Table VIII-4(1/7)   LIST OF UNIT PRICE

I.   BASIN-WIDE PROJECT
A.   SEDIMENT CONTROL WORKS

I.A.1   C-1 Dam, Rubblestone Concrete, Pump Method   62,500 m3   (Unit : cu.m)

		(Unit Rate)		(Quantity)		
(1) Excavation	(Item no. 40)	146.0	x	145,000.0	=	21,170,000.0
(2) Outer concrete	(Item no. 30-A-1)	2,861.0	x	23,400.0	=	66,947,400.0
(3) Inner concrete	(Item no. 30-A-2)	2,791.0	x	15,640.0	=	43,651,240.0
(4) Rubblestone	(Item no. 11)	538.0	x	23,460.0	=	12,621,480.0
(5) Form	(Item no. 72-A)	643.0	x	7,440.0	=	4,783,920.0
	Total(Bs./no.)					149,174,040.0
	Unit Price(Bs./m3)					2,390.0

I.A.2   C-2 Dam, Rubblestone Concrete, Pump Method   40,500 m3   (unit cu.m)

		(Unit Rate)		(Quantity)		
(1) Excavation	(Item no. 40)	146.0	x	73,000.0	=	10,658,000.0
(2) Outer concrete	(Item no. 30-A-1)	2,861.0	x	15,200.0	=	43,487,200.0
(3) Inner concrete	(Item no. 30-A-2)	2,791.0	x	10,130.0	=	28,272,830.0
(4) Rubblestone	(Item no. 11)	538.0	x	15,170.0	=	8,161,460.0
(5) Form	(Item no. 72-A)	643.0	x	4,820.0	=	3,099,260.0
	Total(Bs./no.)					93,678,750.0
	Unit Price(Bs./m3)					2,310.0

I.A.3   C-3 Dam, Steel Frame,   17,100 m3   (Unit cu.m)

		(Unit Rate)		(Quantity)		
(1) Excavation	(Item no. 40)	146.0	x	26,000.0	=	3,796,000.0
(2) Steel frame	(Item no. 76)	23,484.0	x	1,334.0	=	31,327,656.0
(3) Rubblestone	(Item no. 11)	538.0	x	17,100.0	=	9,199,800.0
	Total(Bs./no.)					44,323,456.0
	Unit Price(Bs./m3)					2,590.0

I.A.4   C-4 Dam, Steel Frame,   27,000 m3   (Unit : cu.m)

		(Unit Rate)		(Quantity)		
(1) Excavation	(Item no. 40)	146.0	x	54,000.0	=	7,884,000.0
(2) Steel frame	(Item no. 76)	23,484.0	x	2,106.0	=	49,457,304.0
(3) Rubblestone	(Item no. 11)	538.0	x	27,000.0	=	14,526,000.0
	Total(Bs./no.)					71,867,304.0
	Unit Price(Bs./m3)					2,660.0

Table VIII-4(2/7) LIST OF UNIT PRICE

I.A.5 C-5 Dam, Steel Frame, 14,600 m3 (Unit : cu.m)

		(Unit Rate)	×	(Quantity)		
(1) Excavation	(Item no. 40)	146.0	×	27,000.0	=	3,942,000.0
(2) Steel frame	(Item no. 76)	23,484.0	×	1,139.0	=	26,748,276.0
(3) Rubblestone	(Item no. 11)	538.0	×	14,600.0	=	7,854,800.0
	Total(Bs./no.)					38,545,076.0
	Unit Price(Bs./m3)					2,640.0

I.A.6 C-6 Dam, Steel Frame, 25,100 m3 (Unit : cu.m)

		(Unit Rate)	×	(Quantity)		
(1) Excavation	(Item no. 40)	146.0	×	38,000.0	=	5,548,000.0
(2) Steel frame	(Item no. 76)	23,484.0	×	1,958.0	=	45,981,672.0
(3) Rubblestone	(Item no. 11)	538.0	×	25,100.0	=	13,503,800.0
	Total(Bs./no.)					65,033,472.0
	Unit Price(Bs./m3)					2,590.0

I.A.7 C-7 Dam, Steel Frame, 22,000 m3 (Unit : cu.m)

		(Unit Rate)	×	(Quantity)		
(1) Excavation	(Item no. 40)	146.0	×	34,000.0	=	4,964,000.0
(2) Steel frame	(Item no. 76)	23,484.0	×	1,716.0	=	40,298,544.0
(3) Rubblestone	(Item no. 11)	538.0	×	22,000.0	=	11,836,000.0
	Total(Bs./no.)					57,098,544.0
	Unit Price(Bs./m3)					2,600.0

I.A.8 C-8 Dam, Steel Frame, 17,100 m3 (Unit : cu.m)

		(Unit Rate)	×	(Quantity)		
(1) Excavation	(Item no. 40)	146.0	×	26,000.0	=	3,796,000.0
(2) Steel frame	(Item no. 76)	23,484.0	×	1,334.0	=	31,327,656.0
(3) Rubblestone	(Item no. 11)	538.0	×	17,100.0	=	9,199,800.0
	Total(Bs./no.)					44,323,456.0
	Unit Price(Bs./m3)					2,590.0

I.A.9 C-9 Dam, Steel Frame, 27,200 m3 (Unit : cu.m)

		(Unit Rate)	×	(Quantity)		
(1) Excavation	(Item no. 40)	146.0	×	41,000.0	=	5,986,000.0
(2) Steel frame	(Item no. 76)	23,484.0	×	2,122.0	=	49,833,048.0
(3) Rubblestone	(Item no. 11)	538.0	×	27,200.0	=	14,633,600.0
	Total(Bs./no.)					70,452,648.0
	Unit Price(Bs./m3)					2,590.0

Table VIII-4(3/7)   LIST OF UNIT PRICE

I.A.10 N-1 Dam, Rubblestone Concrete, Pump Method   65,000 m3   (Unit : cu.m)

		(Unit Rate)		(Quantity)	
(1) Excavation	(Item no. 40)	146.0	x	54,500.0	= 7,957,000.0
(2) Outer concrete	(Item no. 30-A-1)	2,861.0	x	19,800.0	= 56,647,800.0
(3) Inner concrete	(Item no. 30-A-2)	2,791.0	x	18,080.0	= 50,461,280.0
(4) Rubblestone	(Item no. 11)	538.0	x	27,120.0	= 14,590,560.0
(5) Form	(Item no. 72-A)	643.0	x	7,740.0	= 4,976,820.0

Total(Bs./no.)   134,633,460.0
Unit Price(Bs./m3)   2,070.0

I.A.11 Mucusos Continuous Dam, 3 nos., 1,059 m3   (Unit : no.)

		(Unit Rate)		(Quantity)	
(1) Excavation	(Item no. 41)	174.0	x	603.0	= 104,922.0
(2) Inner concrete	(Item no. 33-A-2)	2,650.0	x	300.0	= 795,000.0
(3) Rubblestone	(Item no. 11)	538.0	x	444.0	= 238,872.0
(4) Wet stone masonry	(Item no. 6)	753.0	x	1,050.0	= 790,650.0
(5) Form	(Item no. 72-A)	643.0	x	258.0	= 165,894.0
(6) Handling of materials	(Item no. 74)	772.0	x	795.0	= 613,740.0

Total(Bs./3 nos.)   2,709,078.0
Unit Price(Bs./no.)   903,000.0

I.A.12 Mucusas Continuous Dam, 10 nos., 5,350 m3   (Unit : no.)

		(Unit Rate)		(Quantity)	
(1) Excavation	(Item no. 41)	174.0	x	3,190.0	= 555,060.0
(2) Inner concrete	(Item no. 33-A-2)	2,650.0	x	1,530.0	= 4,054,500.0
(3) Rubblestone	(Item no. 11)	538.0	x	2,290.0	= 1,232,020.0
(4) Wet stone masonry	(Item no. 6)	753.0	x	5,100.0	= 3,840,300.0
(5) Form	(Item no. 72-A)	643.0	x	1,310.0	= 842,330.0
(6) Handling of materials	(Item no. 74)	772.0	x	4,030.0	= 3,111,160.0

Total(Bs./10 nos.)   13,635,370.0
Unit Price(Bs./no.)   1,364,000.0

I.A.13 Mucusuru Continuous Dam, 5 nos., 3,180 m3   (Unit : no.)

		(Unit Rate)		(Quantity)	
(1) Excavation	(Item no. 41)	174.0	x	1,705.0	= 296,670.0
(2) Inner concrete	(Item no. 33-A-2)	2,650.0	x	850.0	= 2,252,500.0
(3) Rubblestone	(Item no. 11)	538.0	x	1,270.0	= 683,260.0
(4) Wet stone masonry	(Item no. 6)	753.0	x	3,535.0	= 2,661,855.0
(5) Form	(Item no. 72-A)	643.0	x	750.0	= 482,250.0
(6) Handling of materials	(Item no. 74)	772.0	x	2,360.0	= 1,821,920.0

Total(Bs./5 nos.)   8,198,455.0
Unit Price(Bs./no.)   1,640,000.0

Table VIII-4(4/7) LIST OF UNIT PRICE

I.A.14 Continuous Dam , Other Sites , 92 nos. (Unit : no.)
    (1) Excavation   (Item no. 42)   441.0 x   295.0 = 130,095.0
    (2) Concrete   (Item no. 33-A-1) 2,720.0 x   57.6 = 156,672.0
    (3) Rubblestone   (Item no. 11)   538.0 x   86.4 =   46,483.2
    (4) Wet stone masonry   (Item no. 6)   753.0 x   320.0 = 240,960.0
                            Total(Bs./no.)   (Unit Rate) x (Quantity) 574,210.2
                            Unit Price(Bs./no.)   574,000.0

I.A.15 Retaining Wall (Basin-wide Project) (Unit : no.)
    (1) Excavation   (Item no. 42)   441.0 x   2.1 =   926.1
    (2) Wet stone masonry   (Item no. 6)   2,510.0 x   8.6 =   21,586.0
                            Total(Bs./no.)   (Unit Rate) x (Quantity)   22,512.1
                            Unit Price(Bs./no.)   22,500.0

B. SEDIMENT CONTROL WORKS
I.B.1 Land Clearing (Unit : sq.m)
    (1) Grass land   (Item no.12)   3.7 x 10,000.0 =   37,000.0
                            Total(Bs./ha)   (Unit Rate) x (Quantity)   37,000.0
                            Unit Price(Bs./ha)   37,000.0

I.B.2 Embankment of Dike (Unit : cu.m)
    (1) Excavation   (Item no. 1)   113.0 x   1.0 =   113.0
    (2) Embankment   (Item no. 2)   54.0 x   1.0 =   54.0
                            Total(Bs./m3)   (Unit Rate) x (Quantity)   167.0
                            Unit Price(Bs./m3)   167.0

I.B.3 Sod Facing (Unit : sq.m)
    (1) Seed spraying   (Item no. 4)   24.0 x 10,000.0 = 240,000.0
                            Total(Bs./ha)   (Unit Rate) x (Quantity) 240,000.0
                            Unit Price(Bs./ha)   240,000.0

I.B.4 Gravel Pavement (Unit : cu.m)
    (1) Gravel metalling   (Item no. 3)   560.0 x   1.0 =   560.0
                            Total(Bs./m3)   (Unit Rate) x (Quantity)   560.0
                            Unit Price(Bs./m3)   560.0

Table VIII-4(5/7)　LIST OF UNIT PRICE

I.B.5　Revetment by Concrete Masonry (Unit : m)

		(Unit Rate)		(Quantity)		
(1) Wet stone masonry	(Item no. 6)	753.0	x	6.4	=	4,819.2
(2) Cobblestone filling	(Item no. 3)	560.0	x	1.5	=	840.0
(3) Gabion mattress	(Item no. 9)	1,060.0	x	5.4	=	5,724.0
(4) Wooden pile	(Item no. 8)	2,870.0	x	0.5	=	1,435.0
(5) Concrete block	(Item no. 7)	3,550.0	x	0.4	=	1,420.0
(6) Backfilling	(Item no. 11)	538.0	x	1.8	=	968.4
Total(Bs./m)						15,206.6
Unit Price(Bs./m)						15,200.0

I.B.6　Groin (Unit : no.)

		(Unit Rate)		(Quantity)		
(1) Gabion mattress	(Item no. 9)	1,060.0	x	42.0	=	44,520.0
(2) Rubblestone	(Item no. 11)	538.0	x	2.0	=	1,076.0
Total(Bs./no.)						45,596.0
Unit Price(Bs./no.)						45,600.0

I.B.7　Ground-sill (Unit : no.)

		(Unit Rate)		(Quantity)		
(1) Excavation	(Item no. 1)	113.0	x	18,300.0	=	2,067,900.0
(2) Rubblestone concrete	(*1)	1,624.1	x	2,846.0	=	4,622,165.8
(3) Stone bedding	(Item no. 3)	560.0	x	111.0	=	62,160.0
(4) Cobblestone filling	(Item no. 11)	538.0	x	3,000.0	=	1,614,000.0
(5) Gabion mattress	(Item no. 9)	1,060.0	x	12,900.0	=	13,674,000.0
Total(Bs./no.)						22,040,225.8
Unit Price(Bs./no.)						22,040,000.0

*1　concrete (Unit : cu.m)

		(Unit Rate)		(Quantity)		
(1) Rubblestone	(Item no. 11)	538.0	x	0.6	=	322.8
(2) Concrete	(Item no. 30-A-1)	2,861.0	x	0.4	=	1,144.4
(3) Form	(Item no. 72-A)	643.0	x	0.2	=	156.9
Total(Bs./m3)						1,624.1

Table VIII-4(6/7) LIST OF UNIT PRICE

II. LOCAL PROJECT

A. SEDIMENT CONTROL WORKS

II.A.1 Check Dam (Local Project) (Unit : no.)

		Unit Rate		Quantity		Total
(1) Excavation	(Item no. 42)	441.0	x	12.0	=	5,292.0
(2) Concrete	(Item no. 33-A-1)	2,720.0	x	7.2	=	19,584.0
(3) Rubblestone	(Item no. 11)	538.0	x	10.8	=	5,810.4
(4) Wet stone masonry	(Item no. 6)	753.0	x	40.0	=	30,120.0
Total (Bs./no.)	(Unit Rate)			(Quantity)		60,806.4
Unit Price (Bs./no.)						60,800.0

II.A.2 Retaining Wall (Local Project) (Unit : m)

		Unit Rate		Quantity		Total
(1) Concrete	(Item no. 30-A-1)	2,861.0	x	1.523	=	4,357.3
(2) Form	(Item no. 73-A)	730.0	x	5.266	=	3,844.2
(3) Backfilling	(Item no. 50)	71.3	x	0.413	=	29.4
Total (Bs./m)	(Unit Rate)			(Quantity)		8,230.9
Unit Price (Bs./m)						8,230.0

II.A.3 Revetment (Local Project) (Unit : m)

		Unit Rate		Quantity		Total
(1) Wet stone masonry	(Item no. 6)	753.0	x	5.590	=	4,209.3
(2) Concrete block	(Item no. 7)	3,550.0	x	0.136	=	482.8
(3) Backfilling	(Item no. 50)	71.3	x	1.963	=	140.0
(4) Gabion mattress	(Item no. 9)	1,060.0	x	3.000	=	3,180.0
(5) Cobblestone filling	(Item no. 11)	538.0	x	0.625	=	336.3
Total (Bs./m)	(Unit Rate)			(Quantity)		8,348.3
Unit Price (Bs./m)						8,350.0

B. SEDIMENT CONTROL WORKS

II.B.1 Albarregas River 660 m3 (Unit : cu.m)

		Unit Rate		Quantity		Total
(1) Concrete	(Item no. 33-A-1)	2,720.0	x	1.00	=	2,720.0
(2) Form	(Item no. 73-A)	730.0	x	2.00	=	1,460.0
(3) Reinforcement bars	(Item no. 71)	22,672.0	x	0.02	=	453.4
Total (Bs./m3)	(Unit Rate)			(Quantity)		4,633.4
Unit Price (Bs./m3)						4,630.0

Table VIII-4(7/7)   LIST OF UNIT PRICE

II.B.2 Q'da Milla (Unit : lump sum)
(1) Reinforced concrete   (Ref. A)   4,633.4 x   95.0 =   440,176.8
(2) Plain concrete   (Ref. B)   3,450.0 x 3,385.0 = 11,678,250.0
(3) Earth work   (Ref. C)   174.0 x 5,083.0 =   884,442.0
                          Total(Bs.)   13,002,868.8
                          (Unit Rate)   (Quantity)
                          Unit Price(Bs.)   13,000,000.0

A Reinforced Concrete work 95 m3 (Unit : cu.m)
(1) Concrete   (Item no. 33-A-1) 2,720.0 x 1.00 = 2,720.0
(2) Form   (Item no. 73-A)   730.0 x 2.00 = 1,460.0
(3) Reinforcement bars (Item no. 71)   22,672.0 x 0.02 =   453.4
                       Total(Bs./m3)   (Unit Rate) (Quantity) 4,633.4

B Plain Concrete work 3,385 m3 (Unit : cu.m)
(1) Concrete   (Item no. 33-A-1) 2,720.0 x 1.0 = 2,720.0
(2) Form   (Item no. 73-A)   730.0 x 1.0 =   730.0
                       Total(Bs./m3)   (Unit Rate) (Quantity) 3,450.0

C Earth work 5,083 m3 (Unit : cu.m)
(1) Excavation   (Item no. 41)   174.0 x 1.0 =   174.0
                       Total(Bs./m3)   (Unit Rate) (Quantity) 174.0

