
14.	Dump truck	4 t	5
15.	Tire roller	20 t	2
16.	Vibration roller	5 t	2
17.	Vibration roller	1 t	6
18.	Port-concrete mixer	0.4 m^3	2
19.	Port-concrete mixer	0.2 m^3	7
20.	Agitator truck	2.5 m^3	5
21.	Concrete pump	20 m^3/h	1
22.	Air leg hammer	30 kg	8
23.	Rock drill	30 kg	2
24.	Air compressor	7 m^3/min	5
25.	Muck loader	0.1 m^3	3
26.	Muck car	0.5 m^3	15
27.	Battery locomotive	3 t	3
28.	Boring machine	100 m	1
29.	Grout pump & mixer	200 l	2
30.	Water tanker	6 kl	5
31.	Diesel generator	100 kvA	2
32.	Diesel generator	50 kvA	4
33.	Diesel generator	30 kvA	2
34.	Truck crane	20 t	2
35.	Saw mill	-	2 sets
36.	Fuel tanker	6 kl	3
37.	Grease car	6 t	2
38.	Mobile work shop	6 t	2
39.	Motor grader	3.1 m	2
40.	Road roller	2 t	2
41.	Ordinary truck, w/crane	6 t	3
42.	Asphalt sprayer	200 l	1
43.	Asphalt finisher	2.5 m	1
44.	Pump	4 ø	20
45.	Contra fan	50 m^3/min	3
46.	Welder	270 A	3
47.	Tractor trailer	30 t	1

Table 8.11 UNIT COST LIST FOR MAJOR ITEMS

Dam & Irrigation Scheme		Unit Cost	
	Items	Unit Cost (Rp)	
1.	Excavation, w.rock, Kedungwarak	5,000	/ m^3
2.	Concrete with form & re-bar, KedungWarak	200,000	"
3.	Excavation, T Basin Tunnel	40,000	"
4.	Concrete diversion Tunnel, Dam, w/out form & re-bar	150,000	"
5.	Excavation, w.rock, Ketandan dam	4,500	"
6.	Embankment, Ketandan dam (Earthfill)	4,100	"
7.	Concrete, Ketandan dam (with form & re-bar)	150,000	"
8.	Masonry, Bangle Headworks	30,000	"
9.	Excavation, common, main canal by equipment	2,000	/ m^3
10.	Excavation, common, T.Canal by man-power	2,500	"
11.	Embankment, main canal	2,500	"
12.	Metal works	4.0×10^6	/ t

ANNEX - 9

This ANNEX presents risk-resultant matrixes, and assessment and, intensities of environmental impacts of the proposed flood control and drainage project and dam and irrigation development project.

ANNEX - 9 LIST OF TABLES

Table 9.1 RRM FOR PHYSICAL WORKS AREA CHANNEL IMPROVEMENT OF THE EXISTING RIVERS INCLUDING RIVER STRUCTURES (1/13)

Eco-system Area : Area of Physical Works

K. Widas, K. Ulo, K. Kuncir, K. Kedungsoko (dredging area, embankment, cutoff)

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	± M.A	0
4. Soil	- S.A	0
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	- S.A	0
2. Water : quality	- M.A	0
quantity	0	0
distribution through time	0	0
eutrophication including aquatic weeds	0	0
3. Land use patterns	± M.A	0
4. Forests, including hydrological function	0	0
5. Native flora	0	0
6. Native fauna	0	0
7. Public works facilities	+ L.A	+ L.A
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	0
small-scale trade and services	+ S.A	0
small-scale industry, home industry and handicrafts	0	0
medium and large-scale industry	0	0
3. Land tenure relations	± M.A	0
4. Food production	- M.A	0
5. Other agricultural production	0	0
6. Health	0	0
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR BENEFITED AREA CHANNEL IMPROVEMENT OF THE EXISTING RIVERS INCLUDING RIVER STRUCTURES
Eco-system Area : Benefited Area (2/13)

Inundated area (around Nganjuk and Lengkong)

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	0	0
4. Soil	0	0
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	0	0
2. Water : quality	0	0
quantity	0	0
distribution through time	0	0
eutrophication including aquatic weeds	0	0
3. Land use patterns	0	0
4. Forests, including hydrological function	0	0
5. Native flora	0	0
6. Native fauna	0	0
7. Public works facilities	0	0
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	+ L.A
small-scale trade and services	0	+ M.A
small-scale industry, home industry and handicrafts	0	+ M.A
medium and large-scale industry	0	+ M.A
3. Land tenure relations	0	0
4. Food production	0	+ L.A
5. Other agricultural production	0	+ M.A
6. Health	0	+ L.A
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8. Anthropology and culture, including incidence of of urbanization	0	+ M.A

Table 9.1 RRM FOR PHYSICAL WORKS AREA (FLOOD DIVERSION CHANNEL)

Eco-system Area : Area of Physical Works (3/13)

Flood diversion channel

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	± S.A	0
4. Soil	- S.A	0
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	- S.A	0
2. Water : quality	0	0
quantity	- S.B	- S.B
distribution through time	0	0
eutrophication including aquatic weeds	0	0
3. Land use patterns	± S.A	0
4. Forests, including hydrological function	0	0
5. Native flora	0	0
6. Native fauna	0	0
7. Public works facilities	+ L.A	+ L.A
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	0
small-scale trade and services	+ S.A	0
small-scale industry, home industry and handicrafts	0	0
medium and large-scale industry	0	0
3. Land tenure relations	± S.A	0
4. Food production	- S.A	0
5. Other agricultural production	0	0
6. Health	0	0
7. Other social infrastructure : education, productive skills, community institutions, etc.	- S.A	- S.A
8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR BENEFITED AREA (FLOOD DIVERSION CHANNEL)