II.B.3 Q'da La Portuguesa 4,500 m3 (Unit : cu.m)
A Earth work
(1) Excavation   (Item no. 41)   174.0 x 1.0 =   174.0
                       Unit Price(Bs./m3) (Unit Rate) (Quantity) 174.0

Table VIII-5   BREAKDOWN OF MASTER PLAN CONSTRUCTION COST FOR BASIN-WIDE PROJECT

Unit: Bs

WORK ITEM	UNIT	UNIT COST	QUANTITY	COST
I. DIRECT COST				
A. Sediment Control Works				
(1) Preparatory Works (10% of (2) to (17))	l.s.			92,183,280
(2) Sabo Dam C-1, Rubblestone Concrete	m3	2,390	62,500	149,375,000
(3) Sabo Dam C-2, Rubblestone Concrete	m3	2,310	40,500	93,555,000
(4) Sabo Dam C-3, Steel Frame	m3	2,590	17,100	44,289,000
(5) Sabo Dam C-4, Steel Frame	m3	2,660	27,000	71,820,000
(6) Sabo Dam C-5, Steel Frame	m3	2,640	14,600	38,544,000
(7) Sabo Dam C-6, Steel Frame	m3	2,590	25,100	65,009,000
(8) Sabo Dam C-7, Steel Frame	m3	2,600	22,000	57,200,000
(9) Sabo Dam C-8, Steel Frame	m3	2,590	17,100	44,289,000
(10) Sabo Dam C-9, Steel Frame	m3	2,590	27,200	70,448,000
(11) Sabo Dam N-1, Rubblestone Concrete	m3	2,070	65,000	134,550,000
(12) Continuous Dam, Mucusos	nos.	903,000	3	2,709,000
(13) Continuous Dam, Mucusas	nos.	1,364,000	10	13,640,000
(14) Continuous Dam, Mucusuru	nos.	1,640,000	5	8,200,000
(15) Continuous Dam, Other Sites	nos.	574,000	92	52,808,000
(16) Retaining Wall (Wet Masonry)	nos.	22,500	1,400	31,500,000
(17) Miscellaneous Works(5% of (2) to (16))	l.s.			43,896,800
Sub-Total				1,014,016,080
B. Flood Control Works				
(1) Preparatory Works (10% of (2) to (10))				150,593,900
(2) Land Clearing	ha	37,000	2,300	85,100,000
(3) Excavation of Riverbed	m3	–	–	–
(4) Dike Embankment	m3	167	3,993,000	666,831,000
(5) Sodding	ha	240,000	181	43,440,000
(6) Gravel Pavement	m3	560	64,100	35,896,000
(7) Revetment	m	15,200	30,800	468,160,000
(8) Groin	nos.	45,600	1,370	62,472,000
(9) Ground-sill	no.	22,040,000	1	22,040,000
(10) Puerto Chama Bridge Extension	m2	20,000	6,100	122,000,000
Sub-Total				1,656,532,900
Total of I.				2,670,548,980
II. Land Acquisition				
(1) Platano	Ha	100,000	558	55,800,000
(2) Pasture	Ha	30,000	1,742	52,260,000
Total of II.				108,060,000
III. Administration Cost (5% of I & II)	L.S.			138,930,449
IV. Engineering Service (10% of I)	L.S.			267,054,898
V. Physical Contingency(10% of I,II,III & IV)	L.S.			318,459,433
Grand Total				3,503,053,760

Note : (1) 1 US$ = 40 Bs. = 130 Yen
      (2) Cost of excavation of riverbed of Item I.B.(3) is included in cost of dike embankment
          because materials excavated are used for dike.

Table VIII-6 BREAKDOWN OF MASTER PLAN CONSTRUCTION COST FOR LOCAL PROJECT

Unit: Bs

WORK ITEM	UNIT	UNIT COST	QUANTITY	COST
I. DIRECT COST				
A. Sediment Control Works				
(1) Preparatory Works (10% of (2) to (4))	l.s.			1,753,490
(2) Check Dam	nos.	60,800	88	5,350,400
(3) Retaining Wall	m	8,230	750	6,172,500
(4) Revetment	m	8,350	720	6,012,000
Total				19,288,390
B. Flood Control Works				
(1) Preparatory Works (10% of (2) to (4))	l.s.			1,683,880
(2) Improvement of Albarregas River	m3	4,630	660	3,055,800
(3) Improvement of Q'da Milla	l.s.	13,000,000	1	13,000,000
(4) Improvement of Q'da La Portuguesa	m3	174	4,500	783,000
Total				18,522,680
Total of I.				37,811,070
II. Administration Cost (5% of I.)				1,890,554
III. Engineering Service (10% of I.)				3,781,107
IV. Physical Contingency (10% of I,II & III)				4,348,273
Grand Total				47,831,004

Note: 1 US$ = 40 Bs. = 130 Yen

Table VIII-7   BREAKDOWN OF ACTION PLAN CONSTRUCTION COST FOR BASIN-WIDE PROJECT

Unit: Bs

WORK ITEM	UNIT	UNIT COST	QUANTITY	COST
I. DIRECT COST				
A. Sediment Control Works				
(1) Preparatory Works (10% of (2) to (16))	l.s.			37,240,140
(2) Sabo Dam C-1, Rubblestone Concrete	m3	2,390	62,500	149,375,000
(3) Sabo Dam C-2, Rubblestone Concrete	m3	2,310	0	0
(4) Sabo Dam C-3, Steel Frame	m3	2,590	0	0
(5) Sabo Dam C-4, Steel Frame	m3	2,660	0	0
(6) Sabo Dam C-5, Steel Frame	m3	2,640	14,600	38,544,000
(7) Sabo Dam C-6, Steel Frame	m3	2,590	0	0
(8) Sabo Dam C-7, Steel Frame	m3	2,600	0	0
(9) Sabo Dam C-8, Steel Frame	m3	2,590	0	0
(10) Sabo Dam C-9, Steel Frame	m3	2,590	0	0
(11) Sabo Dam N-1, Rubblestone Concrete	m3	2,070	65,000	134,550,000
(12) Continuous Dam, Mucusos	nos.	903,000	3	2,709,000
(13) Continuous Dam, Mucusas	nos.	1,364,000	10	13,640,000
(14) Continuous Dam, Mucusuru	nos.	1,640,000	5	8,200,000
(15) Continuous Dam, Other Sites	nos.	574,000	0	0
(16) Retaining Wall (Wet Masonry)	nos.	22,500	340	7,650,000
(17) Miscellaneous Works(5% of (2) to (16))	l.s.			17,733,400
Sub-Total				409,641,540
B. Flood Control Works				
(1) Preparatory Works (10% of (2) to (10))				35,812,820
(2) Land Clearing	ha	37,000	674	24,938,000
(3) Excavation of Riverbed	m3	-	-	-
(4) Dike Embankment	m3	167	745,000	124,415,000
(5) Sodding	ha	240,000	28	6,720,000
(6) Gravel Pavement	m3	560	15,420	8,635,200
(7) Revetment	m	15,200	10,300	156,560,000
(8) Groin	nos.	45,600	325	14,820,000
(9) Ground-sill	no.	22,040,000	1	22,040,000
(10) Puerto Chama Bridge Extension	m2	20,000	0	0
Sub-Total				393,941,020
Total of I.				803,582,560
II. Land Acquisition				
(1) Platano	Ha	100,000	183	18,300,000
(2) Pasture	Ha	30,000	491	14,730,000
Total of II.				33,030,000
III. Administration Cost (5% of I & II)	L.S.			41,830,628
IV. Engineering Service (10% of I)	L.S.			80,358,256
V. Physical Contingency(10% of I,II,III & IV)	L.S.			95,880,144
Grand Total				1,054,681,588

Note : (1) 1 US$ = 40 Bs. = 130 Yen
(2) Cost of excavation of riverbed of Item I.B.(3) is included in cost of dike embankment because materials excavated are used for dike.

Table VIII-8   BREAKDOWN OF ACTION PLAN CONSTRUCTION COST FOR LOCAL PROJECT

Unit : Bs

WORK ITEM	UNIT	UNIT COST	QUANTITY	COST
I. DIRECT COST				
A. Sediment Control Works				
(1) Preparatory Works (10% of (2) to (4))	l.s.			1,753,490
(2) Check Dam	nos.	60,800	88	5,350,400
(3) Retaining Wall	m	8,230	750	6,172,500
(4) Revetment	m	8,350	720	6,012,000
Total				19,288,390
B. Flood Control Works				
(1) Preparatory Works (10% of (2) to (4))	l.s.			1,683,880
(2) Improvement of Albarregas River	m3	4,630	660	3,055,800
(3) Improvement of Q'da Milla	l.s.	13,000,000	1	13,000,000
(4) Improvement of Q'da La Portuguesa	m3	174	4,500	783,000
Total				18,522,680
Total of I.				37,811,070
II. Administration Cost (5% of I.)				1,890,554
III. Engineering Service (10% of I.)				3,781,107
IV. Physical Contingency (10% of I,II & III)				4,348,273
Grand Total				47,831,004

Note: 1 US$ = 40 Bs. = 130 Yen

Table VIII-9 DISBURSEMENT SCHEDULE OF ACTION PLAN FOR BASIN-WIDE PROJECT

Unit: 1000 Bs.

Work Item	Total Cost	ANNUAL DISBURSEMENT									
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Direct Cost											
1.1 Sediment Control	409,642	0	0	60,703	80,843	69,671	24,886	24,886	46,305	59,564	42,784
1.2 Flood Control	393,941	0	0	56,314	67,039	37,105	48,190	48,190	48,190	48,190	40,723
Total of 1.	803,583	0	0	117,017	147,882	106,776	73,076	73,076	94,495	107,754	83,507
2. Land Acquisition	33,030	0	4,955	4,955	4,955	4,955	3,303	3,303	3,303	3,301	0
3. Administration Expenses	41,831	4,183	4,183	4,183	6,275	4,183	4,183	4,183	4,183	4,183	2,092
4. Engineering Services	80,358	12,053	4,018	9,361	11,831	8,542	5,846	5,846	7,560	8,620	6,681
5. Physical Contingency	95,880	1,624	1,316	13,552	17,094	12,446	8,641	8,641	10,954	12,386	9,228
Grand Total	1,054,682	17,860	14,472	149,068	188,037	136,902	95,049	95,049	120,495	136,244	101,508

NOTE: Exchange rate is US$1.0 = Bs.40.0 = JYE130. Price level is January of 1989.

Table VIII-10   DISBURSEMENT SCHEDULE OF ACTION PLAN FOR LOCAL PROJECT

Unit: 1000 Bs.

Work Item	Total Cost	ANNUAL DISBURSEMENT									
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Direct Cost											
1.1 Sediment Control	19,288	0	2,462	2,995	2,469	2,407	2,407	1,136	1,804	1,804	1,804
1.2 Flood Control	18,523	0	4,235	8,955	5,333	0	0	0	0	0	0
Total of 1.	37,811	0	6,697	11,950	7,802	2,407	2,407	1,136	1,804	1,804	1,804
2. Administration Expenses	1,891	378	189	189	189	189	189	189	189	95	95
3. Engineering Services	3,781	756	378	1,017	664	205	205	97	153	153	153
4. Physical Contingency	4,348	113	726	1,316	866	280	280	142	215	205	205
Grand Total	47,831	1,134	8,035	14,530	9,552	3,078	3,078	1,553	2,353	2,259	2,259

NOTE: Exchange rate is US$1.0 = Bs.40.0 = JYE130. Price level is January of 1989.

ITEM	UNIT	QUANTITY	PHASE 1 (1991-2000)	PHASE 2 (2001-2010)	PHASE 3 (2011-2020)
BASIN-WIDE PROJECT					
1. Sediment Control					
Sabo Dam (C-1, N-1, C-5)	m³	142,100			
(C-2 - C-4)	m³	84,600			
(C-6 - C-9)	m³	91,400			
Continuous Dam	no.	110	(18 nos.)	(44 nos.)	(48 nos.)
Retaining Wall	no.	1,400	(340 nos.)	(450 nos.)	(610 nos.)
2. Flood Control					
Reinforcement of Existing Dike	km	12.0*			
River Improvement (Phase 1)	km	24.7*			
River Improvement (Phase 2)	km	31.4*			
River Improvement (Phase 3)	km	40.3*			
Puerto Chama Bridge Extension	m²	6,100			
LOCAL PROJECT					
1. Sediment Control					
Check Dam	no.	88			
Retaining Wall	m	750			
Revetment	m	720			
2. Flood Control					
River Improvement of Albarregas River					
River Improvement of Milla River					
River Improvement of Portuguesu River					

	PHASE 1 = Bs1,103 million	PHASE 2 = Bs1,415 million	PHASE 3 = Bs1,033 million
	(@ Bs110x10yrs)	(@ Bs142x10yrs)	(@ Bs103x10yrs)

* Cumulative length of both banks.

CONSTRUCTION TIME SCHEDULE FOR MASTER PLAN

Fig. VIII-1

STUDY ON CHAMA RIVER BASIN
CONSERVATION PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

CONSTRUCTION TIME SCHEDULE FOR ACTION PLAN

Description	Unit	Quantity	Schedule (1991–2000) notes
PRE-CONSTRUCTION STAGE			
I Detailed Design			1st–2nd Year
II Tendering			2nd–3rd Year
CONSTRUCTION STAGE			
I BASIN-WIDE PROJECT			
A Sediment Control Works			
1. Preparatory Works	LS	1	
2. Sabo Dam			
2.1 C-1 Sabo Dam	m³	62,500	(C-1) 4th Year
2.2 C-5 Sabo Dam	m³	14,600	(C-5) 6th Year
2.3 N-1 Sabo Dam	m³	65,000	(N-1) 9th Year
3. Continuous Low Dam			
3.1 Mucusás	No.	10	(Mucusás) 4th Year
3.2 Mucusurú	No.	5	(Mucusurú) 7th Year
3.3 Mucusós	No.	3	(Mucusós) 9th Year
4. Retaining Wall	No.	340	(113 nos.) 5th Year; (227 nos.) 8th Year
B Flood Control Works			
1. Preparatory Works	LS	1	
2. Land Clearing	ha	674	(Sec 1) (Sec 2) (Sec 3) (Sec 4)
3. Dike Embankment	m³	745,000	(Sec 1) (Sec 2) (Sec 3) (Sec 4)
4. Sod Facing	ha	28	(Sec 1) (Sec 2) (Sec 3) (Sec 4)
5. Revetment	m	10,300	(Sec 1) (Sec 2) (Sec 3) (Sec 4)
6. Groin	No.	325	(Sec 5) (Groin)
7. Groundsill	No.	1	(Groundsill)
II LOCAL PROJECT			
A Sediment Control Works			
1. Preparatory Works	LS	1	
2. Retaining Wall	No.	750	(Retaining Wall)
3. Check Dam	m	88	(42 nos.) (46 nos.)
4. Revetment	m	720	(Revetment)
B Flood Control Works			
1. Albarregas River	m³	660	
2. Milla River	LS	1	
3. Portuguesu River	m³	4,500	

Year columns: 1st Year 1991, 2nd Year 1992, 3rd Year 1993, 4th Year 1994, 5th Year 1995, 6th Year 1996, 7th Year 1997, 8th Year 1998, 9th Year 1999, 10th Year 2000.

CONSTRUCTION TIME SCHEDULE FOR ACTION PLAN

Fig. VIII-2

STUDY ON CHAMA RIVER BASIN CONSERVATION PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

ANNEX VIII-1

Breakdown of Unit Price

Item No. 1   Work Site : Lower reaches of EL VIGIA

                Works   : Excavation of river deposit

                Price   :F/C   8.0   Y/m3, L/C   111.0   Bs./m3

                                      (Equiv.   113.0   Bs/m3)

                Remarks : 1,000 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.20	30,000.0	6,000	1,400.0	280
b)Foreman	local	m.d.	3.00	0.0	0	675.0	2,025
c)Operator		m.d.	7.20	0.0	0	600.0	4,320
d)Assis.operator		m.d.	4.80	0.0	0	500.0	2,400
e)Common labor		m.d.	8.00	0.0	0	450.0	3,600
sub - total 1					6,000		12,625
2.Material							
a)Light oil		lit.	760.20	0.0	0	0.7	532
b)Lubricant		lit.	13.40	0.0	0	25.9	347
sub - total 2					0		879
3.Equipment							
a) Bulldozer(80%)	21 t	hr	8.20	0.0	0	2,538.0	20,812
b)Tractor shovel(80%)	3.2 m3	hr	6.80	0.0	0	2,814.0	19,135
c)Backhoe(20%)	1.2 m3	hr	2.20	0.0	0	3,158.0	6,948
d)Dump truck	11 t	hr	33.30	0.0	0	742.0	24,709
sub - total 3					0		71,604
Total of 1 , 2 & 3					6,000		85,108
Overhead	(30 %)				1,800		25,532
Total for 1,000 m3					7,800		110,640
Unit price for 1 m3					8		111

Breakdown of Unit Price

Item No. 2

Work Site : Lower reaches of EL VIGIA

Works : Embankment for flood protection dike

Price :F/C 20.0 Y/m3, L/C 48.0 Bs./m3

(Equiv. 54.0 Bs/m3)

Remarks : 1,000 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.50	30,000.0	15,000	1,400.0	700
b)Foreman	local	m.d.	2.00	0.0	0	675.0	1,350
c)Operator		m.d.	1.50	0.0	0	600.0	900
d)Assis.operator		m.d.	1.00	0.0	0	500.0	500
e)Semi-skilled labor		m.d.	0.50	0.0	0	465.0	233
e)Common labor		m.d.	8.00	0.0	0	450.0	3,600
sub - total 1					15,000		7,283
2.Material							
a)Light oil		lit.	155.10	0.0	0	0.4	62
b)Lubricant		lit.	1.94	0.0	0	1.3	3
sub - total 2					0		65
3.Equipment							
a)Motor grader	3.1 m	hr	6.90	0.0	0	1,144.0	7,894
b)Tamping roller	5 t	hr	6.67	0.0	0	431.0	2,875
c)Bulldozer	21 t	hr	6.67	0.0	0	2,538.0	16,928
d)Vibrating roller,hand	0.5 t	hr	1.67	0.0	0	210.0	351
e)Compactor	90 kg	day	0.24	0.0	0	207.0	50
f)Sprinkler truck	8 kl	hr	1.67	0.0	0	707.0	1,181
sub - total 3					0		29,279
Total of 1 , 2 & 3					15,000		36,627
Overhead	(30 %)				4,500		10,988
Total for 1,000 m3					19,500		47,615
Unit price of 1 m3					20		48

Breakdown of Unit Price

Item No. 3

Work Site : Lower reaches of EL VIGIA

Works : Gravel metalling

Price :F/C 3.0 Y/m3, L/C 559.0 Bs./m3
(Equiv. 560.0 Bs/m3)

Remarks : 200 m or 600 m2 or 120 m3 basis (3.0 m (W) x 0.2 m (D))

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.01	30,000.0	300	1,400.0	14
b)Foreman	local	m.d.	1.00	0.0	0	675.0	675
c)Operator		m.d.	1.50	0.0	0	600.0	900
d)Assis.operator		m.d.	1.00	0.0	0	500.0	500
e)Semi-Skilled labor		m.d.	1.50	0.0	0	465.0	698
f)Common labor		m.d.	4.00	0.0	0	450.0	1,800
sub-total 1					300		4,587
2.Material							
a)Light oil		lit.	88.40	0.0	0	0.7	62
b)Lubricant		lit.	1.90	0.0	0	25.9	49
c)River-run		ton	125.00	0.0	0	300.0	37,500
d)Miscellaneous	(3 %)				0		1,128
sub-total 2					0		38,739
3.Equipment							
a)Wheel loader	2.1 m3	hr	1.80	0.0	0	1,412.0	2,542
b)Dump truck	8 t	hr	6.00	0.0	0	581.0	3,486
c)Motor grader	3.1 m	hr	0.36	0.0	0	1,144.0	412
d)Vibrating roller	4 t	hr	1.90	0.0	0	683.0	1,298
e)Compactor	90 kg	day	0.05	0.0	0	207.0	10
f)Sprinkler truck	8 kl	hr	0.40	0.0	0	707.0	283
g)Miscellaneous	(3 %)				0		241
sub-total 3					0		8,272
Total of 1 , 2 & 3					300		51,598
Overhead	(30 %)				90		15,479
Total for 120 m3					390		67,077
Unit price for 1 m3					3		559

Breakdown of Unit Price

Item No. 4

Work Site : Lower reaches of EL VIGIA

Works : Slope protection of sod facing

Price :F/C　0.0　Y/m2, L/C　24.0　Bs./m2
(Equiv.　24.0　Bs/m2)

Remarks : 1,000 m2 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	2.00	0.0	0	675.0	1,350
b)Driver		m.d.	0.70	0.0	0	500.0	350
c)Semi-skilled labor		m.d.	4.50	0.0	0	465.0	2,093
d)Common labor		m.d.	12.00	0.0	0	450.0	5,400
sub-total 1					0		9,193
2.Material							
a)Seed		kg	30.00	0.0	0	1.2	36
b)Fertilizer		kg	200.00	0.0	0	8.5	1,700
c)Light oil		lit.	48.90	0.0	0	0.7	34
d)Lubricant		lit.	0.97	0.0	0	25.9	25
e)Miscellaneous	(3 %)				0		54
sub-total 2					0		1,849
3.Equipment							
a)Cargo truck	6 t	hr	4.00	0.0	0	394.0	1,576
b)Seed sprayer	1.3 m3	hr	10.00	0.0	0	456.0	4,560
c)Compactor	90 kg	day	4.00	0.0	0	207.0	828
d)Centrifugal pump	50 mm	day	1.00	0.0	0	63.0	63
e)Diesel generator	3 kVA	day	1.00	0.0	0	195.0	195
d)Miscrllaneous	(3 %)				0		217
sub-total 3					0		7,439
Total of 1 , 2 & 3					0		18,481
Overhead					0		5,544
Total for 1,000 m2					0		24,025
Unit price for 1 m2					0		24

Breakdown of Unit Price

Item No. 6   Work Site : _____

Works   : Wet stone masonry _____

Price   : F/C   8.0   Y/m2, L/C   751.0   Bs./m2
                          (Equiv.   753.0   Bs/m2)

Remarks   : 10 m2 basis (t = 45 cm)

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.30	0.00	0	675.0	203
b)Operator		m.d.	0.20	0.00	0	600.0	120
c)Asiss.operator		m.d.	0.20	0.00	0	500.0	100
d)Mason		m.d.	2.00	0.00	0	515.0	1,030
e)Concrete worker		m.d.	0.25	0.00	0	465.0	116
f)Carpenter		m.d.	1.00	0.00	0	515.0	515
g)Common labor		m.d.	4.00	0.00	0	450.0	1,800
sub-total 1						0	3,884
2.Material							
a)Rubble		ton	5.00	0.00	0	240.0	1,200
b)River-run		ton	2.70	0.00	0	300.0	810
c)Concrete(ref.Item No.B-2)		cu.m	1.00	94.00	94	1,626.0	1,626
d)Light oil		lit.	6.50	0.00	0	0.7	5
e)Lubricant		lit.	0.17	0.00	0	25.9	4
f)Timber	plank	cu.m	0.04	0.00	0	9,300.0	372
g)PVC pipe	2 in	m	1.30	0.00	0	33.0	43
h)Miscellaneous	(3%)				2		121
sub-total 2					96		4,181
3.Equipment							
a)Wheel loader	2.1 m3	hr	0.07	0.00	0	1,412.0	99
b)Dump truck	8 t	hr	0.20	0.00	0	581.0	116
c)Cargo truck	6 t	hr	0.40	0.00	0	394.0	158
d)Truck crane	4.9 t	hr	0.30	0.00	0	684.0	205
e)Miscellaneous	(3%)				0		17
sub-total 3					0		595
Total of 1 , 2 & 3					96		8,660
Overhead	(30%)				29		2,598
Total for 10 m2	t = 45 cm				125		11,258
Unit price for 1 m2	t = 30 cm				8		751
Unit price for 1 m3					28		2,502
Equivalent L/C							2,510

Breakdown of Unit Price

Item No. 7   Work Site : _____

             Works   : Concrete block for wet stone masonry

             Price   : F/C   126.0 Y/m3, L/C   3,509.0   Bs./m3
                                          (Equiv.   3,550.0   Bs/m3)
             Remarks : 8 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.57	0.00	0	675.0	385
b)Operator		m.d.	1.30	0.00	0	600.0	780
c)Carpenter		m.d.	2.06	0.00	0	515.0	1,061
d)Mechanic		m.d.	0.08	0.00	0	515.0	41
e)Electrician		m.d.	0.08	0.00	0	515.0	41
f)Concrete worker		m.d.	1.00	0.00	0	465.0	465
g)Steel worker		m.d.	0.08	0.00	0	515.0	41
h)Common labor		m.d.	3.00	0.00	0	450.0	1,350
sub-total 1					0		4,164
2.Material							
a)Concrete(Ref.Item no.C-2)		cu.m	8.00	94.00	752	1,574.0	12,592
b)Reinforcement bar		kg	16.00	0.00	0	9.5	152
c)Timber	plank	cu.m	0.10	0.00	0	9,300.0	930
d)Nail		kg	1.20	0.00	0	25.0	30
e)Annealed iron wire		kg	0.47	0.00	0	9.3	4
f)Form oil		lit.	1.20	0.00	0	24.6	30
g)Light oil		lit.	55.40	0.00	0	0.7	39
h)Lubricant		lit.	0.91	0.00	0	25.9	24
i)Miscellaneous	(3%)				23		414
sub-total 2					775		14,215
3.Equipment							
a)Concrete vibrator	45 mm	day	1.00	0.00	0	131.0	131
b)Air compressor	10.5 m3	day	0.20	0.00	0	3,113.0	623
c)Diesel generator	10 kVA	day	0.50	0.00	0	416.0	208
d)Cargo truck	6 t	hr	2.00	0.00	0	394.0	788
e)Truck crane	4.9 t	hr	2.00	0.00	0	684.0	1,368
f)Miscellaneous	(3%)				0		94
sub-total 3					0		3,212
Total of 1 , 2 & 3					775		21,591
Overhead	(30%)				233		6,477
Total for 8 m3					1,008		28,068
Unit price for 1 m3					126		3,509

Breakdown of Unit Price

Item No. 8

Work Site :

Works : Wooden pile

Price : F/C   0.0   Y/no, L/C   2,872.0   Bs./no.
(Equiv.   2,870.0   Bs/no.)

Remarks : 10 nos. basis (l=3.0 m , 18 cm diam.)

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	2.00	0.00	0	675.0	1,350
b)Operator		m.d.	0.30	0.00	0	600.0	180
c)Driver		m.d.	0.50	0.00	0	500.0	250
d)Semi-skilled labor		m.d.	4.00	0.00	0	465.0	1,860
e)Common labor		m.d.	20.00	0.00	0	450.0	9,000
sub-total 1					0		12,640
2.Material							
a)Timber	log	cu.m	0.64	0.00	0	9,300.0	5,952
b)light oil		lit.	31.50	0.00	0	0.7	22
c)Lubricant		lit.	0.91	0.00	0	25.9	24
d)Miscellaneous	(3%)				0		180
sub-total 2					0		6,178
3.Equipment							
a)Cargo truck	6 t	hr	2.00	0.00	0	394.0	788
b)Truck crane	4.9 t	hr	3.50	0.00	0	684.0	2,394
d)Miscellaneous	(3%)				0		95
sub-total 3					0		3,277
Total of 1 , 2 & 3					0		22,095
Overhead	(30%)				0		6,629
Total for 10 nos.					0		28,724
Unit price for 1 no.					0		2,872

Breakdown of Unit Price

Item No. 9   Work Site : Lower reaches of EL VIGIA

Works   : Groin Work (Gabion mat)

Price   : F/C   0.0   Y/m3, L/C   1,060.0   Bs./m3
                        (Equiv.   1,060.0   Bs/m3)

Remarks   : 100 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	8.50	0.00	0	675.0	5,738
b)Operator		m.d.	0.93	0.00	0	600.0	558
c)Assis.operator		m.d.	0.93	0.00	0	500.0	465
d)Semi-skilled labor		m.d.	16.80	0.00	0	465.0	7,812
e)Common labor		m.d.	84.00	0.00	0	450.0	37,800
sub-total 1						0	52,373
2.Material							
a)Light oil		lit.	55.80	0.00	0	0.7	39
b)Lubricant		lit.	1.35	0.00	0	25.9	35
c)Annealed iron wire		kg	2,500.00	0.00	0	9.3	23,250
d)Miscellaneous	(3%)				0		700
sub-total 2						0	24,024
3.Equipment							
a)Wheel loader	2.1 m3	hr	1.50	0.00	0	1,412.0	2,118
b)Dump truck	8 t	hr	5.00	0.00	0	581.0	2,905
c)Miscellaneous	(3%)				0		151
sub-total 3						0	5,174
Total of 1 , 2 & 3						0	81,571
Overhead	(30%)					0	24,471
Total for 100 m3						0	106,042
Unit price for 1 m3						0	1,060

Breakdown of Unit Price

Item No. 11   Work Site : EL VIGIA

Works   : Cobble & rubble bedding for groung sill work

Price   : F/C   0.0   Y/m3, L/C   538.0   Bs./m3
                                    (Equiv.   538.0   Bs./m3)
Remarks   : 100 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	5.00	0.00	0	675.0	3,375
b)Operator		m.d.	1.68	0.00	0	600.0	1,008
c)Assis.operator		m.d.	1.68	0.00	0	500.0	840
d)Semi-skilled labor		m.d.	7.50	0.00	0	465.0	3,488
e)Common labor		m.d.	37.60	0.00	0	450.0	16,920
sub-total 1					0		25,631
2.Material							
a)Light oil		lit.	102.60	0.00	0	0.7	72
b)Lubricant		lit.	2.83	0.00	0	25.9	73
d)Miscellaneous	(3%)				0		4
sub-total 2					0		149
3.Equipment							
a)Wheel loader	2.1 m3	hr	1.50	0.00	0	1,412.0	2,118
b)Dump truck	8 t	hr	5.00	0.00	0	581.0	2,905
c)Truck crane	20 t	hr	6.00	0.00	0	1,683.0	10,098
c)Miscellaneous	(3%)				0		454
sub-total 3					0		15,575
Total of 1 , 2 & 3					0		41,355
Overhead	(30%)				0		12,407
Total for 100 m3					0		53,762
Unit price for 1 m3					0		538

Breakdown of Unit Price

Item No. 12

Work Site : Lower reaches of EL VIGIA

Works : Land clearing

Price : F/C 0.0 Y/m2, L/C 3.7 Bs./m2
(Equiv. 3.7 Bs./m2)

Remarks : 1,000 m2 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.05	0.00	0	675.0	34
b)Operator		m.d.	0.07	0.00	0	600.0	42
c)Assis.operator		m.d.	0.07	0.00	0	500.0	35
d)Driver		m.d.	0.04	0.00	0	500.0	20
e)Semi-skilled labor		m.d.	0.20	0.00	0	465.0	93
f)Common labor		m.d.	2.70	0.00	0	450.0	1,215
g)Miscellaneous	(2%)				0		29
sub-total 1					0		1,468
2.Material							
a)Light oil		lit.	12.70	0.00	0	0.7	9
b)Lubricant		lit.	0.15	0.00	0	25.9	4
c)Miscellaneous	(2%)				0		0
sub-total 2					0		13
3.Equipment							
a)Bulldozer	21 t	hr	0.50	0.00	0	2,538.0	1,269
b)Cargo truck	6 t	hr	0.25	0.00	0	394.0	99
c)Miscellaneous	(2%)				0		27
sub-total 3					0		1,395
Total of 1 , 2 & 3					0		2,876
Overhead	(30%)				0		863
Total for 1,000 m2					0		3,739
Unit price for 1 m2					0		3.7

Breakdown of Unit Price

Item No. B-1

Work Site :

Works : Concrete mixing by a batcher plant 0.5 m3 x 1

Concrete Type B

Price : 71 Yen/m3 and 1,723 Bs./m3

Remarks : 0.5 m3 x 60 min /5 min x 7 hrs = 42 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.10	30,000.00	3,000	1,400.0	140
b)Foreman	local	m.d.	1.00	0.00	0	675.0	675
c)Operator		m.d.	1.00	0.00	0	600.0	600
d)Asiss.operator		m.d.	2.00	0.00	0	500.0	1,000
e)Mechanic		m.d.	2.00	0.00	0	515.0	1,030
f)Electrician		m.d.	2.00	0.00	0	515.0	1,030
g)Common labor		m.d.	12.00	0.00	0	450.0	5,400
sub-total 1					3,000		9,875
2.Material							
a)Light oil		lit.	81.50	0.00	0	0.7	57
b)Lubricant		lit.	0.70	0.00	0	25.9	18
c)Cement		ton	11.60	0.00	0	1,180.0	13,688
d)Coarse aggregate		ton	53.60	0.00	0	400.0	21,440
e)Fine aggregate		ton	30.20	0.00	0	400.0	12,080
f)Water-reducing agent		kg	29.20	0.00	0	46.2	1,349
g)Miscellaneous	(2%)				0		973
sub-total 2					0		49,605
3.Equipment							
a)Concrete plant	0.5 m3	hr	7.00	0.00	0	1,398.0	9,786
b)Diesel generator	50 kvA	day	1.50	0.00	0	986.0	1,479
c)Water tank	5 m3	day	1.50	0.00	0	837.0	1,256
d)Miscellaneous	(3%)				0		376
sub-total 3					0		12,897
Total of 1 , 2 & 3					3,000		72,377
Unit cost for 1 m3					71		1,723

Breakdown of Unit Price

Item No. B-2

Work Site :

Works : Concrete mixing by a portable mixer 0.5 m3 at site

Concrete Type B

Price : 94 Yen/m3 and 1,626 Bs./m3

Remarks : 16 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.05	30,000.00	1,500	1,400.0	70
b)Foreman	local	m.d.	1.00	0.00	0	675.0	675
c)Operator		m.d.	1.00	0.00	0	600.0	600
d)Asiss.operator		m.d.	1.00	0.00	0	500.0	500
e)Mechanic		m.d.	0.50	0.00	0	515.0	258
f)Electrician		m.d.	0.50	0.00	0	515.0	258
g)Common labor		m.d.	6.00	0.00	0	450.0	2,700
sub-total 1					1,500		5,061
2.Material							
a)Light oil		lit.	19.80	0.00	0	0.7	14
b)Lubricant		lit.	0.50	0.00	0	25.9	13
c)Cement		ton	4.40	0.00	0	1,180.0	5,192
d)Coarse aggregate		ton	20.40	0.00	0	400.0	8,160
e)Fine aggregate		ton	11.50	0.00	0	400.0	4,600
f)Water-reducing agent		kg	11.10	0.00	0	46.2	513
g)Miscellaneous	(2%)				0		370
sub-total 2					0		18,862
3.Equipment							
a)Concrete mixer	0.5 m3	day	1.00	0.00	0	1,220.0	1,220
b)Diesel generator	10 kVA	day	1.00	0.00	0	416.0	416
c)Water tank	5 m3	day	0.50	0.00	0	837.0	419
d)Miscellaneous	(2%)				0		41
sub-total 3					0		2,096
Total of 1 , 2 & 3					1,500		26,019
Unit cost for 1 m3					94		1,626