Eco-system Area : Benefited Area (4/13)

Inundated area (around Nganjuk)

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	0	0
4. Soil	0	0
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	0	0
2. Water : quality	0	0
quantity	0	0
distribution through time	0	0
eutrophication including aquatic weeds	0	0
3. Land use patterns	0	0
4. Forests, including hydrological function	0	0
5. Native flora	0	0
6. Native fauna	0	0
7. Public works facilities	0	0
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities	0	0
agriculture	0	+ L.A
small-scale trade and services	0	+ M.A
small-scale industry, home industry and handicrafts	0	+ M.A
medium and large-scale industry	0	+ M.A
3. Land tenure relations	0	0
4. Food production	0	+ L.A
5. Other agricultural production	0	+ M.A
6. Health	0	+ L.A
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8. Anthropology and culture, including incidence of of urbanization	0	+ M.A

Table 9.1 RRM FOR PHYSICAL WORKS AREA (CONTROLLABLE RETARDING)

Eco-system Area : Area of Physical Works (5/13)

K. Widas, K. Ulo, K. Kuncir (embankment, drainage sluice)

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
1.	Geological features	0	0
2.	Mineral resources	0	0
3.	Topography	± S.A	0
4.	Soil	- S.A	0
5.	Sedimentation	0	0
6.	Climate, Including hydrology	0	0
7.	Archaeology and historical remains	0	0
B.	Renewable Resources		
1.	Air	0	0
2.	Water : quality	0	0
	quantity	0	0
	distribution through time	0	0
	eutrophication including aquatic weeds	0	0
3.	Land use patterns	± S.A	0
4.	Forests, including hydrological function	0	0
5.	Native flora	0	0
6.	Native fauna	0	0
7.	Public works facilities	+ S.A	+ S.A
C.	Technology		
1.	Construction methods	0	0
2.	Operating rule of reservoir	0	0
3.	Externalities to agriculture	0	0
4.	Externalities to small-scale industry, home industry, and handicrafts	0	0
5.	Externalities to medium and large scale industry	0	0
6.	Externalities to every-day life and activities	0	0
D.	Human Environment		
1	Demography	0	0
2.	Economic activities	0	
	agriculture	0	0
	small-scale trade and services	+ S.A	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
3.	Land tenure relations	± S.A	0
4.	Food production	- S.A	0
5.	Other agricultural production	0	0
6.	Health	0	0
7.	Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8.	Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR BENEFITED AREA (CONTROLLABLE RETARDING)

Eco-system Area : Benefited Area (6/13)

Controllable retarding basin

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
1.	Geological features	0	0
2.	Mineral resources	0	0
3.	Topography	0	0
4.	Soil	0	0
5.	Sedimentation	0	0
6.	Climate, Including hydrology	0	0
7.	Archaeology and historical remains	0	0
B.	Renewable Resources		
1.	Air	0	0
2.	Water : quality	0	0
	quantity	0	0
	distribution through time	0	0
	eutrophication including aquatic weeds	0	0
3.	Land use patterns	0	0
4.	Forests, including hydrological function	0	0
5.	Native flora	0	0
6.	Native fauna	0	0
7.	Public works facilities	0	0
C.	Technology		
1.	Construction methods	0	0
2.	Operating rule of reservoir	0	0
3.	Externalities to agriculture	0	0
4.	Externalities to small-scale industry, home industry, and handicrafts	0	0
5.	Externalities to medium and large scale industry	0	0
6.	Externalities to every-day life and activities	0	0
D.	Human Environment		
1	Demography	0	0
2.	Economic activities		
	agriculture	0	+ L.A
	small-scale trade and services	0	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
3.	Land tenure relations	0	0
4.	Food production	0	+ L.A
5.	Other agricultural production	0	0
6.	Health	0	+ L.A
7.	Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8.	Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR PHYSICAL WORKS AREA (KEDUNGWARAK)

Eco-system Area : Area of Physical Works (7/13)

weir site, reservoir, borrow and quarry area, canal, pump station

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	± S.A	± M.A
4. Soil	- S.A	± M.A
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	- S.B	0
2. Water : quality	- S.A	0
quantity	0	0
distribution through time	0	± L.A
eutrophication including aquatic weeds	0	- S.D
3. Land use patterns	± M.A	± M.A
4. Forests, including hydrological function	- S.A	± S.A
5. Native flora	0	0
6. Native fauna	0	+ S.C
7. Public works facilities	± L.A	+ L.A
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	0
small-scale trade and services	+ S.A	0
small-scale industry, home industry and handicrafts	0	0
medium and large-scale industry	0	0
3. Land tenure relations	± M.A	0
4. Food production	0	- M.A
5. Other agricultural production	0	- S.A
6. Health	0	0
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	- S.A
8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR BENEFITED AREA (KEDUNGWARAK)

Eco-system Area : Benefited Area (8/13)

Irrigation area around reservoir

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
1.	Geological features	0	0
2.	Mineral resources	0	0
3.	Topography	0	0
4.	Soil	0	0
5.	Sedimentation	0	0
6.	Climate, Including hydrology	0	0
7.	Archaeology and historical remains	0	0
B.	Renewable Resources		
1.	Air	0	0
2.	Water : quality	0	- S.C
	quantity	0	+ L.A
	distribution through time	0	+ L.A
	eutrophication including aquatic weeds	0	0
3.	Land use patterns	0	0
4.	Forests, including hydrological function	0	0
5.	Native flora	0	0
6.	Native fauna	0	0
7.	Public works facilities	0	0
C.	Technology		
1.	Construction methods	0	0
2.	Operating rule of reservoir	0	0
3.	Externalities to agriculture	0	0
4.	Externalities to small-scale industry, home industry, and handicrafts	0	0
5.	Externalities to medium and large scale industry	0	0
6.	Externalities to every-day life and activities	0	0
D.	Human Environment		
1	Demography	0	0
2.	Economic activities	0	0
	agriculture	0	+ L.A
	small-scale trade and services	0	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
3.	Land tenure relations	0	0
4.	Food production	0	+ L.A
5.	Other agricultural production	0	0
6.	Health	0	- S.D
7.	Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8.	Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR SURROUNDING AREA (KEDUNGWARAK)