Breakdown of Unit Price

Item No. C-1

Work Site :

Works : Concrete mixing by a batcher plant 0.5 m3 x 1

Concrete Type C

Price : 71 Yen/m3 and 1,671 Bs./m3

Remarks : 0.5 m3 x 60 min /5 min x 7 hrs = 42 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.10	30,000.00	3,000	1,400.0	140
b)Foreman	local	m.d.	1.00	0.00	0	675.0	675
c)Operator		m.d.	1.00	0.00	0	600.0	600
d)Asiss.operator		m.d.	2.00	0.00	0	500.0	1,000
e)Mechanic		m.d.	2.00	0.00	0	515.0	1,030
f)Electrician		m.d.	2.00	0.00	0	515.0	1,030
g)Common labor		m.d.	12.00	0.00	0	450.0	5,400
sub-total 1					3,000		9,875
2.Material							
a)Light oil		lit.	81.50	0.00	0	0.7	57
b)Lubricant		lit.	0.70	0.00	0	25.9	18
c)Cement		ton	9.00	0.00	0	1,180.0	10,620
d)Coarse aggregate		ton	57.30	0.00	0	400.0	22,920
e)Fine aggregate		ton	29.50	0.00	0	400.0	11,800
f)Water-reducing agent		kg	22.70	0.00	0	46.2	1,049
g)Miscellaneous	(2%)				0		929
sub-total 2					0		47,393
3.Equipment							
a)Concrete plant	0.5 m3	hr	7.00	0.00	0	1,398.0	9,786
b)Diesel generator	50 kVA	day	1.50	0.00	0	986.0	1,479
c)Water tank	5 m3	day	1.50	0.00	0	837.0	1,256
d)Miscellaneous	(3%)				0		376
sub-total 3					0		12,897
Total of 1 , 2 & 3					3,000		70,165
Unit cost for 1 m3					71		1,671

Breakdown of Unit Price

Item No. C-2

Work Site :

Works : Concrete mixing by a portable mixer 0.5 m3 at site

Concrete Type C

Price : 94 Yen/m3 and 1,574 Bs./m3

Remarks : 16 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	0.05	30,000.00	1,500	1,400.0	70
b)Foreman	local	m.d.	1.00	0.00	0	675.0	675
c)Operator		m.d.	1.00	0.00	0	600.0	600
d)Asiss.operator		m.d.	1.00	0.00	0	500.0	500
e)Mechanic		m.d.	0.50	0.00	0	515.0	258
f)Electrician		m.d.	0.50	0.00	0	515.0	258
g)Common labor		m.d.	6.00	0.00	0	450.0	2,700
sub-total 1					1,500		5,061
2.Material							
a)Light oil		lit.	19.80	0.00	0	0.7	14
b)Lubricant		lit.	0.50	0.00	0	25.9	13
c)Cement		ton	3.40	0.00	0	1,180.0	4,012
d)Coarse aggregate		ton	21.80	0.00	0	400.0	8,720
e)Fine aggregate		ton	11.30	0.00	0	400.0	4,520
f)Water-reducing agent		kg	8.65	0.00	0	46.2	400
g)Miscellaneous	(2%)				0		354
sub-total 2					0		18,033
3.Equipment							
a)Concrete mixer	0.5 m3	day	1.00	0.00	0	1,220.0	1,220
b)Diesel generator	10 kVA	day	1.00	0.00	0	416.0	416
c)Water tank	5 m3	day	0.50	0.00	0	837.0	419
d)Miscellaneous	(2%)				0		41
sub-total 3					0		2,096
Total of 1 , 2 & 3					1,500		25,190
Unit cost for 1 m3					94		1,574

Breakdown of Unit Price

Item No. 30 - A - 1   Work Site : SABO DAM

Works : Outer concrete, Concrete Type B

Pump Method

Price : F/C   100   /m3 , L/C   2,830.00   /m3
(Equiv.   2,861.00   Bs./m3)

Remarks : 45 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	1.00	0.0	0	675.0	675
b)Operator		m.d.	1.90	0.0	0	600.0	1,140
c)Mechanic		m.d.	0.50	0.0	0	515.0	258
d)Electrician		m.d.	0.50	0.0	0	515.0	258
e)Concrete worker		m.d.	5.00	0.0	0	465.0	2,325
f)Common labor		m.d.	5.00	0.0	0	450.0	2,250
sub-total 1					0		6,906
2.Material							
a)Concrete(Ref.Item No.B-1)		cu.m	45.00	71.0	3,195	1,723.0	77,535
b)Light oil		lit.	88.00	0.0	0	0.7	62
c)Lubricant		lit.	1.40	0.0	0	25.9	36
d)Miscellaneous	(3%)				96		2,329
sub-total 2					3,291		79,962
3.Equipment							
a)Truck mixer	3.2 m3	hr	4.60	0.0	0	677.0	3,114
b)Concrete pump	30 m3/hr	hr	3.20	0.0	0	1,839.0	5,885
c)Concrete vibrator	45 mm	day	5.00	0.0	0	131.0	655
d)Air compressor	10.5 m3	day	0.30	0.0	0	3,113.0	934
e)Diesel generator	50 kVA	day	0.30	0.0	0	986.0	296
f)Miscellaneous	(3%)				0		327
sub-total 3					0		11,211
Total of 1 , 2 & 3					3,291		98,079
Overhead	(30%)				987		29,424
Total for 45 m3					4,278		127,503
Unit price for 1 m3					100		2,830

Breakdown of Unit Price

Item No. 30 - A - 2 Work Site : SABO DAM

Works : Inner concrete,Concrete Type C

Pump Method

Price : F/C 100 /m3 , L/C 2,760.00 /m3
(Equiv. 2,791.00 Bs./m3)

Remarks : 45 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	1.00	0.0	0	675.0	675
b)Operator		m.d.	1.90	0.0	0	600.0	1,140
c)Mechanic		m.d.	0.50	0.0	0	515.0	258
d)Electrician		m.d.	0.50	0.0	0	515.0	258
e)Concrete worker		m.d.	5.00	0.0	0	465.0	2,325
f)Common labor		m.d.	5.00	0.0	0	450.0	2,250
sub-total 1					0		6,906
2.Material							
a)Concrete(Ref.Item No.C-1)		cu.m	45.00	71.0	3,195	1,671.0	75,195
b)Light oil		lit.	88.00	0.0	0	0.7	62
c)Lubricant		lit.	1.40	0.0	0	25.9	36
d)Miscellaneous	(3%)				96		2,259
sub-total 2					3,291		77,552
3.Equipment							
a)Truck mixer	3.2 m3	hr	4.60	0.0	0	677.0	3,114
b)Concrete pump	30 m3/hr	hr	3.20	0.0	0	1,839.0	5,885
c)Concrete vibrator	45 mm	day	5.00	0.0	0	131.0	655
d)Air compressor	10.5 m3	day	0.30	0.0	0	3,113.0	934
e)Diesel generator	50 kVA	day	0.30	0.0	0	986.0	296
f)Miscellaneous	(3%)				0		327
sub-total 3					0		11,211
Total of 1 , 2 & 3					3,291		95,669
Overhead	(30%)				987		28,701
Total for 45 m3					4,278		124,370
Unit price for 1 m3					100		2,760

Breakdown of Unit Price

Item No. 33 - A - 1   Work Site : CONTINUOUS DAM,EL MORRO SITE

Works   : Outer concrete,Concrete Type B

Pump Method

Price   : F/C   130   /m3 , L/C   2,680.00   /m3

                  (Equiv.   2,720.00   Bs./m3)

Remarks   : 16 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.50	0.0	0	675.0	338
b)Operator		m.d.	0.50	0.0	0	600.0	300
c)Mechanic		m.d.	0.25	0.0	0	515.0	129
d)Electrician		m.d.	0.25	0.0	0	515.0	129
e)Concrete worker		m.d.	2.00	0.0	0	465.0	930
f)Common labor		m.d.	3.00	0.0	0	450.0	1,350
sub-total 1					0		3,176
2.Material							
a)Concrete(Ref.Item No.B-2)		cu.m	16.00	94.0	1,504	1,626.0	26,016
b)Light oil		lit.	22.70	0.0	0	0.7	16
c)Lubricant		lit.	0.18	0.0	0	25.9	5
d)Miscellaneous	(3%)				45		781
sub-total 2					1,549		26,818
3.Equipment							
a)Concrete pump	30 m3/hr	hr	1.15	0.0	0	1,839.0	2,115
b)Concrete vibrator	45 mm	day	2.00	0.0	0	131.0	262
c)Air compressor	10.5 m3	day	0.10	0.0	0	3,113.0	311
d)Diesel generator	50 kVA	day	0.20	0.0	0	986.0	197
e)Miscellaneous	(3%)				0		87
sub-total 3					0		2,972
Total of 1 , 2 & 3					1,549		32,966
Overhead	(30%)				465		9,890
Total for 16 m3					2,014		42,856
Unit price for 1 m3					130		2,680

Breakdown of Unit Price

Item No. 33 - A - 2

Work Site : CONTINUOUS DAM,EL MORRO SITE

Works : Inner concrete,Concrete Type C

Pump Method

Price : F/C 130 /m3 , L/C 2,610.00 /m3
(Equiv. 2,650.00 Bs./m3)

Remarks : 16 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.50	0.0	0	675.0	338
b)Operator		m.d.	0.50	0.0	0	600.0	300
c)Mechanic		m.d.	0.25	0.0	0	515.0	129
d)Electrician		m.d.	0.25	0.0	0	515.0	129
e)Concrete worker		m.d.	2.00	0.0	0	465.0	930
f)Common labor		m.d.	3.00	0.0	0	450.0	1,350
sub-total 1					0		3,176
2.Material							
a)Concrete(Ref.Item No.C-2)		cu.m	16.00	94.0	1,504	1,574.0	25,184
b)Light oil		lit.	22.70	0.0	0	0.7	16
c)Lubricant		lit.	0.18	0.0	0	25.9	5
d)Miscellaneous	(3%)				45		756
sub-total 2					1,549		25,961
3.Equipment							
a)Concrete pump	30 m3/hr	hr	1.15	0.0	0	1,839.0	2,115
b)Concrete vibrator	45 mm	day	2.00	0.0	0	131,0	262
c)Air compressor	10.5 m3	day	0.10	0.0	0	3,113.0	311
d)Diesel generator	50 kVA	day	0.20	0.0	0	986.0	197
e)Miscellaneous	(3%)				0		87
sub-total 3					0		2,972
Total of 1 , 2 & 3					1,549		32,109
Overhead	(30%)				465		9,633
Total for 16 m3					2,014		41,742
Unit price for 1 m3					130		2,610

Breakdown of Unit Price

Item No. 40   Work Site : SABO DAM

Works : Excavation by 0.6 m3 backhoe

Gravel

Price : F/C   0   /m3 , L/C   146.00   /m3
                        (Equiv.   146.00   Bs./m3)
Remarks : 270 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	1.00	0.0	0	675.0	675
b)Operator		m.d.	2.80	0.0	0	600.0	1,680
c)Assis.operator		m.d.	2.80	0.0	0	500.0	1,400
d)Common labor		m.d.	10.00	0.0	0	450.0	4,500
sub-total 1					0		8,255
2.Material							
a)Light oil		lit.	238.60	0.0	0	0.7	167
b)Lubricant		lit.	4.30	0.0	0	25.9	111
sub-total 2					0		278
3.Equipment							
a)Backhoe	0.6 m3	hr	8.00	0.0	0	1,398.0	11,184
b)Dump truck	8 t	hr	13.50	0.0	0	581.0	7,844
c)Bulldozer	21 t	hr	1.10	0.0	0	2,538.0	2,792
sub-total 3					0		21,820
Total of 1 , 2 & 3					0		30,353
Overhead	(30%)				0		9,106
Total for 270 m3					0		39,459
Unit price for 1 m3					0		146

Breakdown of Unit Price

Item No. 41   Work Site : CONTINUOUS DAM

Works : Excavation by 0.6 m3 backhoe

Soft rock II

Price : F/C   0   /m3 , L/C   174.00   /m3
(Equiv.   174.00   Bs./m3)

Remarks : 210 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	1.00	0.0	0	675.0	675
b)Operator		m.d.	2.50	0.0	0	600.0	1,500
c)Assis.operator		m.d.	2.50	0.0	0	500.0	1,250
d)Common labor		m.d.	10.00	0.0	0	450.0	4,500
sub-total 1					0		7,925
2.Material							
a)Light oil		lit.	216.20	0.0	0	0.7	151
b)Lubricant		lit.	3.80	0.0	0	25.9	98
sub-total 2					0		249
3.Equipment							
a)Backhoe	0.6 m3	hr	8.00	0.0	0	1,398.0	11,184
b)Dump truck	8 t	hr	11.40	0.0	0	581.0	6,623
c)Bulldozer	21 t	hr	0.86	0.0	0	2,538.0	2,183
sub-total 3					0		19,990
Total of 1 , 2 & 3					0		28,164
Overhead	(30%)				0		8,449
Total for 210 m3					0		36,613
Unit price for 1 m3					0		174

Breakdown of Unit Price

Item No. 42

Work Site : CHECK DAM

Works : Excavation by manpower

Gravel

Price : F/C   0   /m3 , L/C   441.00   /m3
(Equiv.   441.00   Bs./m3)

Remarks : 10 m3 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.50	0.0	0	675.0	338
b)Skilled labor		m.d.	3.00	0.0	0	515.0	1,545
c)Common labor		m.d.	3.00	0.0	0	450.0	1,350
d)Miscellaneous	(5%)				0		162
sub-total 1					0		3,395
Total of 1					0		3,395
Overhead	(30%)				0		1,019
Total for 10 m3					0		4,414
Unit price for 1 m3					0		441

Breakdown of Unit Price

Item No. 50

Work Site : REVETMENT (LOCAL PROJECT)

Works : Backfill by 0.6 m3 backhoe

Gravelly soil

Price : F/C 0 /m3 , L/C 71.30 /m3

(Equiv. 71.30 Bs./m3)

Remarks : 330 m3/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	1.00	0.0	0	675.0	675
b)Operator		m.d.	1.00	0.0	0	600.0	600
c)Assis.operator		m.d.	1.00	0.0	0	500.0	500
d)Common labor		m.d.	10.00	0.0	0	450.0	4,500
sub-total 1					0		6,275
2.Material							
a)Light oil		lit.	108.30	0.0	0	0.7	76
b)Lubricant		lit.	0.98	0.0	0	25.9	25
sub-total 2					0		101
3.Equipment							
a)Backhoe	0.6 m3	hr	8.00	0.0	0	1,398.0	11,184
b)Vibrating compactor	90 kg	day	1.00	0.0	0	207.0	207
c)Miscellaneous	(3%)				0		342
sub-total 3					0		11,733
Total of 1 , 2 & 3					0		18,109
Overhead	(30%)				0		5,433
Total for 330 m3					0		23,542
Unit price for 1 m3					0		71.3

Breakdown of Unit Price

Item No. 71   Work Site :

Works   : Reinforcement bar

Price   : F/C   0   /t , L/C   22,672.00   /t
                          (Equiv.   22,672.00   Bs./t)

Remarks   : 3 t/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	3.60	0.0	0	675.0	2,430
b)Steel worker		m.d.	13.80	0.0	0	515.0	7,107
c)Operator		m.d.	0.40	0.0	0	600.0	240
d)Driver		m.d.	0.60	0.0	0	500.0	300
e)Welder		m.d.	3.90	0.0	0	565.0	2,204
f)Skilled labor		m.d.	5.00	0.0	0	515.0	2,575
g)Common labor		m.d.	7.80	0.0	0	450.0	3,510
sub-total 1					0		18,366
2.Material							
a)Reinforcement bar		ton	3.09	0.0	0	9,450.0	29,201
b)Light oil		lit.	70.90	0.0	0	0.7	50
c)Lubricant		lit.	1.90	0.0	0	25.9	49
d)Miscellaneous	(2%)				0		586
sub-total 2					0		29,886
3.Equipment							
a)Welder	300 A	day	2.00	0.0	0	72.0	144
b)Diesel generator	50 kVA	day	0.30	0.0	0	986.0	296
c)Cargo truck	6 t	hr	4.00	0.0	0	394.0	1,576
d)Truck crane	4.9 t	hr	3.00	0.0	0	684.0	2,052
sub-total 3					0		4,068
Total of 1 , 2 & 3					0		52,320
Overhead	(30%)				0		15,696
Total for 3 t					0		68,016
Unit price for 1 t					0		22,672

Breakdown of Unit Price

Item No. 72 - A

Work Site : SABO DAM

Works : Form work

Price : F/C 0 /m2 , L/C 643.00 /m2

(Equiv. 643.00 Bs./m2)

Remarks : 100 m2 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	4.50	0.0	0	675.0	3,038
b)Concrete worker		m.d.	10.00	0.0	0	465.0	4,650
c)Rigger		m.d.	10.00	0.0	0	565.0	5,650
d)Operator		m.d.	1.50	0.0	0	600.0	900
e)Assis.operator		m.d.	1.50	0.0	0	500.0	750
f)Skilled labor		m.d.	5.00	0.0	0	515.0	2,575
g)Common labor		m.d.	16.00	0.0	0	450.0	7,200
sub-total 1						0	24,763
2.Material							
a)Metal form	200x1500	no.	1.10	0.0	0	531.0	584
b)Metal form	300x1500	no.	8.00	0.0	0	531.0	4,248
c)Steel angle		kg	7.90	0.0	0	11.8	93
d)Channel steel		kg	250.00	0.0	0	11.8	2,950
e)Bolt and nut		kg	9.30	0.0	0	43.6	405
f)Clump		no.	36.70	0.0	0	38.8	1,424
g)Clip		no.	45.80	0.0	0	6.5	298
h)Anchor bolt,22mm	1=400	no	68.70	0.0	0	39.3	2,700
i)Timber	plank	cu.m	0.30	0.0	0	9,300.0	2,790
j)Form oil		lit.	12.00	0.0	0	24.6	295
k)Light oil		lit.	48.00	0.0	0	0.7	34
l)Lubricant		lit.	0.80	0.0	0	25.9	21
m)Miscellaneous	(3%)					0	475
sub-total 2						0	16,317
3.Equipment							
a)Truck crane	4.9 t	hr	12.20	0.0	0	684.0	8,345
sub-total 3						0	8,345
Total of 1 , 2 & 3						0	49,425
Overhead	(30%)					0	14,828
Total for 100 m2						0	64,253
Unit price for 1 m2						0	643

Breakdown of Unit Price

Item No. 73 - A   Work Site : STRUCTURAL CONCRETE

Works   : Form work

Price   : F/C   245   /m2 , L/C   655.00   /m2
                       (Equiv.   730.00   Bs./m2)

Remarks   : 100 m2 basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	4.50	0.0	0	675.0	3,038
b)Rigger		m.d.	10.00	0.0	0	565.0	5,650
c)Carpenter		m.d.	32.00	0.0	0	515.0	16,480
d)Common labor		m.d.	24.00	0.0	0	450.0	10,800
sub-total 1					0		35,968
2.Material							
a)Metal form	300x1500	no.	10.10	863.0	8,716	266.0	2,687
b)Timber	plank	cu.m	0.10	6,050.0	605	7,440.0	744
c)Timber	square	cu.m	1.40	6,050.0	8,470	7,440.0	10,416
d)Form oil		lit.	12.00	40.0	480	12.3	148
e)Miscellaneous	(3%)				548		420
sub-total 2					18,819		14,415
Total of 1 & 2					18,819		50,383
Overhead	(30%)				5,646		15,115
Total for 100 m2					24,465		65,498
Unit price for 1 m2					245		655

Breakdown of Unit Price

Item No. 74

Work Site : EL MORRO SITE

Works : Hauling in the Job Site

by 2 ton truck with crane(1 ton)

Price : F/C 0 /m2 , L/C 772.00 /m2

(Equiv. 772.00 Bs./m2)

Remarks : 6 ton/day basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	local	m.d.	0.10	0.0	0	675.0	68
b)Driver		m.d.	1.00	0.0	0	500.0	500
c)Common labor		m.d.	2.00	0.0	0	450.0	900
sub-total 1					0		1,468
2.Material							
a)Light oil		lit.	24.80	0.0	0	0.7	17
b)Lubricant		lit.	0.69	0.0	0	25.9	18
c)Miscellaneous	(3%)				0		1
sub-total 2					0		36
3.Equipment							
a)Cargo truck w/crane	2 ton	hr	8.00	0.0	0	250.0	2,000
b)Miscellaneous	(3%)				0		60
sub-total 3					0		2,060
Total of 1 , 2 & 3					0		3,564
Overhead	(30%)				0		1,069
Total for 6 ton					0		4,633
Unit price for 1 ton					0		772

Breakdown of Unit Price

Item No. 76   Work Site : STEEL FRAME DAM,C-3 to C-4 AND C-5 to C-9

Works   : Steel Frame Dam

           Steel Frame Work

Price   : F/C   2,500   /ton, L/C   22,715.00   /ton
                            (Equiv.   23,484.00   Bs./ton)

Remarks   : 15.6 ton(or 200 m3) basis

Particular	Description	Unit	Q'ty	Foreign currency (Yen)		Local Currency (Bs.)	
				Unit Cost	Amount	Unit Cost	Amount
1.Labor							
a)Foreman	foreign	m.d.	1.00	30,000.0	30,000	1,400.0	1,400
b)Foreman	local	m.d.	15.00	0.0	0	675.0	10,125
c)Driver		m.d.	4.00	0.0	0	500.0	2,000
d)Skilled labor		m.d.	34.00	0.0	0	515.0	17,510
e)Common labor		m.d.	68.00	0.0	0	450.0	30,600
sub-total 1					30,000		61,635
2.Material							
a)Steel frame		ton	15.60	0.0	0	13,000.0	202,800
b)Light oil		lit.	99.20	0.0	0	0.7	69
c)Lubricant		lit.	2.75	0.0	0	25.9	71
sub-total 2					0		202,940
3.Equipment							
a)Cargo truck,w/crane	2 t	hr	32.00	0.0	0	250.0	8,000
sub-total 3					0		8,000
Total of 1 , 2 & 3					30,000		272,575
Overhead	(30%)				9,000		81,773
Total for 15.6 ton					39,000		354,348
Unit price for 1 ton					2,500		22,715

IX. PROJECT EVALUATION

SUPPORTING REPORT

IX. PROJECT EVALUATION

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1.   GENERAL

    Economic and financial studies were carried out for the master plan
and the action plan that were formulated with the design periods of 2020
and 2000, respectively, to solve the major problems on sediment and
flood in the Chama River Basin. The study on economic aspects was made
mainly to identify economic viability through the economic indicators
such as internal rate of return (IRR). Financial aspects were also
studied, especially on the financial capability of agencies concerned to
implement the project and attain the project objectives.

    All calculations in monetary terms were based on the price level of
January 1989, and the project life (for economic evaluation) was fixed
at 30 years after completion of the works, considering the life of
structures to be constructed.

2. ECONOMIC EVALUATION

2.1 Project Benefit

The project objectives are to protect the agricultural land in the probable inundation area at the lower reaches and to protect the arterial roads (Routes 2 and 7) and houses in the upper/middle reaches from sediment and flood damage. The major property items in these areas are listed in Table IX-1, together with their vulnerability to flood damage. The items with high quantity and high vulnerability were taken into account in the benefit calculation.

Methodology and Conditions for Calculation of Project Benefit

Project benefit is defined as the reduction of damage by flooding water and sediment flow between the with- and the without-the-proejct situations. Hence, the damage in both situations has to be estimated to quantify the project benefit in monetary terms in consideration of the future change of land use in the probable inundation areas and the increase in traffic volume, though it must be recognized that the estimates are subject to a certain degree of uncertainty.

Damage in the Chama River Basin can be classified into three categories; namely,

- Damage due to submergence by flooding water, which is mainly inflicted on the cultivated land, mostly plantain plantations, plantain in the lower reaches and partly on the properties consisting of houses and household effects in Mérida and Ejido in the upper reaches.

- Damage due to traffic interruption by riverbank erosion, debris flow, etc., including augmentation of operation cost of vehicles affected by detouring and speed-down, as well as loss of productivity of people who may lose their time for economic activities. This takes place in the upper/middle reaches.

- Indirect damage, including loss of income and sales, adverse economic influence to the nation, deterioration of sanitary conditions, negative aesthetic effects of flooding/debris flow, etc.

(1) Damage Due to Submergence by Flooding Water

The damage directly inflicted on the plantains in the lower reaches is calculated by the following formula:

Damage = Ia x (Pr x Up + Rc) x Dr

where,

Ia : Inundation area in the plantain land
Pr : Production rate of plantian (12,000 kg/ha/year)
Up : Unit price of plantain (2.5 Bs./kg)
Rc : Restoration cost (4,200 Bs./ha)
Dr : Damage rate

The damage rates are estimated for each inundation depth and duration, judging from their conditions of 20 cm inundation depth and 3-day flood duration (see Table IX-2). The transformation of land use is shown in Fig. IX-1 and Table IX-3, and the forecast on cultivated land in the lower reaches is given in Table IX-4.

The damage due to submergence of property (houses and household effects) in Mérida and Ejido can be calculated by the following formula:

Damage = Nh x Vp x Dr

where,

Nh : Number of houses
Vp : Value of property (150,000 Bs./house)
Dr : Damage rate (0.05)

(2) Damage Due to Traffic Interruption

Traffic volume and operation cost of vehicles were basically estimated from "Analisis de la Demanda de Transito y la Seccion Tipica" and "Estudio de las Alternativas del Tramo Estanquez -Panamericana." The damage due to traffic interruption is the sum of the incremental operation cost of vehicles by detouring, if there is any detour route, plus the loss of productivity of the affected people, as presented in the following equation:

$$Damage = Tv \times (Oc \times Id + Pv \times Pp \times Lt)$$

where,

Tv : Traffic volume

Oc : Operation cost of vehicles (cars and trucks)

Id : Incremental distance by detouring

Pv : People in vehicles

Pp : Per capita productivity

Lt : Loss of time for economic activities due to traffic interruption or increment of traveling time by detours.

Table IX-5 presents the estimated traffic volume in the years 2000, 2010 and 2020 at the 28 probable disaster points, the estimated damage by traffic interruption and the detailed figures used for the calculation. The unit damage per point was calculated on the basis of the estimated traffic damage, and if the number of points is more or less than 28, depending on the magnitude of flood/rainfall, the unit damage was multiplied by the number of disaster points to estimate the total damage.

(3) Indirect Damage

The indirect damage is assumed to correspond to 20% of the total damage mentioned above. (Reference was made to the research on flood damage in other tropical countries.)

Annual Average Benefit

The damages due to flooding water and traffic interruption are estimated for several probable rainfalls or discharges by applying the calculation conditions set forth in Table IX-6 to the above formulas. The annual average damage is figured out from the following formula.

$$B = \sum_{i=1}^{n} 1/2 \ [D(Q_{i-1}) + D(Q_i)] \times [P(Q_{i-1}) - P(Q_i)]$$

where,

B	:	Annual average benefit
$D(Q_{i-1}), D(Q_i)$	:	Flood damage caused by the floods with Q_{i-1} and Q_i discharges, respectively
$P(Q_{i-1}), P(Q_i)$	:	Probabilities of occurrence of Q_{i-1} and Q_i discharges, respectively
n	:	Number of floods applied

(1) Master Plan

In the master plan study, the annual average benefit was estimated for several project scales in flood return periods of 5, 10, 30, 50 and 100 years, as tabulated in the following table.

Project Scale (Flood Return Period)	Annual Average Benefit in 2020 (million Bs)
5-year	145
10-year	191
30-year	220
50-year	227
100-year	231

The master plan was formulated on the scale of a 100-year return period flood and its annual average benefit is expected to

increase to 126, 171 and 231 million bolívares at the years 2000, 2010 and 2020, respectively, assuming that the project will be completed by the year 2020. The breakdown of annual average benefit in 2020 is shown in Table IX-7.

(2) Action Plan

Works of the action plan are the same as those to be executed in the first ten years of the master plan, and its annual average benefit, same as the master plan in 2000, is estimated at 126 million bolívares as shown in Table IX-8.

2.2 Economic Project Cost

The economic costs of the project are nominal figures that duly reflect the true economic value of goods and services involved. These costs were used only for the economic evaluation of the project. Transfer items such as taxes and duties imposed on construction materials and equipment, including government subsidy and contractor's profit, should be excluded from the elements of financial cost. Land has to be acquired for project implementation, and its economic value is considered to correspond to the productivity foregone by the project, which is reflected by the price.

(1) Master Plan

The economic cost of the master plan was calculated as summarized in the following table, on the assumption that transfer items are involved in the financial cost by 20%.

Project Scale (Flood Return Period)	Economic Project Cost in 2020 (million Bs)
5-year	2,343
10-year	2,423
30-year	2,600
50-year	2,768
100-year	2,866

(2) Action Plan

The CORDIPLAN conducted a study on conversion factors from the financial cost to the economic cost and also on the shadow wage rate for unskilled labor. In this connection, the construction cost for the action plan was classified as presented in Table IX-9, and the following rates were applied for the calculation of economic cost. Foreign currency and other labor items were taken into account as estimated.

- Common Labor (unskilled labor) : 0.55
- Light Oil (diesel oil)   : 4.06
- Lubricant   : 1.46
- Concrete   : 0.76
- Other Materials   : 0.80
- Construction Equipment   : 0.73

The economic project costs for the action plan is estimated at 907 million bolívares, and the breakdown is presented in Table IX-10.

2.3 Economic Viability of the Project

The economic viability of the Master Plan is assessed by the internal rate of return (IRR), benefit-cost ratio (B/C) and net present value (NPV). The calculation was based on annual cash flow prepared from the above-said economic project cost and annual average benefit.

(1) Master Plan

The Master Plan was formulated on a 100-year return period basis through the technical and social considerations. In this section, however, the economic viability is examined not only for this project scale but for other scales as well to justify the project on comparative terms. The economic indices for each project scale are tabulated as follows.

Project Scale (Flood Return Period)	IRR (%)	B/C	NPV (million Bs)
5-year	8.3	1.02	20.22
10-year	12.3	1.30	280.34
30-year	11.9	1.29	296.35
50-year	11.0	1.23	248.55
100-year	10.7	1.22	244.20

The annual cash flow in the project scale of a 100-year return period is tabulated in Table IX-11.

(2) Action Plan

The economic viability of the action plan, calculated on the annual cost and benefit flow on Table IX-12, shows higher values than the master plan, as given below, because some of the works in the master plan, which have higher efficiencies, will be put into implementation in the action plan.

    IRR : 13.2%
    B/C : 1.58
    NPV : 346.52 million bolivares
           (Note: Discount rate is 8% for B/C and NPV.)

2.4 Socioeconomic Impacts

Project implementation could exert favorable influence on not only the Chama River Basin but also the whole nation. The favorable impacts are summarized as follows:

- The national roads leading to the other major cities will be released from traffic interruption caused to sediment flow. Nationwide circulation of commodities will be secured resulting in the stabilization of the people's living condition in the whole country.

- Due to non-flooding in the lower reaches where fertile lands exist, it becomes possible to produce more plantains which has a higher productivity than the pasture land, even in the present flood risk areas.

- A number of engineers, technicians, laborers, etc., will be required for project implementation, so that increase of employment opportunities is expected, at least during the construction period.

Environmental influence by project implementation is generally assessed from the water quality, fauna/flora and aesthetic scenery. Turbidity of river water may be lessened by preventing sediment from flowing into the lower reaches. In constructing some structures in a river channel, the matter of most concern from the environmental viewpoint is the life of fishes that go up and down in the river stream.

The Chama River is rich in trouts, but they are raised in man-made fishponds that take in water from the river. Therefore, the structures to be constructed will not deteriorate the present situation. Sediment control structures which restrain the development of land erosion may contribute to the growth of vegetation. Under this situation, they will not give any adverse effect on the fauna/flora in the basin.

3. FINANCIAL CONSIDERATION

3.1 Budgetary Conditions

The national budget during the Seventh National Development Plan (1984-1988) has increased from 77,041 million bolívares in 1984 to 185,122 million bolívares in 1988 at the current price with about 25% annual average growth (see Table IX-13). The bulk of the national budget is allocated to the Executive Branch (98%), while the rest is distributed to the legislative and judicial branches (0.7% and 0.9%), as presented in Table IX-14.

The Executive Branch contains 16 ministries at present (the Ministry of Information and Tourism was abolished in 1986). Three of the ministries, Finance, Education, and Interior Relations, are in the top orders of budgetary allocation, sharing 35.0%, 15.0% and 14.7% of the national budget. (The Ministry of Finance uses about 85% of its budget for amortization and payment of interests for loans.) The Ministry of Environment and National Resources Conservation (MARNR) which is in charge of river basin conservation and river management, is in the ninth order, sharing 2.8% of the national budget, but its annual increase rate is 36.5% on the current price basis, which is much higher than the average of the total. The proportion of the national budget to GDP ranges from 18.8% to 24.8% during 1984-1987, and about 22% on an average. The MARNR had allocated approximately 300 to 1,200 million bolívares on the current prices in 1984-1988 to public works as presented in Talbe IX-15, which accounts for 17 to 23% of the total budget of the MARNR.

In connection with the Chama River Basin conservation, the offices in charge are Zone Office No. 16 of MARNR and the project office organized under Zone Office No. 5 for the development of the region south of Maracaibo Lake, which are located in Mérida and El Vigía, respectively. (Management by Zone Office No. 16 actually covers the whole state of Mérida.) The regional office of the Ministry of Transport and Communications in Mérida is also connected with this project from the viewpoint of road maintenance of arterial roads Route 2 and Route 7.

Zone Office No. 16 of the MARNR has had financial sources for public works implementation from the ministry, the state government, the CADAFE (public corporation of electricity), and the TRIENAL (special budget earmarked for infrasture projects for three years from 1986 to 1988). The total annual budgets of this office during 1984-1988 are presented in Table IX-16, and its investment on public works is summarized by district in Table IX-17. The office for the region south of the Maracaibo Lake had made a large investment on public works on the annual average of 57 million bolívares during 1984-1988 as shown in Table IX-18. The Mérida regional office of the MTC had spent 46 million bolívares on the average for road maintenance works during 1984-1988, as shown in Table IX-19.

The per capita investment of Zone Office No. 16 is Bs 24 on the average, which is lower than the national level of Bs 41. On the other hand, that of the region south of Maracaibo Lake amounts to Bs 386 because a national project is now going on in this region. (Refer to Table IX-20.)