Eco-system Area : Surrounding Area (9/13)

Catchment area of K.Kedungwarak

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
	1. Geological features	0	0
	2. Mineral resources	0	0
	3. Topography	0	0
	4. Soil	0	0
	5. Sedimentation	0	0
	6. Climate, Including hydrology	0	0
	7. Archaeology and historical remains	0	0
B.	Renewable Resources		
	1. Air	0	0
	2. Water : quality	0	0
	quantity	0	0
	distribution through time	0	+ S.A
	eutrophication including aquatic weeds	0	0
	3. Land use patterns	0	0
	4. Forests, including hydrological function	0	0
	5. Native flora	0	0
	6. Native fauna	0	0
	7. Public works facilities	0	0
C.	Technology		
	1. Construction methods	0	0
	2. Operating rule of reservoir	0	0
	3. Externalities to agriculture	0	0
	4. Externalities to small-scale industry, home industry, and handicrafts	0	0
	5. Externalities to medium and large scale industry	0	0
	6. Externalities to every-day life and activities	0	0
D.	Human Environment		
	1 Demography	0	0
	2. Economic activities		
	agriculture	0	0
	small-scale trade and services	0	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
	3. Land tenure relations	0	0
	4. Food production	0	0
	5. Other agricultural production	0	0
	6. Health	0	0
	7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
	8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR PHYSICAL WORKS AREA (KETANDAN)

Eco-system Area : Area of Physical Works (10/13)

dam site, reservoir, borrow and quarry area, access road

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	± S.A	± M.A
4. Soil	- S.A	± M.A
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	0	0
2. Water : quality	- S.A	0
quantity	0	0
distribution through time	0	± L.A
eutrophication including aquatic weeds	0	- S.D
3. Land use patterns	± M.A	± M.A
4. Forests, including hydrological function	- M.A	± M.A
5. Native flora	0	0
6. Native fauna	0	+ S.C
7. Public works facilities	+ S.A	+ S.A
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	0
small-scale trade and services	+ S.A	0
small-scale industry, home industry and handicrafts	0	0
medium and large-scale industry	0	0
3. Land tenure relations	± S.A	0
4. Food production	0	0
5. Other agricultural production	0	0
6. Health	0	0
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR BENEFITED AREA (KETANDAN : WIDAS EXTENSION AREA)
Eco-system Area : Benefited Area (11/13)
Widas Extension Area

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
1.	Geological features	0	0
2.	Mineral resources	0	0
3.	Topography	0	0
4.	Soil	0	0
5.	Sedimentation	0	0
6.	Climate, Including hydrology	0	0
7.	Archaeology and historical remains	0	0
B.	Renewable Resources		
1.	Air	0	0
2.	Water : quality	0	- S.C
	quantity	0	+ L.A
	distribution through time	0	+ L.A
	eutrophication including aquatic weeds	0	0
3.	Land use patterns	0	0
4.	Forests, including hydrological function	0	0
5.	Native flora	0	0
6.	Native fauna	0	0
7.	Public works facilities	0	0
C.	Technology		
1.	Construction methods	0	0
2.	Operating rule of reservoir	0	0
3.	Externalities to agriculture	0	0
4.	Externalities to small-scale industry, home industry, and handicrafts	0	0
5.	Externalities to medium and large scale industry	0	0
6.	Externalities to every-day life and activities	0	0
D.	Human Environment		
1	Demography	0	0
2.	Economic activities		
	agriculture	0	+ L.A
	small-scale trade and services	0	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
3.	Land tenure relations	0	0
4.	Food production	0	+ L.A
5.	Other agricultural production	0	0
6.	Health	0	- S.D
7.	Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8.	Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 ?RRM FOR SURROUNDING AREA (KETANDAN)

Eco-system Area : Surrounding Area (12/13)

catchment area of K. Ketandan

Sectors/Time Period	Construction	Operation
A. Non-renewable Resources		
1. Geological features	0	0
2. Mineral resources	0	0
3. Topography	0	0
4. Soil	0	0
5. Sedimentation	0	0
6. Climate, Including hydrology	0	0
7. Archaeology and historical remains	0	0
B. Renewable Resources		
1. Air	0	0
2. Water : quality	0	0
quantity	0	0
distribution through time	0	+ S.A
eutrophication including aquatic weeds	0	0
3. Land use patterns	0	0
4. Forests, including hydrological function	0	0
5. Native flora	0	0
6. Native fauna	0	0
7. Public works facilities	0	0
C. Technology		
1. Construction methods	0	0
2. Operating rule of reservoir	0	0
3. Externalities to agriculture	0	0
4. Externalities to small-scale industry, home industry, and handicrafts	0	0
5. Externalities to medium and large scale industry	0	0
6. Externalities to every-day life and activities	0	0
D. Human Environment		
1 Demography	0	0
2. Economic activities		
agriculture	0	0
small-scale trade and services	0	0
small-scale industry, home industry and handicrafts	0	0
medium and large-scale industry	0	0
3. Land tenure relations	0	0
4. Food production	0	0
5. Other agricultural production	0	0
6. Health	0	0
7. Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8. Anthropology and culture, including incidence of of urbanization	0	0

Table 9.1 RRM FOR PHYSICAL WORKS AREA (TRANSBASIN TUNNEL)

Eco-system Area : Area of Physical Works (13/13)

tunnel , access road

Sectors/Time Period		Construction	Operation
A.	Non-renewable Resources		
1.	Geological features	0	0
2.	Mineral resources	0	0
3.	Topography	± S.A	0
4.	Soil	- S.A	± S.A
5.	Sedimentation	0	0
6.	Climate, Including hydrology	0	0
7.	Archaeology and historical remains	0	0
B.	Renewable Resources		
1.	Air	0	0
2.	Water : quality	0	0
	quantity	+ S.C	± S.C
	distribution through time	0	± M.A
	eutrophication including aquatic weeds	0	0
3.	Land use patterns	± S.A	0
4.	Forests, including hydrological function	0	0
5.	Native flora	0	0
6.	Native fauna	0	0
7.	Public works facilities	+ M.A	+ M.A
C.	Technology		
1.	Construction methods	0	0
2.	Operating rule of reservoir	0	0
3.	Externalities to agriculture	0	0
4.	Externalities to small-scale industry, home industry, and handicrafts	0	0
5.	Externalities to medium and large scale industry	0	0
6.	Externalities to every-day life and activities	0	0
D.	Human Environment		
1	Demography	0	0
2.	Economic activities		
	agriculture	0	0
	small-scale trade and services	0	0
	small-scale industry, home industry and handicrafts	0	0
	medium and large-scale industry	0	0
3.	Land tenure relations	0	0
4.	Food production	0	0
5.	Other agricultural production	0	0
6.	Health	0	0
7.	Other social infrastructure : education, productive skills, community institutions, etc.	0	0
8.	Anthropology and culture, including incidence of of urbanization	0	0

Table 9.2 INTENSITY OF NEGATIVE IMPACT

Criteria	Time Period	
	Construction	Operation
A. Total Number of People Affected		
* Area of Physical Work (Channel Improvement)	0	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
D.7 other social infrastructure : education, productive skills, community institutions, etc.	difficult to quantify	difficult to quantify
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)	0	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work (Kedungwarak)		
D.7. Other social infrastructure : education, productive skills, cummunity institutions, etc.	0	difficult to quantify
* Benefited Area (Kedungwarak)		
B.2 Water quality	0	difficult to quantify
D.6 Health	0	difficult to quantify
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)	0	0
* Benefited Area (Widas Extension Area)		
B.2 Water quality	0	difficult to quantify
D.6 Health	0	difficult to quantify
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)	0	0

Criteria	Time Period	
	Construction	Operation
B. Total Area Affected		
* Area of Physical Work (Channel Improvement)		
A.4 Soil	more than 6,824 ha	0
B.1 Air	difficult to quantify	0
B.2.1 Water quality	from physical work area to the confluence with K. Brantas	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
A.4 Soil	about 19.2 ha	0
B.1 Air	difficult to quantify	0
B.2 Water quantity	difficult to quantify	difficult to quantify
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
A.4 Soil	about 2070 m (total)	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work (Kedungwarak)		
A.4 Soil	about 80 ha	0
B.1 Air	difficult to quantify	0
B.2.1 Water quality	from weir site to the confluence with K.Widas	0
B.2.4 Aquatic weeds	0	difficult to quantify
B.4 Forest	about 110 ha	0
* Benefited Area (Kedungwarak)		
B.2.2 Water quality	0	122 ha
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
A.4 Soil	about 110 ha	0
B.2.1 Water quality	from dam site to the confluence with K.Widas	0
B.2.4 Aquatic weeds	0	difficult to quantify
B.4 Forest	about 200 ha	0

Criteria		Time Period	
		Construction	Operation
* Benefited Area (Widas Extension Area)			
B.2	Water quality	0	2300 ha
* Surrounding Area (Ketandan)		0	0
* Area of Physical Work (Transbasin Tunnel)			
A.4	Soil	2.7 km	0
C. Length of The Time Involved		about 5 years	about 50 years
D. Intensity of Impact			
* Area of Physical Work (Channel Improvement)			
A.4	Soil	- S.A	0
B.1	Air	- S.A	0
B.2.1	Water quality	- M.A	0
D.4	Food Production	- M.A	0
* Benefited Area (Channel Improvement)		0	0
* Area of Physical Work (Flood Diversion Channel)			
A.4	Soil	- S.A	0
B.1	Air	- S.A	0
B.2.2	Water quantity	- S.B	- S.B.
D.4	Food Production	- S.A	0
D.7	Other social infrastructure : education, productive skills, community institutions, etc.	- S.A	- S.A
* Benefited Area (Flood Diversion Channel)		0	0
* Area of Physical Work (Controllable Retarding)			
A.4	Soil	- S.A	0
D.4	Food Production	- S.A	0
* Benefited Area (Controllable Retarding)		0	0
* Area of Physical Work (Kedungwarak)			
A.4	Soil	- S.A	$\pm$ M.A
B.1	Air	- S.B	0
B.2.1	Water quality	- S.A	0
B.2.4	Aquatic weeds	0	- S.D
B.4	Forest	- S.A	$\pm$ S.A
D.4	Food Production	0	- M.A