3.2 Financial Capability

The annual growth rate of GDP in Venezuela shows 3.8% on an average during 1968-1982 with a high fluctuation of 4.5% for 1968-1972, 6.8% for 1972-1977 and 0.4% for 1977-1982, which is attributed mainly to the international price of petroleum. The annual growth rate of the recent years resulted in 3.3% on an average, which is almost equivalent to the rate projected in the Seventh National Development Plan. On the average, about 22% of the GDP has been earmarked for the national budget in these five years, 3% of which is allocated to MARNR. This rate of allocation is growing at about 10% annually on the average. Public investment in development/conservation projects in the State of Mérida and the region south of Maracaibo Lake is made mainly by MARNR Zone Office No. 16 and the MARNR regional office for the region south of Maracaibo Lake. The public investment of these offices accounts for about 2% of the MARNR's total budget. (See Table IX-21.)

Master Plan

To forecast the available fund for public investment in these areas, two cases are examined under the different combinations between the growth rate of GDP and the ratio of budget allocation to MARNR. One is 3% and 3% as the minimum case, and the other is 4% and 4% as the maximum case, respectively. The public investment thus examined for the 1991-2020 period ranges from 5,100 million bolivares to 8,300 million bolivares. (See Table IX-22.)

The total cost of the master plan is estimated at 3,551 million bolivares. In case that the master plan is implemented under the MARNR's budget, the allocation rate of public investment will amount to as much as 70% in the above-said minimum case, as shown in Table IX-22. Under these circumstances, the MARNR's budget may not be able to handle all the funds for the project.

Assuming that 50% of the required cost is funded by an international financing agency on the conditions of 8% annual interest and 20-year repayment period including a 5-year grace period, the annual disbursement for the master plab was calculated as shown in Table IX-23.

Action Plan

The MARNR's available fund for public investment is forecast in two cases, as discussed above, ranging from 1,230 to 1,780 million bolivares for the 1991-2000 as given in Table IX-22.

The MTC of Mérida State expends a considerable amount of its budget to maintain roads and highways, which shares about 8% of its budget for all the projects on an average for these five years. A large part of this maintenance cost will be saved through the implementation of the urgent plan, so that the MTC can also be a source for financing the plan.

Assuming that 50% of the road maintenance cost can be allocated to this plan, the available fund is estimated to be in a range of from 200 million to 220 million bolivares as presented in Table IX-24. The total available fund is, therefore, the sum of those from the MARNR and the

MTC, which is from 1,480 million to 1,980 million bolivares. The total cost of the action plan is estimated at 1,103 million bolivares. The MARNR has to allocate its budget for public investment by as much as 50% to 70%, as shown in Table IX-22. Under these circumstances, the MARNR's budget may not be able to handle all the funds for the project.

Assuming that 50% of the required cost is funded by an international financing agency on the conditions of 8% annual interest and 20-year repayment period including a 5-year grace period, the annual disbursement for the action plan was calculated as shown in Table IX-25.

4. PROJECT JUSTIFICATION

In general, project justification is based on the economic viability or the internal rate of return (IRR). For water supply and flood control works, the justifiable borderline or percentage of IRR can be lower than other infrastructure projects.

The projects of both the master plan and the action plan which were formulated on the project scales of 100-year and 10-year return periods, respectively, have sufficient IRRs (10.7% and 13.2%) and the benefit-cost ratios (B/C) and net present values (NPV) are also high. Although the realization of the project may be difficult through only the MARNR's budget, implementation is financially and economically justifiable with a loan from an international financing institution.

Table IX-1   SUMMARY OF MAJOR ASSETS IN THE PROJECT RELATED AREAS
AND THEIR FLOOD DAMAGE VULNERABILITY

RIVER REACHES / ITEM	UNIT	QUANTITY	FLOOD DAMA VULNERABIL
1. Lower Reaches (Probable Inundation Area)			
- Panture Land	ha.	8,070	Low
- Plantain Plantation	ha.	7,880	High
- Vegitable Plantation	--	(almost none)	---
- Forest	ha.	900	Low
- Houses	nos.	603	Low
- Establishments	--	(almost none)	---
- Arterial Road (Paved Road)	km	17	Low
2. Upper/Middle Reaches			
- Houses	nos.	130	High
- Establishments	--	(none)	---
- Arterial Road (Routes 2 & 7)	km	140	High

Table IX-2   ESTIMATED FLOOD DAMAGE RATES OF PLANTAIN IN LOWER REACHES

FLOOD DURATION (day)	INUNDATION DEPTH (cm)										
	20	18	16	14	12	10	8	6	4	2	0
3.0	1.000	0.900	0.800	0.700	0.600	0.500	0.400	0.300	0.200	0.100	0.000
2.8	0.933	0.840	0.747	0.653	0.560	0.467	0.373	0.280	0.187	0.093	0.000
2.6	0.867	0.780	0.693	0.607	0.520	0.433	0.347	0.260	0.173	0.087	0.000
2.4	0.800	0.720	0.640	0.560	0.480	0.400	0.320	0.240	0.160	0.080	0.000
2.2	0.733	0.660	0.587	0.513	0.440	0.367	0.293	0.220	0.147	0.073	0.000
2.0	0.667	0.600	0.533	0.467	0.400	0.333	0.267	0.200	0.133	0.067	0.000
1.8	0.600	0.540	0.480	0.420	0.360	0.300	0.240	0.180	0.120	0.060	0.000
1.6	0.533	0.480	0.427	0.373	0.320	0.267	0.213	0.160	0.107	0.053	0.000
1.4	0.467	0.420	0.373	0.327	0.280	0.233	0.187	0.140	0.093	0.047	0.000
1.2	0.400	0.360	0.320	0.280	0.240	0.200	0.160	0.120	0.080	0.040	0.000
1.0	0.333	0.300	0.267	0.233	0.200	0.167	0.133	0.100	0.067	0.033	0.000
0.8	0.267	0.240	0.213	0.187	0.160	0.133	0.107	0.080	0.053	0.027	0.000
0.6	0.200	0.180	0.160	0.140	0.120	0.100	0.080	0.060	0.040	0.020	0.000
0.4	0.133	0.120	0.107	0.093	0.080	0.067	0.053	0.040	0.027	0.013	0.000
0.2	0.067	0.060	0.053	0.047	0.040	0.033	0.027	0.020	0.013	0.007	0.000
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table IX-3 CHANGE OF LAND USE IN THE POSSIBLE INUNDATION AREA

STRETCH NO.	YEAR	PASTURE	PLANTAIN	FOREST	SHRUB & OTHERS	RIVER CHANNEL	TOTAL
[AREAL DISTRIBUTION (Unit: km2)]							
Stretch 1	1968	26.2	1.4	0.5	3.9	7.0	39.0
	1981	23.6	8.3	0.0	0.1	7.0	39.0
Stretch 2	1968	26.4	8.2	0.0	1.6	1.6	37.8
	1981	23.9	12.3	0.0	0.0	1.6	37.8
Stretch 3	1968	7.0	0.8	0.0	7.3	1.2	16.3
	1981	5.0	10.1	0.0	0.0	1.2	16.3
Stretch 4	1968	17.4	11.4	0.2	0.8	1.4	31.2
	1981	8.6	18.0	3.2	0.0	1.4	31.2
Stretch 5	1968	27.4	20.9	7.2	0.0	1.2	56.7
	1981	19.6	30.1	5.8	0.0	1.2	56.7
Total	1968	104.4	42.7	7.9	13.6	12.4	181.0
	1981	80.7	78.8	9.0	0.1	12.4	181.0
[PERCENTAGE DISTRIBUTION (Unit: %)]							
Stretch 1	1968	67	4	1	10	18	100
	1981	61	21	0	0	18	100
Stretch 2	1968	70	22	0	4	4	100
	1981	63	33	0	0	4	100
Stretch 3	1968	43	5	0	45	7	100
	1981	31	62	0	0	7	100
Stretch 4	1968	56	37	1	3	4	100
	1981	28	58	10	0	4	100
Stretch 5	1968	48	37	13	0	2	100
	1981	35	53	10	0	2	100
Total	1968	58	24	4	8	7	100
	1981	45	44	5	0	7	100

Table IX-4   FORECAST OF CULTIVATED LAND IN THE LOWER REACHES

STRETCH NO.	SIDE	TOTAL AREA (km2)	MAXIMUM CULTIVATED LAND	CULTIVATED LAND (km2) 1968	(%)	1981	(%)	ANNUAL GROWTH (km2/yr.)	FORECAST * (km2) 1988	2000	2010	2020
Stretch 1	Right	18.4	14.9	1.4	8%	3.8	21%	0.185	5.10	7.32	9.17	11.02
	Left	20.6	17.1	--	--	4.5	22%	0.346	6.92	11.07	14.53	17.10
Stretch 2	Right	25.0	22.0	7.5	30%	8.4	34%	0.069	8.88	9.71	10.40	11.09
	Left	12.8	9.8	0.7	5%	3.9	30%	0.246	5.62	8.57	9.80	9.80
Stretch 3	Right	8.8	6.3	0.8	9%	6.3	75%	0.446	6.30	6.30	6.30	6.30
	Left	7.5	5.0	--	--	3.8	51%	0.292	5.00	5.00	5.00	5.00
Stretch 4	Right	14.9	11.2	4.0	27%	7.5	50%	0.269	9.38	11.20	11.20	11.20
	Left	16.3	12.6	7.4	45%	10.5	64%	0.238	12.17	12.60	12.60	12.60
Stretch 5	Right	39.7	36.4	20.9	53%	28.1	71%	0.554	31.98	36.40	36.40	36.40
	Left	17.0	13.7	--	--	2.0	12%	0.154	3.08	4.93	6.47	8.01
T o t a l		181.0	149.0	42.7	24%	78.8	44%	2.799	94.4	113.1	121.9	128.5

NOTE * : Until the near future (2000), the cultivated land may be covered by plantain plantation but in the far future in the year 2010 or 2020, agricultural products with a higher productivity (50,000 Bs./yr.) than plantains, such as pepper, are possibly cultivated in the lower reaches, and flood damage calculation in these years considers that the cultivated land shares a pepper plantation area by 5%.

Table IX-5   ESTIMATE OF TRAFFIC DAMAGE BY PROBABLE ROAD DISASTERS

No.	Place	Detour Way (Y/N)	Inter-ruption (hr.)	Traffic Volume (Vehicles)				Traffic Damage (1000 Bs.)			
				1988	2000	2010	2020	1988	2000	2010	2020
1	El Pedregal	No	24	3,760	5,930	7,950	9,970	910	1,440	1,930	2,420
2	La Muchchache	No	48	3,760	6,930	7,950	9,970	3,660	5,770	7,740	9,710
3	Cacute	No	24	3,760	5,930	7,950	9,970	910	1,440	1,930	2,420
4	Tampacel	No	24	3,760	5,930	7,950	9,970	910	1,440	1,930	2,420
5	Tabay	No	3	3,760	5,930	7,950	9,970	10	20	30	30
6	El Salado	No	24	3,760	5,930	7,950	9,970	910	1,440	1,930	2,420
7	Mesa de La Virgen (1)	No	3	3,760	5,930	7,950	9,970	10	20	30	30
8	Mesa de La Virgen (2)	No	3	3,760	5,930	7,950	9,970	10	20	30	30
9	Merida	No	0	3,760	5,930	7,950	9,970	0	0	0	0
10	Qd. Los Higuerones	Yes	12	9,410	14,840	19,890	24,940	380	600	800	1,010
11	Conf. of Chama & N.S	Yes	12	9,410	14,840	19,890	24,940	380	600	800	1,010
12	Qd. Los Limos	No	48	9,960	15,730	21,110	26,490	9,700	15,320	20,560	25,810
13	Qd. Maciqua1	No	48	9,960	15,730	21,110	26,490	9,700	15,320	20,560	25,810
14	Arraques	No	48	9,960	15,730	21,110	26,490	9,700	15,320	20,560	25,810
15	Qd. La Jaya	No	48	9,960	15,730	21,110	26,490	9,700	15,320	20,560	25,810
16	Qd. El Diablo	Yes *	3	9,770	15,660	21,250	26,840	30	50	80	100
17	La Honda	Yes *	3	9,770	15,660	21,250	26,840	30	50	80	100
18	La Palmita	Yes *	3	9,770	15,660	21,250	26,840	30	50	80	100
19	La Providencia	Yes *	3	9,770	15,660	21,250	26,840	30	50	80	100
20	Carabanchel	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
21	Qd. Romero	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
22	Qd. Cubalibre	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
23	----	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
24	Qd. Tabacal	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
25	Qd. Silencio	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
26	----	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
27	Qd. Caciquito	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30
28	Qd. Penon II	Yes *	3	3,620	5,820	7,720	9,620	10	20	20	30

Total	47,100	74,450	99,890	125,410
Damage Per Place	1,682	2,659	3,568	4,479

NOTE *: Due to a short interruption time, vehicles are assumed
        not to take a detour route.

        Conditions on damage calculation are :
        Operation cost (cars) = 0.70 Bs/km for detour route (speed = 30 km/hr) and
                                0.68 Bs/km for highway (speed = 60 km/hr).
        Operation cost (truck)= 2.10 Bs/km for detour route (speed = 10 km/hr) and
                                1.61 Bs/km for highway (speed = 60 km/hr).
        Loss of productivity = 15 Bs/hr*person (2 persons/vehicle)
        Detouring distance   = 47 km

Table IX-6   CONDITIONS FOR FLOOD DAMAGE CALCULATION

FLOOD OR RAINFALL IN RETURN PERIOD	LOWER REACHES										UPPER/MIDDLE REACHES	
	STRETCH 1		STRETCH 2		STRETCH 3		STRETCH 4		STRETCH 5		NUMBER OF DISASTER POINTS	NUMBER OF HOUSES SUBMERGED
	I.D. (cm)	F.D. (day)	I.D. (cm)	F.D. (day)	I.D. (cm)	F.D. (day)	I.D. (cm)	F.D. (day)	I.D. (cm)	F.D. (day)	(nos.)	(nos.)
2 Years	21.1	0.7	7.3	2.3	11.4	2.5	13.3	3.2	13.9	6.5	0	0
5 Years	28.0	1.3	9.6	3.0	12.6	3.5	15.0	4.1	21.1	6.7	15	0
10 Years	33.1	1.8	12.0	3.4	14.8	4.3	17.8	4.9	25.5	6.7	28	30
30 Years	45.6	3.2	14.0	4.5	17.1	5.1	20.2	5.3	32.4	6.7	60	70
50 Years	47.6	3.3	15.3	4.8	18.4	5.4	21.5	6.6	34.5	6.7	75	110
100 Years	59.1	3.3	18.5	4.8	20.7	5.6	22.6	6.6	38.9	6.7	100	130

NOTE: I.D.= inundation depth   F.D. = flood duration
The location and coverage of inundation areas of each stretch are presented in Fig. VII-12 in the supporting report.

Table IX-7   BREAKDOWN OF ANNUAL AVERAGE BENEFIT OF MASTER PLAN
(in the Year of 2020)

Unit: million Bs.

RIVER REACHES	STRETCH/ ITEM	RIVER SIDE	PROJECT SCALE IN FLOOD RETURN PERIOD				
			5-YEAR	10-YEAR	30-YEAR	50-YEAR	100-YEAR
Lower	Stretch 1	Right	5.62	7.93	9.31	9.85	10.08
		Left	8.74	12.33	14.48	15.32	15.68
	Stretch 2	Right	6.54	8.87	10.17	10.58	10.80
		Left	5.77	7.83	8.98	9.34	9.54
	Stretch 3	Right	5.26	6.91	7.81	8.09	8.22
		Left	4.17	5.48	6.20	6.42	6.52
	Stretch 4	Right	11.64	15.17	17.05	17.60	17.83
		Left	13.10	17.06	19.18	19.80	20.06
	Stretch 5	Right	46.61	59.35	65.46	67.25	68.01
		Left	10.24	13.04	14.39	14.78	14.95
	Sub-total		117.684	153.965	173.03	179.012	181.69
Upper/ Middle	Traffic	---	27.41	37.19	46.94	48.28	48.96
	Houses	---	0.00	0.02	0.05	0.06	0.07
	Sub-total		27.411	37.214	46.99	48.344	49.025
	T o t a l		145.095	191.179	220.02	227.356	230.715

Table IX-8   BREAKDOWN OF ANNUAL AVERAGE BENEFIT OF ACTION PLAN
              (in the Year of 2000)

Unit: 1000 Bs

RIVER REACHES	STRETCH/ ITEM	RIVER SIDE	ANNUAL BENEFIT
Lower Reaches	Stretch 1	Right	0
		Left	7,800
	Stretch 2	Right	0
		Left	6,716
	Stretch 3	Right	0
		Left	0
	Stretch 4	Right	14,824
		Left	16,677
	Stretch 5	Right	58,012
		Left	0
	Sub-total		104,029
Upper/Middle Reaches	Traffic	---	29,063
	Houses	---	70
	Sub-total		29,133
	T o t a l		133,162

Unit: %

No.	Work Item	F.C.	Labor		Materials				Rental Equipment	Overhead	Total
			Common	Others	L.O.	Lub.	Concrete	Others			
1.	**Sediment Control Works**										
1.1	C-1 Sabo Dam	0.7	6.4	6.4	0.1	0.1	43.5	2.2	17.7	22.9	100.0
		0.7	3.5	6.4	0.5	0.1	33.0	1.7	12.9	22.9	81.9
1.2	C-5 Sabo Dam	2.1	13.0	9.7	0.1	0.1	0.0	43.5	13.0	18.5	100.0
		2.1	7.2	9.7	0.3	0.1	0.0	34.8	9.5	18.5	82.2
1.3	N-1 Sabo Dam	0.8	5.9	6.2	0.1	0.1	47.7	2.4	13.9	22.9	100.0
		0.8	3.3	6.2	0.3	0.1	36.3	1.9	10.2	22.9	81.9
1.4	Continuous Dam, Mucusos	0.5	14.1	13.2	0.1	0.1	21.0	9.3	18.7	23.0	100.0
		0.5	7.8	13.2	0.6	0.2	16.0	7.4	13.6	23.0	82.2
1.5	Continuous Dam, Mucusas	0.5	13.9	12.8	0.1	0.1	21.7	8.4	19.4	23.0	100.0
		0.5	7.6	12.8	0.6	0.2	16.5	6.8	14.1	23.0	82.1
1.6	Continuous Dam, Mucusuru	0.5	13.9	12.9	0.1	0.1	21.6	8.7	19.1	23.0	100.0
		0.5	7.7	12.9	0.6	0.2	16.5	6.9	14.0	23.0	82.1
1.7	Retaining Wall	1.4	4.3	6.0	0.0	0.0	57.0	1.7	6.7	22.8	100.0
		1.4	2.4	6.0	0.1	0.0	43.3	1.4	4.9	22.8	82.3
2.	**Flood Control Works**										
2.1	Land Clearing	0.0	32.5	6.8	0.2	0.1	0.0	0.0	37.3	23.1	100.0
		0.0	17.9	6.8	1.0	0.2	0.0	0.0	27.2	23.1	76.1
2.2	Dike Embankment	5.1	4.3	7.6	0.4	0.2	0.0	0.0	60.5	21.9	100.0
		5.1	2.4	7.6	1.4	0.3	0.0	0.0	44.2	21.9	82.9
2.3	Sodding	0.0	22.5	15.8	0.1	0.1	0.0	7.5	31.0	23.1	100.0
		0.0	12.4	15.8	0.6	0.2	0.0	6.0	22.6	23.1	80.5
2.4	Gravel Pavement	0.2	2.7	4.1	0.1	0.1	0.0	57.5	12.3	23.0	100.0
		0.2	1.5	4.1	0.4	0.1	0.0	46.0	9.0	23.0	84.3
2.5	Revetment	0.2	24.0	14.4	0.1	0.1	8.7	21.3	8.2	23.0	100.0
		0.2	13.2	14.4	0.2	0.1	6.6	17.1	6.0	23.0	80.8
2.6	Groin	0.0	35.5	13.8	0.0	0.0	0.0	22.1	5.4	23.1	100.0
		0.0	19.6	13.8	0.2	0.1	0.0	17.6	4.0	23.1	78.3
2.7	Groundsill	0.4	23.9	11.3	0.1	0.1	14.3	13.9	13.1	23.0	100.0
		0.4	13.1	11.3	0.3	0.1	10.9	11.1	9.5	23.0	79.8

NOTE: F.C. = foreign currency, L.O. = light oil, Lub. = Lubricant

Upper row shows the distribution of financial cost, and lower row shows the percentage for calculation of economic cost, multiplied by the following conversion rates:

Common Labor	0.55
Light Oil	4.06
Lubricant	1.46
Concrete	0.76
Other Materials	0.80
Rental Equipment	0.73

Table IX-9(2/2) COMPOSITION OF FINANCIAL COST AND CALCULATION
OF CONVERSION RATES TO ECONOMIC COST
(Local Project)

Unit: %

No.	Work Item	F.C.	Labor		Materials				Rental Equip-ment	Over-head	Total
			Common	Others	L.O.	Lub.	Concrete	Others			
1. Sediment Control Works											
1.1	Check Dam	0.6	14.6	16.1	0.0	0.0	26.4	11.7	7.6	22.9	100.0
		0.6	8.0	16.1	0.2	0.0	20.1	9.4	5.5	22.9	82.9
1.2	Retaining Wall	0.5	7.9	18.0	0.0	0.0	31.9	13.9	4.8	23.0	100.0
		0.5	4.3	18.0	0.1	0.0	24.2	11.1	3.5	23.0	84.8
1.3	Revetment	0.2	23.5	15.9	0.1	0.0	9.8	20.3	7.2	23.0	100.0
		0.2	12.9	15.9	0.2	0.1	7.5	16.2	5.2	23.0	81.3
2. Flood Control Works											
2.1	Improvement of Albarregas River	0.8	7.0	15.5	0.0	0.0	35.1	14.1	4.6	22.9	100.0
		0.8	3.8	15.5	0.1	0.0	26.7	11.2	3.4	22.9	84.5
2.2	Improvement of Q'da Milla	1.0	6.1	10.7	0.1	0.0	43.6	7.0	8.7	22.8	100.0
		1.0	3.3	10.7	0.2	0.0	33.1	5.6	6.4	22.8	83.2
2.3	Improvement of Q'da La Portugues	0.0	12.3	9.4	0.4	0.3	0.0	0.0	54.6	23.1	100.0
		0.0	6.8	9.4	1.7	0.4	0.0	0.0	39.9	23.1	81.1

NOTE: F.C. = foreign currency, L.O. = light oil, Lub. = Lubricant

Upper row shows the distribution of financial cost, and lower row shows the percentage for calculation of economic cost, multiplied by the following conversion rates:

Common Labor	0.55
Light Oil	4.06
Lubricant	1.46
Concrete	0.76
Other Materials	0.80
Rental Equipment	0.73

NO.	WORK ITEM	FINANCIAL COST (million Bs.)	CONVERSION RATE *	ECONOMIC COST (million Bs.)
I.	DIRECT COST			
	A. Sediment Control Works			
	(1) Preparatory Works [10% of (2) to (9)]	37.24	---	30.52
	(2) C-1 Sabo Dam, Rubblestone Concrete	149.38	0.82	122.34
	(3) C-5 Sabo Dam, Steel Frame	38.54	0.82	31.68
	(4) N-1 Sabo Dam, Rubblestone Concrete	134.55	0.82	110.20
	(5) Mucusos Continuous Dam	2.71	0.82	2.23
	(6) Mucusas Continuous Dam	13.64	0.82	11.20
	(7) Mucusuru Continuous Dam	8.20	0.82	6.73
	(8) Retaining Wall (Wet Masonry)	7.65	0.82	6.30
	(9) Miscellaneous Works [5% of (2) to (8)]	17.73	---	14.53
	Sub-total	409.64		335.73
	B. Flood Control Works			
	(1) Preparatory Works [10% of (2) to (8)]	35.81	---	29.05
	(2) Land Clearing	24.94	0.76	18.98
	(3) Dike Embankment	124.42	0.83	103.14
	(4) Sodding	6.72	0.81	5.41
	(5) Gravel Pavement	8.64	0.84	7.28
	(6) Revetment	156.56	0.81	126.50
	(7) Groin	14.82	0.78	11.60
	(8) Groundsill	22.04	0.80	17.59
	Sub-total	393.94		319.55
	Total of I	803.58		655.27
II.	LAND ACQUISITION			
	(1) Plantain	18.30	1.00	18.30
	(2) Pasture	14.73	1.00	14.73
	Total of II	33.03		33.03
III.	ADMINISTRATION COST (5% of I & II)	41.83	---	34.42
IV.	ENGINEERING SERVICE (10% of I)	80.36	---	65.53
V.	PHYSICAL CONTINGENCY (10% of I to IV)	95.88	---	78.82
	Grand Total	1,054.68	---	867.07

NOTE *: Refer to Table IX-9.

Table IX-10(2/2)   CALCULATION OF ECONOMIC PROJECT COST FOR ACTION PLAN
(Local Project)

NO.	WORK ITEM	FINANCIAL COST (million Bs.)	CONVERSION RATE *	ECONOMIC COST (million Bs.)
I.	DIRECT COST			
	A. Sediment Control Works			
	(1) Preparatory Works [10% of (2) to (4)]	1.75	---	1.46
	(2) Check Dam	5.35	0.83	4.44
	(3) Retaining Wall	6.17	0.85	5.23
	(4) Revetment	6.01	0.81	4.89
	Sub-total	19.29		16.01
	B. Flood Control Works			
	(1) Preparatory Works [10% of (2) to (4)]	1.68	---	1.40
	(2) Improvement of Albarregas River	3.06	0.85	2.58
	(3) Improvement of Q'da Milla	13.00	0.83	10.82
	(4) Improvement of Q'da La Portuguesa	0.78	0.81	0.64
	Sub-total	18.52		15.44
	Total of I	37.81		31.45
II.	ADMINISTRATION COST (5% of I)	1.89	---	1.57
III.	ENGINEERING SERVICE (10% of I)	3.78	---	3.15
V.	PHYSICAL CONTINGENCY (10% of I to III)	4.35	---	3.62
	Grand Total	47.83	---	39.78

NOTE *: Refer to Table IX-9.

Table IX-11   ANNUAL COST AND BENEFIT FLOW OF MASTER PLAN

Unit: million Bs

| NO. | YEAR | ECONOMIC COST | | | | ANNUAL AVERAGE BENEFIT | ANNUAL CASH FLOW |
		INVEST-MENT (1)*	INVEST-MENT (2)**	OMR	TOTAL		
1	1991	85.14	3.83		88.97	0.00	-88.97
2	1992	85.14	3.83		88.97	13.32	-75.65
3	1993	85.14	3.83		88.97	26.63	-62.34
4	1994	85.14	3.83		88.97	39.95	-49.02
5	1995	85.14	3.83		88.97	53.26	-35.71
6	1996	85.14	3.83		88.97	66.58	-22.39
7	1997	85.14	3.83		88.97	79.90	-9.07
8	1998	85.14	3.83		88.97	93.21	4.24
9	1999	85.14	3.83		88.97	106.53	17.56
10	2000	85.14	3.83		88.97	119.84	30.87
11	2001	113.86	0.00	3.50	117.36	133.16	15.80
12	2002	113.86	0.00	3.50	117.36	136.93	19.57
13	2003	113.86	0.00	3.50	117.36	140.70	23.34
14	2004	113.86	0.00	3.50	117.36	144.47	27.11
15	2005	113.86	0.00	3.50	117.36	148.24	30.88
16	2006	113.86	0.00	3.50	117.36	152.01	34.65
17	2007	113.86	0.00	3.50	117.36	155.77	38.41
18	2008	113.86	0.00	3.50	117.36	159.54	42.18
19	2009	113.86	0.00	3.50	117.36	163.31	45.95
20	2010	113.86	0.00	3.50	117.36	167.08	49.72
21	2011	83.75	0.00	5.40	89.15	170.85	81.70
22	2012	83.75	0.00	5.40	89.15	176.84	87.69
23	2013	83.75	0.00	5.40	89.15	182.82	93.67
24	2014	83.75	0.00	5.40	89.15	188.81	99.66
25	2015	83.75	0.00	5.40	89.15	194.80	105.65
26	2016	83.75	0.00	5.40	89.15	200.79	111.63
27	2017	83.75	0.00	5.40	89.15	206.77	117.62
28	2018	83.75	0.00	5.40	89.15	212.76	123.61
29	2019	83.75	0.00	5.40	89.15	218.75	129.60
30	2020	83.75	0.00	5.40	89.15	224.73	135.58
31	2021			7.40	7.40	230.72	223.32
32	2022			7.40	7.40	230.72	223.32
33	2023			7.40	7.40	230.72	223.32
34	2024			7.40	7.40	230.72	223.32
35	2025			7.40	7.40	230.72	223.32
36	2026			7.40	7.40	230.72	223.32
37	2027			7.40	7.40	230.72	223.32
38	2028			7.40	7.40	230.72	223.32
39	2029			7.40	7.40	230.72	223.32
40	2030			7.40	7.40	230.72	223.32
41	2031			7.40	7.40	230.72	223.32
42	2032			7.40	7.40	230.72	223.32
43	2033			7.40	7.40	230.72	223.32
44	2034			7.40	7.40	230.72	223.32
45	2035			7.40	7.40	230.72	223.32
46	2036			7.40	7.40	230.72	223.32
47	2037			7.40	7.40	230.72	223.32
48	2038			7.40	7.40	230.72	223.32
49	2039			7.40	7.40	230.72	223.32
50	2040			7.40	7.40	230.72	223.32
51	2041			7.40	7.40	230.72	223.32
52	2042			7.40	7.40	230.72	223.32
53	2043			7.40	7.40	230.72	223.32
54	2044			7.40	7.40	230.72	223.32
55	2045			7.40	7.40	230.72	223.32
56	2046			7.40	7.40	230.72	223.32
57	2047			7.40	7.40	230.72	223.32
58	2048			7.40	7.40	230.72	223.32
59	2049			7.40	7.40	230.72	223.32
60	2050			7.40	7.40	230.72	223.32

IRR = 10.71%
B/C = 1.22
B-C = 244.20

NOTE *: Investment on the basin-wide project.
**: Investment on the local project.

Table IX-12   ANNUAL COST AND BENEFIT FLOW OF ACTION PLAN

UNIT : MILLION BS.

| | YEAR | ECONOMIC COST | | | | ANNUAL AVERAGE BENEFIT | ANNUAL CASH FLOW |
		INVEST-MENT (1)*	INVEST-MENT (2)**	OMR	TOTAL		
1	1991	14.60	1.04		15.64	0.00	-15.64
2	1992	12.84	6.65		19.49	0.00	-19.49
3	1993	122.60	12.05		134.64	0.00	-134.64
4	1994	154.39	7.92		162.31	16.65	-145.67
5	1995	112.67	2.56		115.23	33.29	-81.94
6	1996	78.21	2.56		80.77	49.94	-30.83
7	1997	78.21	1.30		79.51	66.58	-12.93
8	1998	98.96	1.96		100.92	83.23	-17.70
9	1999	111.80	1.88		113.68	99.87	-13.81
10	2000	82.79	1.88		84.67	116.52	31.85
11	2001			3.50	3.50	133.16	129.66
12	2002			3.50	3.50	133.16	129.66
13	2003			3.50	3.50	133.16	129.66
14	2004			3.50	3.50	133.16	129.66
15	2005			3.50	3.50	133.16	129.66
16	2006			3.50	3.50	133.16	129.66
17	2007			3.50	3.50	133.16	129.66
18	2008			3.50	3.50	133.16	129.66
19	2009			3.50	3.50	133.16	129.66
20	2010			3.50	3.50	133.16	129.66
21	2011			3.50	3.50	133.16	129.66
22	2012			3.50	3.50	133.16	129.66
23	2013			3.50	3.50	133.16	129.66
24	2014			3.50	3.50	133.16	129.66
25	2015			3.50	3.50	133.16	129.66
26	2016			3.50	3.50	133.16	129.66
27	2017			3.50	3.50	133.16	129.66
28	2018			3.50	3.50	133.16	129.66
29	2019			3.50	3.50	133.16	129.66
30	2020			3.50	3.50	133.16	129.66
31	2021			3.50	3.50	133.16	129.66
32	2022			3.50	3.50	133.16	129.66
33	2023			3.50	3.50	133.16	129.66
34	2024			3.50	3.50	133.16	129.66
35	2025			3.50	3.50	133.16	129.66
36	2026			3.50	3.50	133.16	129.66
37	2027			3.50	3.50	133.16	129.66
38	2028			3.50	3.50	133.16	129.66
39	2029			3.50	3.50	133.16	129.66
40	2030			3.50	3.50	133.16	129.66

IRR = 13.22%
B/C = 1.58
NVP = 346.52 Million Bs.

NOTE *: Investment on the basin-wide project.
      **: Investment on the local project.