Criteria	Time Period	
	Construction	Operation
D.5 Other agriculture production	0	- S.A
D.7 Other social infrastructure : education, productive skills, community institution, etc.	0	- S.A
* Benefited Area (Kedungwarak)		
B.2.1 Water quality	0	- S.C
D.6 Health	0	- S.D
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
A.4 Soil	- S.A	± M.A
B.2.1 Water quality	- S.A	0
B.2.4 Aquatic weeds	0	- S.D
B.4 Forest	- M.A	± M.A
* Benefited Area (Widas Extension Area)		
B.2.1 Water quality	0	- S.C
D.6 Health	0	- S.D
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
A.4 Soil	- S.A	± S.A
E. Number of Components of the Environment Affected		
* Area of Physical Work (Channel Improvement)	12 %	0 %
* Benefited Area (Channel Improvement)	0 %	0 %
* Area of Physical Work (Flood Diversion Channel)	16 %	6 %
* Benefited Area (Flood Diversion Channel)	0 %	0 %
* Area of Physical Work (Controllable Retarding)	6 %	0 %
* Benefited Area (Controllable Retarding)	0 %	0 %
* Area of Physical Work (Kedungwarak)	12 %	12 %
* Benefited Area (Kedungwarak)	0 %	6 %

Criteria		Construction	Operation
B.2.4	Aquatic weeds	0	reversible
B.4	Forest	reversible	0
D.4	Food Production	0	irreversible but can be replaced elsewhere
D.5	Other agriculture production	0	do
D.7	Other social infra - structure : education, productive skills, community institutions, etc.	0	reversible
* Benefited Area (Kedungwarak)			
B.2.1	Water quality	0	reversible
D.6	Health	0	reversible
* Surrounding Area (Kedungwarak)		0	0
* Area of Physical Work (Ketandan)			
A.4	Soil	reversible	0
B.2.1	Water quality	reversible	0
B.2.4	Aquatic weeds	0	reversible
B.4	Forest	reversible	0
* Benefited Area (Widas Extension Area)			
B.2.1	Water quality	0	reversible
D.6	Health	0	reversible
* Surrounding Area (Ketandan)		0	0
* Area of Physical Work (Transbasin Tunnel)			
A.4	Soil	reversible	0

Table 9.3 ITENSITY OF NEUTRAL IMPACT

Criteria	Time Period Construction	Operation
A. Total Number of People Affected		
* Area of Physical Work (Channel Improvement)		
B.3 Land use pattern	425 families	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
B.3 Land use pattern	15 families	0
B.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
B.3 Land use pattern	not exact data now	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work (Kedungwarak)		
B.3 Land use pattern	approximately 70 families	approximately 70 families
B.7 Public work facilities	difficult to quantify	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Kedungwarak)	0	0
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		

Criteria	Construction	Operation
* Surrounding Area (Kedungwarak)	0 %	0 %
* Area of Physical Work (Ketandan)	9 %	3 %
* Benefited Area (Widas Extension Area)	0 %	6 %
* Surrounding Area (Ketandan)	0 %	0 %
* Area of Physical Work (Transbasin Tunnel)	3 %	0 %
F. Cumulative Effect	non-cumulative	non-cumulative
G. Reversible/Irreversible		
* Area of Physical Work (Channel Improvement)		
A.4 Soil	reversible	0
B.1 Air	reversible	0
B.2.1 Water quality	reversible	0
D.4 Food Production	reversible	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
A.4 Soil	reversible	0
B.1 Air	reversible	0
B.2.2 Water quantity	reversible	reversible
D.4 Food Production	reversible	0
D.7 Other social infra - structure : education, productive skills, community institutions, etc.	reversible	reversible
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
A.4 Soil	reversible	0
D.4 Food Production	reversible	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work (Kedungwarak)		
A.4 Soil	reversible	0
B.1 Air	reversible	0
B.2.1 Water quality	reversible	0

Criteria	Time Period: Construction	Time Period: Operation
B.3 Land use pattern	about 10 house holds	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Widas Extension Area)	0	0
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
B.2.2 Water quantity	difficult to quantify	0
B.3 Land use pattern	no exact data now	0
B. Total Area Affected		
* Area of Physical Work (Channel Improvement)		
A.3 Topography	difficult to calculate	0
B.3 Land use pattern	more than 6,824Ha	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
A.3 Topography	more than 19.2 ha	0
B.3 Land use pattern	more than 19.2 ha	0
D.3 Land tenure relation	more than 19.2 ha	0
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
A.3 Topography	about 2070 m (total)	0
B.3 Land use pattern	about 2070 m (total)	0
D.3 Land tenure relation	about 2070 m (total)	0

Criteria	Time Period: Construction	Time Period: Operation
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work (kedungwarak)		
A.3 Topography	about 80 ha	about 156 ha
A.4 Soil	0	about 80 ha
B.2.3 Distribution through time	0	from weir site to the confluence with K. Widas
B.3 Land use pattern	about 80 ha	about 156 ha
B.4 Forest	0	about 110 ha
B.7 Public work facilities	about 3 km	0
D.3 Land tenure relation	difficult to quantify	0
* Benefited Area (Kedungwarak)	0	0
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
A.3 Topography	about 110 ha	about 165 ha
A.4 Soil	0	about 110 ha
B.2.3 Distribution through time	0	from weir site to the confluence with K. Widas
B.3 Land use pattern	about 275 ha	about 275 ha
B.4 Forest	0	about 200 ha
D.3 Land tenure relation	no exact data now	0
* Benefited Area (Widas Extension Area)	0	0
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
A.3 Topography	about 2.7 km	about 2.7 km
A.4 Soil	0	about 2.7 km
B.2.2 Water quantity	difficult to quantify	difficult to quantify

Criteria	Time Period Construction	Operation
B.2.3 Distribution through time	0	from Kedungwarak weir to Ketandan dam
B.3 Land use pattern	about 2.7 km	about 2.7 km
C. Length of Time Involved	about 5 years	about 50 years
D. Intensity of Impact		
* Area of Physical Work (Channel Improvement)		
A.3 Topography	± M.A	0
B.3 Land use pattern	± M.A	0
D.3 Land tenure relation	± M.A	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
A.3 Topography	± S.A	0
B.3 Land use patterns	± S.A	0
D.3 Land tenure relations	± S.A	0
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
A.3 Topography	± S.A	0
B.3 Land use patterns	± S.A	0
D.3 Land tenure relation	± S.A	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Works (Kedungwarak)		
A.3 Topography	± S.A	± M.A
A.4 Soil	- S.A	± M.A
B.2.3 Distribution through time	0	± L.A
B.3 Land use pattern	± M.A	± M.A
B.4 Forest	- S.A	± S.A
B.7 Public work facilities	± L.A	+ L.A
D.3 Land tenure relation	± M.A	0

Criteria	Time Period	
	Construction	Operation
* Benefited Area (Kedungwarak)	0	0
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
A.3 Topography	± S.A	± M.A
A.4 Soil	- S.A	± M.A
B.2.3 Distribution through time	0	± L.A
B.3 Land use pattern	± M.A	± M.A
B.4 Forest including hydrological function	- M.A	± M.A
D.3 Land tenure relations	± S.A	0
* Benefited Area (Widas Extension Area)	0	0
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
A.3 Topography	± S.A	0
A.4 Soil	- S.A	± S.A
B.2.2 Water quantity	± S.C	± S.C
B.2.3 Distribution through time	0	± M.A
B.3 Land use patterns	± S.A	0
E. Number of Component of the Environment Affected		
* Area of Physical Work (Channel Improvement)	9 %	0 %
* Benefited Area (Channel Improvement)	0 %	0 %
* Area of Physical Work (Flood Diversion Channel)	9 %	0 %
* Benefited Area (Flood Diversion Channel)	0 %	0 %
* Area of Physical Work (Controllable Retarding)	9 %	0 %
* Benefited Area (Controllable Retarding)	0 %	0 %
* Area of Physical Work (Kedungwarak)	12 %	15 %

Criteria	Time Period	
	Construction	Operation
* Benefited Area (Kedungwarak)	0 %	0 %
* Surrounding Area (Kedungwarak)	0 %	0 %
* Area of Physical Work (Ketandan)	9 %	15 %
* Benefited Area (Widas Extension Area)	0 %	0 %
* Surrounding Area (Ketandan)	0 %	0 %
* Area of Physical Work (Transbasin Tunnel)	9 %	9 %
F. Cumulative	non-cumulative	non-cumulative
G. Reversible / Irreversible		
* Area of Physical Work (Channel Improvement)		
A.3 Topography	irreversible	0
B.3 Land use pattern	irreversible	0
D.3 Land tenure relation	reversible	0
* Benefited Area (Channel Improvement)	0	0
* Area of Physical Work (Flood Diversion Channel)		
A.3 Topography	irreversible	0
B.3 Land use patterns	irreversible	0
D.3 Land tenure relations	reversible	0
* Benefited Area (Flood Diversion Channel)	0	0
* Area of Physical Work (Controllable Retarding)		
A.3 Topography	irreversible	0
B.3 Land use patterns	irreversible	0
D.3 Land tenure relations	reversible	0
* Benefited Area (Controllable Retarding)	0	0
* Area of Physical Work		

Criteria	Time Period	
	Construction	Operation
* Area of Physical Work (Kedungwarak)		
A.3 Topography	irreversible	irreversible
A.4 Soil	0	irreversible
B.2.3 Distribution through time	0	reversible
B.3 Land use pattern	irreversible	irreversible
B.4 Forest	0	irreversible
B.7 Public work facilities	reversible	0
D.3 Land tenure relation	reversible	0
* Benefited Area (Kedungwarak)	0	0
* Surrounding Area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
A.3 Topography	irreversible	irreversible
A.4 Soil	0	irreversible
B.2.3 Distribution through time	0	reversible
B.3 Land use pattern	irreversible	irreversible
B.4 Forest	0	irreversible
D.3 Land tenure relation	reversible	0
* Benefited Area (Widas Extension Area)	0	0
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
A.3 Topography	irreversible	0
A.4 Soil	0	irreversible
B.2 Water quantity	reversible	reversible
B.2.3 Distribution through time	0	reversible
B.3 Land use pattern	irreversible	0

Table 9.4 INTENSITY OF POSITIVE IMPACT

Criteria		Time Period: Construction	Time Period: Operation
A. Total Number of People Affected			
* Area of Physical Work (Channel Improvement)			
B.7	Public work facilities	difficult to quantify	difficult to quantify
D.2	Economic activities - small-scale trade & services	- do -	0
* Benefited Area (Channel Improvement)			
D.2	Economic activities - agriculture	0	difficult to quantify
	- small-scale trade and services	0	- do -
	- small-scale industry, home industry and handicrafts	0	- do -
	- medium and large-scale industry	0	- do -
D.6	Health	0	- do -
D.8	Anthropology and culture, including incidence of urbanization	0	- do -
* Area of Physical Work (Flood Diversion Channel)			
B.7	Public work facilities	difficult to quantify	difficult to quantify
D.2	Economic activities - small-scale trade & services	- do -	0
* Benefited Area (Flood Diversion Channel)			
D.2	Economic activites - agriculture	0	difficult to quantify
	- small-scale trade and services	0	- do -
	- small-scale industry, home industry and hadicrafts	C	- do -
	- medium and large-scale industry	0	- do -
D.6	Health	0	- do -
D.8	Anthropology and culture, including incidence of urbanization	0	- do -
* Area of Physical Work (Controllable Retarding)			
B.7	Public work facilities	difficult to quantify	difficult to quantify
D.2	Economic activities - small-scale trade and services	- do -	0
* Benefited Area (Controllable Retarding)			

Criteria	Time Period	
	Construction	Operation
D.2 Economic activities agriculture	0	difficult to quantify
D.6 Health	0	- do -
* Area of Physical Works (Kedungwarak)		
B.7 Public works facilities	0	difficult to quantify
D.2 Economic activities - small-scale trade & services	difficult to quantify	0
* Benefited Area (Kedungwarak)		
D.2 Economic activities - agriculture	0	difficult to quantify
* Surrounding area (Kedungwarak)	0	0
* Area of Physical Work (Ketandan)		
B.7 Public work facilities	difficult to quantity	difficult to quantity
D.2 Economic activities - small-scale trade & services	- do -	- do -
* Benefited Area (Ketandan)		
D.2 Economic activities - Agriculture	0	difficult to quantity
* Surrounding Area (Ketandan)	0	0
* Area of Physical Work (Transbasin Tunnel)		
B.7 Public work facilities	difficult to quantity	difficult to quantity
B. Total Area Affected		
* Area of Physical Work (Channel Improvement)		
B.7 Public work facilities	about 30 bridges and access road and difficult to quantity	about 30 bridges and access road and difficult to quantity
D.2 Economic activities - Small-scale trade and services	difficult to quantity	0

Criteria		Time Period: Construction	Time Period: Operation
* Benefited Area (Channel Improvement)			
D.2	Economic activities		
	- Agriculture	0	difficult to quantity
	- Small-scale trade and services	0	- do -
	- Small-scale industry, home industry and handicrafts	0	- do -
	- Medium and large-scale industry	0	- do -
D.4	Food production	0	- do -
D.5	Other agricultural production	0	- do -
* Area of Physical Work (Flood diversion Channel)			
B.7	Public work facilities	6 bridge, and difficult to quantity	6 bridge and difficult to quantity
D.2	Economic activities		
	- Small-scale trade and services	difficult to quantity	0
* Benefited Area (Flood Diversion Channel)			
D.2	Economic activities		
	- Agriculture	0	difficult to quantity
	- Small-scale trade and services	0	- do -
	- Small-scale industry, home industry and handicraft	0	- do -
	- Medium and large-scale industry	0	- do -
D.4	Food production	0	- do -
D.5	Other agricultural production	0	- do -
* Area of Physical Work (Controllable Retarding)			
B.7	Public work facilities	access roads	access roads
D.2	Economic facilities		
	- Small-scale trade and services	difficult to quantity	0
* Benefited Area (Controllable Retarding)			
D.2	Economic activities		

Criteria		Time Period: Construction	Time Period: Operation
	- Agriculture	0	difficult to quantity
D.4	Food production	0	- do -
*	Area of Physical Work (Kedungwarak)		
B.6	Native fauna	0	the largest of the reservoir
B.7	Public work facilities	0	about 3 km, and difficult to quantity
D.2	Economic activities - Small-scale trade and services	difficult to quantity	0
*	Benefited Area (Kedungwarak)		
B.2.2	Water quantity	0	122 ha
B.2.3	Distribution through time	0	122 ha
D.2	Economic activities - Agriculture	0	difficult to quantity
D.4	Food production	0	122 ha
*	Surrounding Area (Kedungwarak)		
B.2.3	Distribution through time	0	from weir site to the confluence with K. Widas
*	Area of Physical Work (Ketandan)		
B.6	Native fauna	0	the largest of the reservoir
B.7	Public works facilities	about 3 km	about 3 km
D.2	Economic activities - Small-scale trade and services	difficult to quantity	0
*	Benefited Area (Widas Extension Area)		
B.2.2	Water quantity	0	2300 ha
B.2.3	Distribution through time	0	2300 ha
D.2	Economic activities - Agriculture	0	difficult to quantity

Criteria		Time Period: Construction	Time Period: Operation
D.4	Food production	0	2300 ha
*	Surrounding Area (Ketandan)		
B.2.3	Distribution through time	0	from weir site to the confluence with K. Widas
*	Area of Physical Work (Transbasin Tunnel)		
B.7	Public work facilities	access roads 2,7 km	access roads, 2,7 km
C.	Leng of Time Involved	about 5 years	about 50 years
D.	Intensity of Impact		
*	Area of Physical Work (Channel Improvement)		
B.7	Public work facilities	+ L.A	+ L.A
D.2	Economic activities - Small-sacle ade and services	+ S.A	0
*	Benefited Area (Channel Improvement)		
D.2	Economic activities - Agriculture	0	+ L.A
	- Small-scale trade and services	0	+ M.A
	- Small-scale idustry, home industry and handicrafts	0	+ M.A
	- Medium and large-scale industry	0	+ M.A
D.4	Food production	0	+ L.A
D.5	Other agricultural production	0	+ M.A
D.6	Health	0	+ L.A
D.8	Anthropology and culture, including incidence of urbanization	0	+ M.A
*	Area of Physical Work (Flood Diversion Channel)		
B.7	Public work facilities	+ L.A	+ L.A
D.2	Economic activities - Small-scale trade and services	+ S.A	0

Criteria		Tiem Period Construction	Operation
*	Benefited Area (Flood Diversion Channel)		
D.2	Economic activities		
	- Agriculture	0	+ L.A
	- Small-sacle trade and services	0	+ M.A
	- Small-scale industry, home industry and handicrafts	0	+ M.A
	- Medium and large-scale industry	0	+ M.A
D.4	Food production	0	+ L.A
D.5	Other agricultural production	0	+ M.A
D.6	Health	0	+ L.A
D.8	Anthropology and culture, including incidence of urbanization	0	+ M.A
*	Area of Physical Work (Controllable Retarding)		
B.7	Public work facilities	+ S.A	+ S.A
D.2	Economic activities		
	- Small-scale trade and services	+ S.A	0
*	Benefited Area (Controllable		
D.2	Economic activities		
	- Agriculture	0	+ L.A
D.4	Food production	0	+ L.A
D.6	Health	0	+ L.A
*	Area of Physical Work (Kedungwarak)		
B.6	Native fauna	0	+ S.C
B.7	Public work facilities	$\pm$ L.A	+ L.A
D.2	Economic activities		
	- Small-scale trade and services	+ S.A	0
*	Benefited Area (Kedungwarak)		
B.2.2	Water quantity	0	+ L.A
B.2.3	Distribution through time	0	+ L.A
D.2	Economic activities		
	- Agriculture	0	+ L.A

Criteria	Time Period Construction	Operation
D.4 Food production	0	+ L.A
* Surrounding Area (Kedungwarak)		
B.2.3 Distribution through time	0	+ S.A
* Area of Physical Work (Ketandan)		
B.6 Native fauna	0	+ S.C
B.7 Public work facilities	+ S.A	+ S.A
D.2 Economic activities - Small-scale trade and services	+ S.A	0
* Benefited Area (Widas Extension Area)		
B.2.2 Water quantity	0	+ L.A
B.2.3 Distribution through time	0	+ L.A
D.2 Economic activities - Agriculture	0	+ L.A
D.4 Food production	0	+ L.A
* Surrounding Area (Ketandan)		
B.2.3 Distribution through time	0	+ S.A
* Area of Physical Work (Transbasin Tunnel)		
B.7 Public work facilities	+ M.A	+ M.A
E. Number of Component of The Environment Affected		
* Area of Physical Work (Channel Improvement)	6 %	3 %
* Benefited Area (Channel Improvement)	0 %	24 %
* Area of Physical Work (Flood Diversion Channel)	6 %	3 %
* Benefited Area (Flood Diversion Channel)	0 %	24 %
* Area of Physical Work (Controllable Retarding)	6 %	3 %
* Benefited Area (Controllable Retarding)	0 %	9 %

Criteria	Time Period Construction	Operation
* Area of Physical Work (Kedungwarak)	3 %	6 %
* Benefited Area (Kedungwarak)	0 %	12 %
* Surrounding Area (Kedungwarak)	0 %	3 %
* Area of Physical Work (Ketandan)	6 %	6 %
* Benefited Area (Widas Extension Area)	0 %	12 %
* Surrounding Area (Ketandan)	0 %	3 %
* Area of Physical Work (Transbasin Tunnel)	3 %	3 %
F. Cumulative Effect	non-cumulative	non-cumulative
G Reversible/Irreversible		
* Area of Physical Work (Channel Improvement)		
B.7 Public work facilities	reversible	reversible
D.2 Economic activities - Small-scale trade and services	reversible	0
* Benefited Area (Channel Improvement)		
D.2 Economic activities - Agriculture	0	reversible
- Small-scale trade and services	0	- do -
- Small-sacle industry, home industry and handicrafts	0	- do -
- Medium and large-scale industry	0	- do -
D.4 Food production	0	- do -
D.5 Other agricultural production	0	- do -
D.6 Health	0	- do -
D.8 Anthropology and culture, including incidence of urbanization	0	- do -

Criteria		Time Period: Construction	Time Period: Operation
* Area of Physical Work (Flood Dievrsion Channel)			
B.7	Public work facilities	reversible	reversible
D.2	Economic activities - Small-scale trade and services	reversible	0
* Benefited Area (Flood Diversion Channel)			
D.2	Economic activities - Agriculture	0	reversible
	- Small-scale trade and services	0	- do -
	- Small-scale industry, home industry and handicrafts	0	- do -
	- Medium and large-scale industry	0	- do -
D.4	Food production	0	- do -
D.5	Other agricultural production	0	- do -
D.6	Health	0	- do -
D.8	Anthropology and culture, including incidence of urbanization	0	- do -
* Area of Physical Work (Controllable Retarding)			
B.7	Public Work facilities	reversible	reversible
D.2	Economic activities - small-scale trade and services	reversible	0
* Benefited Area (Controllable Retarding)			
D.2	Economic activities - agriculture	0	reversible
D.4	Food production	0	- do -
D.6	Health	0	- do -
* Area of Physical Work (Kedungwarak)			
B.6	Native fauna	0	reversible
B.7	Public work facilities	0	reversible
D.2	Economic activities - small-scale trade and services	reversible	0

Criteria	Time Period	
	Construction	Operation
* Benefited Area (Kedungwarak)		
B.2.2 Water quantity	0	reversible
B.2.3 Distribution through time	0	- do -
D.2 Economic activities - agriculture	0	- do -
D.4 Food production	0	- do -
* Surrounding Area (Kedungwarak)		
B.2.3 Distribution through time	0	reversible
* Area of Physical Work (Ketandan)		
B.6 Native fauna	0	reversible
B.7 Public work facilities	reversible	reversible
D.2 Economic activities - small-scale trade and services	reversible	0
* Benefited Area (Widas Extension Area)		
B.2.2 Water quantity	0	reversible
B.2.3 Distribution through time	0	- do -
D.2 Economic activities - agriculture	0	- do -
D.4 Food production	0	- do -
* Surrounding Area (Ketandan)		
B.2.3 Distribution through time	0	reversible
* Area of Physical Work (Transbasin Tunnel)		
B.7 Public work facilities	reversible	reversible