Table IX-13   MONETARY ALLOCATION OF THE NATIONAL BUDGET, 1984-1988

Unit: thousand million Bs. at current price

BRANCH/MINISTRY	1984	1985	1986	1987	1988	ANNUAL GROWTH
1. EXECUTIVE	75.74	101.59	120.68	156.17	180.75	24.3%
Presidential Secretary Office	1.08	1.01	1.67	1.81	3.1	30.2%
Interior Relations	11.56	16.13	18.45	21.31	26.3	22.8%
Exterior Relations	0.46	0.76	0.74	1.33	1.63	37.2%
Finance	24.67	41.17	42.56	59.9	56.21	22.9%
Defense	4.95	6.08	6.61	8.72	12.31	25.6%
Promotion	0.22	0.17	1.08	3.29	2.63	85.9%
Education	14.01	15.71	16.86	19.85	28.08	19.0%
Sanitary & Social Assistance	4.72	5.24	6.47	8.99	12.64	27.9%
Agriculture & Animal Husbandry	3.44	3.01	5.35	7.19	7.75	22.5%
Labor	0.14	0.87	0.87	1.2	1.65	85.3%
Transport & Communications	3.89	4.22	8.42	8.76	10.99	29.6%
Justice	0.71	0.76	0.83	1.12	1.49	20.4%
Energy & Mining	0.16	0.2	0.21	0.27	0.34	20.7%
Environment & Natural Resources Conservation	1.83	1.89	4.35	4.6	6.35	36.5%
Urban Development	2.85	3.27	5.45	6.86	9.2	34.0%
Information & Tourism	0.15	0.22	---	---	---	---
Juvenile	0.9	0.88	0.76	0.97	0.08	-45.4%
2. LEGISLATIVE	0.66	0.55	0.66	0.79	1.54	23.6%
3. JUDICIAL	0.65	0.71	0.94	1.06	2.83	44.5%
T O T A L	77.04	102.84	122.28	158.02	185.12	24.5%

NOTE: Figures may not add up to totals due to rounding.
SOURCE: Central Budgetary Office (OCPRE)

Table IX-14   PERCENTAGE ALLOCATION OF THE NATIONAL BUDGET, 1984-1988

BRANCH/MINISTRY	1984	1985	1986	1987	1988	AVERAGE
1. EXECUTIVE	98.31%	98.78%	98.69%	98.83%	97.64%	98.45%
Presidential Secretary Office	1.40%	0.98%	1.37%	1.15%	1.67%	1.31%
Interior Relations	15.01%	15.68%	15.09%	13.49%	14.21%	14.69%
Exterior Relations	0.60%	0.74%	0.61%	0.84%	0.88%	0.73%
Finance	32.02%	40.03%	34.81%	37.91%	30.36%	35.03%
Defense	6.43%	5.91%	5.41%	5.52%	6.65%	5.98%
Promotion	0.29%	0.17%	0.88%	2.08%	1.42%	0.97%
Education	18.19%	15.28%	13.79%	12.56%	15.17%	15.00%
Sanitary & Social Assistance	6.13%	5.10%	5.29%	5.69%	6.83%	5.81%
Agriculture & Animal Husbandry	4.47%	2.93%	4.38%	4.55%	4.19%	4.10%
Labor	0.18%	0.85%	0.71%	0.76%	0.89%	0.68%
Transport & Communications	5.05%	4.10%	6.89%	5.54%	5.94%	5.50%
Justice	0.92%	0.74%	0.68%	0.71%	0.80%	0.77%
Energy & Mining	0.21%	0.19%	0.17%	0.17%	0.18%	0.19%
Environment & Natural Resources Conservation	2.38%	1.84%	3.56%	2.91%	3.43%	2.82%
Urban Development	3.70%	3.18%	4.46%	4.34%	4.97%	4.13%
Information & Tourism	0.19%	0.21%	----	----	----	----
Juvenile	1.17%	0.86%	0.62%	0.61%	0.04%	0.66%
2. LEGISLATIVE	0.86%	0.53%	0.54%	0.50%	0.83%	0.65%
3. JUDICIAL	0.84%	0.69%	0.77%	0.67%	1.53%	0.90%
T O T A L	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

NOTE: Figures may not add up to totals due to rounding.
SOURCE: Central Budgetary Office (OCPRE)

Table IX-15 BUDGET OF MARNR AND ALLOCATION TO PUBLIC WORKS, 1984-1988

Unit: million Bs

ITEM	1984	1985	1986	1987	1988	Total
1. Total Budget of MARNR *1)	1,835	1,894	4,353	4,596	6,350	19,028
2. Public Investment *2)						
- Study & Investigation	6	14	21	25	59	125
- Construction	300	277	890	676	1,091	3,234
- Conservation & Maintenance	5	16	92	92	81	285
- Inspection	3	13	10	11	7	43
Total of 2.	313	320	1,014	803	1,237	3,687
3. Share of 2. to 1.	17.1%	16.9%	23.3%	17.5%	19.5%	19.4%

NOTE: Figures may not add up to total due to rounding.

SOURCE *1): Central Budgetary Office (OCPRE)
　　　　*2): Division of Budget, Direction of Programming and Budget, MARNR

Table IX-16   BUDGET OF MARNR ZONE OFFICE NO.16, 1984-1988

Unit: 1000 Bs

YEAR	DIVISION	FINANCIAL SOURCES				
		MINISTRY	STATE GOV'T	CADAFE	TRIENAL	TOTAL
1984	Directorate General	48.72				48.72
	Administrative Services	252.60				252.60
	Information & Investigation	416.28				416.28
	Planning & Coordination	214.40	500.00			714.40
	Administration of Environment	1,581.62	600.00			2,181.62
	Infrastructure	3,441.58	2,014.71	896.70		6,352.99
	Sub-Total	5,955.20	3,114.71	896.70	0.00	9,966.61
1985	Directorate General	48.72				48.72
	Administrative Services	326.45				326.45
	Information & Investigation	412.44	249.56			662.00
	Planning & Coordination	643.38	182.44			825.82
	Administration of Environment	1,560.75	539.00			2,099.75
	Infrastructure	2,664.51	3,016.56	2,800.00		8,481.07
	Sub-Total	5,656.25	3,987.56	2,800.00	0.00	12,443.82
1986	Directorate General	98.76				98.76
	Administrative Services	646.45				646.45
	Information & Investigation	353.76				353.76
	Planning & Coordination	681.72				681.72
	Administration of Environment	1,496.68	450.00			1,946.68
	Infrastructure	1,980.35			3,679.90	5,660.25
	Sub-Total	5,257.72	450.00	0.00	3,679.90	9,387.62
1987	Directorate General	29.76				29.76
	Administrative Services	1,515.77				1,515.77
	Information & Investigation	844.34				844.34
	Planning & Coordination	673.96				673.96
	Administration of Environment	2,103.87	550.00			2,653.87
	Infrastructure	3,123.78	2,650.00	3,990.00	7,600.00	17,363.78
	Sub-Total	8,291.47	3,200.00	3,990.00	7,600.00	23,081.47
1988	Directorate General	390.48				390.48
	Administrative Services	2,090.52				2,090.52
	Information & Investigation	1,003.29				1,003.29
	Planning & Coordination	827.76	150.00			977.76
	Administration of Environment	2,856.81	1,340.00			4,196.81
	Infrastructure	4,236.49	5,215.00	3,811.35	11,610.75	24,873.59
	Sub-Total	11,405.34	6,705.00	3,811.35	11,610.75	33,532.44

NOTE : Figures may not add up to totals due to rounding.
SOURCE: Budget Section, MARNR Zone Office No.16.

DISTRICT	NO. OF WORKS 1984-1988 (nos.)	TOTAL ANNUAL INVESTMENT (1000 Bs)					
		1984	1985	1986	1987	1988	TOTAL
Alberto Adriani	11	0.00	0.00	0.00	300.00	5,297.97	5,597.97
Andres Bello	4	0.00	588.49	202.49	0.00	0.00	790.98
Arzobispo Chacon	44	1,092.00	1,410.21	2,238.62	3,016.89	2,200.00	9,957.72
Campo Elias	6	0.00	0.00	200.00	210.00	2,249.83	2,659.83
Libertador	42	1,330.00	985.30	2,244.92	4,531.80	9,416.95	18,508.97
M i r a n d a	38	4,020.00	1,258.35	1,906.12	2,662.51	2,230.29	12,077.27
Pinto Salinas	15	0.00	1,008.05	1,006.18	1,459.90	457.74	3,931.87
R a n g e l	20	690.00	2,028.27	690.00	80.00	712.83	4,201.10
Rivas Davila	8	275.00	0.00	500.00	690.00	839.14	2,304.14
S u c r e	8	380.00	0.00	40.00	180.00	329.96	929.96
T o v a r	20	0.00	399.89	499.69	2,428.49	2,701.96	6,030.03
T o t a l	216	7,787.00	7,678.56	9,528.01	15,559.59	26,436.65	66,989.81

NOTE   : Figures may not add up to totals due to rounding.
SOURCE: Budget Section, MARNR Zone Office No.16.

Table IX-18   PUBLIC INVESTMENT OF THE OFFICE FOR THE REGION SOUTH OF MARACAIBO LAKE

Unit: million Bs.

I T E M	1984	1985	1986	1987	1988	Total	Average
1. Study & Investigation	0.1	0.1	0.5	0.5	0.5	1.7	0.3
2. Construction	0.0	61.8	50.0	64.0	52.0	227.8	45.6
3. Conservation & Maintenance	4.0	11.0	24.5	7.7	10.1	57.3	11.5
Total	4.1	72.9	75.0	72.2	62.6	286.8	57.4

SOURCE: Office for the region south of Maracaibo Lake, MARNR Zone Office No.5

Table IX-19   PUBLIC INVESTMENT OF THE MERIDA REGIONAL OFFICE OF MTC

Unit: million Bs.

I T E M	1984	1985	1986	1987	1988	Total	Average
1. Study & Investigation	0.14	---	0.20	---	---	0.34	0.07
2. Highways	---	60.00	173.84	397.90	357.00	988.74	197.75
3. Urban Road System	10.01	13.86	5.98	15.00	10.86	55.71	11.14
4. Paved Road	33.33	29.95	35.44	22.30	26.38	147.40	29.48
5. Rural Road System	18.10	41.23	51.89	55.65	64.20	231.07	46.21
6. Road Maintenance	23.39	19.24	34.00	36.50	19.60	132.73	26.55
7. Aereal Transport	---	7.59	20.60	21.04	35.96	85.19	17.04
8. Terrestrial Transport	---	---	---	---	1.00	1.00	0.20
9. Other Works	6.65	2.00	---	2.00	3.60	14.25	2.85
Total	91.62	173.87	321.95	550.39	518.60	1,656.43	331.29

SOURCE: Merida Regional Office of MTC

I T E M	UNIT	1984	1985	1986	1987	1988	AVERAGE
1. Budget of MARNR *1)	million Bs.	1,835	1,894	4,353	4,596	6,350	3,806
- Public Investment *2)	million Bs.	313	320	1,014	803	1,237	737
- Population of the Nation *3)	thousand persons	16,851	17,317	17,791	18,272	18,757	17,798
- Per Capita Investment	Bs.	19	18	57	44	66	41
2. Zone 16 Office							
- Public Investment *4)	million Bs.	8	8	10	16	26	14
- Population of Merida State *3)	thousand persons	539	552	566	580	594	566
- Per Capita Investment	Bs.	15	14	18	28	44	24
3. Office for the Region South of Maracaibo Lake							
- Public Investment *5)	million Bs.	4	73	75	72	63	57
- Population of the Region *3)	thousand persons	145	147	148	150	151	148
- Per Capita Investment	Bs.	28	497	507	480	417	386

SOURCE *1): Central Budgetary Office
*2): Division of Budget, Direction of Programming & Budget MARNR
*3): "PROYECCIONES DE POBLACCION 1980-2000", OCEI
*4): Budget Section, MARNR Zone No.16
*5): Office for the Region South of Maracaibo Lake, MARNR Zone No.5

Table IX-21   RELATIONSHIP AMONG GDP, NATIONAL BUDGET AND PUBLIC INVESTMENT
IN THE CHAMA RIVER BASIN

I T E M	UNIT	1984	1985	1986	1987	1988	AVERAGE
1. Gross Domestic Product (GDP) *1)	million Bs	409,487	464,620	493,765	719,423	---	521,824
- Real Growth Rate	%	---	1.8	-4.7	13.8	---	3.3
2. National Budget *2)	million Bs	77,041	102,844	122,283	158,018	185,122	129,062
- Proportion to GDP	%	18.8	22.1	24.8	22.0	---	21.9
3. Budget of MARNR *3)	million Bs	1,835	1,894	4,353	4,596	6,350	3,806
- Allocation Ratio to the National Budget (1./2.)	%	2.4	1.8	3.6	2.9	3.4	2.9
- Interannual Growth of Allocation Ratio	%	---	-22.7	93.3	-18.3	17.9	9.5
4. Public Investment in the Project Area							
- Zone No.16 Office *4)	million Bs	10	12	9	22	31	17
- Office for the Region South of Maracaibo Lake *5)	million Bs	4	73	75	72	63	57
Total	million Bs	14	85	84	94	94	74
- Allocation Ratio to the MARNR's Budget	%	0.8	4.5	1.9	2.0	1.5	2.1

SOURCE *1): "Anuario Estadistico de Venezuela 1978", OCEI
*2): Central Budgetary Office
*3): Division of Budget, Direction of Programming & Budget, MARNR Caracas
*4): Budget Section, MARNR Zone No.16
*5): Office for the Region South of Maracaibo Lake, MARNR Zone No.5

Table IX-22   FORECAST OF AVAILABLE FUND FROM MARNR

CASE/ITEM	1990	2000	2010	2020	TOTAL	
					1991-2000	1991-2020

CASE 1.: 3% GROWTH RATE OF GDP AND
     3% BUDGET ALLOCATION TO MARNR

CASE/ITEM	1990	2000	2010	2020	1991-2000	1991-2020
1. GDP (3% GROWTH)	786,133	1,056,497	1,419,844	1,908,151	9,282,498	38,522,622
2. NATIONAL BUDGET (22% OF 1.)	172,949	232,429	312,366	419,793	2,042,150	8,474,977
3. BUDGET TO MARNR (3% OF 2.)	5,188	6,973	9,371	12,594	61,264	254,249
4. PUBLIC INVESTMENT IN MERIDA STATE AND REGION SOUTH OF MARACAIBO LAKE (2% OF 3.)	104	139	187	252	1,225	5,085
5. ALTERNATIVE ALLOCATIONS FOR THE PROJECT FUND						
- 60% OF 4.	62	84	112	151	735	3,051
- 70% OF 4.	73	98	131	176	858	3,559
- 80% OF 4.	83	112	150	202	980	4,068

CASE 2.: 4% GROWTH RATE OF GDP AND
     4% BUDGET ALLOCATION TO MARNR

CASE/ITEM	1990	2000	2010	2020	1991-2000	1991-2020
1. GDP (4% GROWTH)	809,253	1,197,892	1,773,173	2,624,729	10,104,617	47,202,380
2. NATIONAL BUDGET (22% OF 1.)	178,036	263,536	390,098	577,440	2,223,016	10,384,524
3. BUDGET TO MARNR (4% OF 2.)	7,121	10,541	15,604	23,098	88,921	415,381
4. PUBLIC INVESTMENT IN MERIDA STATE AND REGION SOUTH OF MARACAIBO LAKE (2% OF 3.)	142	211	312	462	1,778	8,308
5. ALTERNATIVE ALLOCATIONS FOR THE PROJECT FUND						
- 40% OF 4.	57	84	125	185	711	3,323
- 50% OF 4.	71	105	156	231	889	4,154
- 60% OF 4.	85	126	187	277	1,067	4,985

Table IX-23 ANNUAL REPAYMENT SCHEDULE OF MASTER PLAN
UNDER THE CONDITION·OF 50% FUNDED BY LOAN

Unit: million Bs

YEAR (1)	LOAN (2)	AMORTIZA-TION (3)	ACCUMULA-TION (4)	INTEREST (5)	LOCAL FUND (6)	DISBURSE-MENT (7)
			[Σ(2)-Σ(3)]	[(4)x8%]		[(3)+(5)+(6)]
1991	55.13		55.13	4.41	55.13	59.54
1992	55.13		110.25	8.82	55.13	63.95
1993	55.13		165.38	13.23	55.13	68.36
1994	55.13		220.50	17.64	55.13	72.77
1995	55.13		275.63	22.05	55.13	77.18
1996	55.13	3.68	327.08	26.17	55.13	84.97
1997	55.13	7.35	374.85	29.99	55.13	92.46
1998	55.13	11.03	418.95	33.52	55.13	99.67
1999	55.13	14.70	459.38	36.75	55.13	106.58
2000	55.13	18.38	496.13	39.69	55.13	113.19
2001	70.76	22.05	544.84	43.59	70.76	136.39
2002	70.76	25.73	589.87	47.19	70.76	143.67
2003	70.76	29.40	631.22	50.50	70.76	150.66
2004	70.76	33.08	668.91	53.51	70.76	157.34
2005	70.76	36.75	702.91	56.23	70.76	163.74
2006	70.76	41.47	732.20	58.58	70.76	170.80
2007	70.76	46.18	756.78	60.54	70.76	177.48
2008	70.76	50.90	776.63	62.13	70.76	183.79
2009	70.76	55.62	791.77	63.34	70.76	189.72
2010	70.76	60.34	802.19	64.18	70.76	195.27
2011	51.66	61.38	792.47	63.40	51.66	176.44
2012	51.66	62.42	781.71	62.54	51.66	176.62
2013	51.66	63.46	769.91	61.59	51.66	176.72
2014	51.66	64.50	757.07	60.57	51.66	176.73
2015	51.66	65.55	743.19	59.45	51.66	176.66
2016	51.66	65.32	729.53	58.36	51.66	175.34
2017	51.66	65.08	716.11	57.29	51.66	174.03
2018	51.66	64.85	702.92	56.23	51.66	172.75
2019	51.66	64.62	689.95	55.20	51.66	171.48
2020	51.66	64.39	677.22	54.18	51.66	170.23
2021		63.12	614.11	49.13		112.25
2022		61.85	552.26	44.18		106.03
2023		60.57	491.69	39.33		99.91
2024		59.30	432.39	34.59		93.89
2025		58.03	374.36	29.95		87.98
2026		53.31	321.05	25.68		78.99
2027		48.59	272.46	21.80		70.39
2028		43.88	228.58	18.29		62.16
2029		39.16	189.43	15.15		54.31
2030		34.44	154.98	12.40		46.84
2031		31.00	123.99	9.92		40.92
2032		27.55	96.43	7.71		35.27
2033		24.11	72.33	5.79		29.89
2034		20.66	51.66	4.13		24.80
2035		17.22	34.44	2.76		19.98
2036		13.78	20.66	1.65		15.43
2037		10.33	10.33	0.83		11.16
2038		6.89	3.44	0.28		7.16
2039		3.44	0.00	0.00		3.44
2040		0.00	0.00	0.00		0.00
TOTAL	1,775.4	1,775.4	21,305.3	1,704.4	1,775.4	5,255.3

NOTE : Loan conditions are; annual interest = 8%,
repayment period = 20 years including a 5-year grace period.

Table IX-24 FORECAST OF AVAILABLE FUND FROM MTC

CASE/ITEM	1990	1995	2000	TOTAL OF 1991-2000
CASE 1.: 3% GROWTH RATE OF GDP				
1. GDP (3% GROWTH)	786,133	911,344	1,056,497	9,282,497
2. NATIONAL BUDGET (22% OF 1.)	172,949	200,496	232,429	2,042,149
3. BUDGET TO MTC (5.5% OF 2.)	9,512	11,027	12,784	112,318
4. PUBLIC INVESTMENT IN MERIDA STATE (4.5% OF 3.)	428	496	575	5,054
5. ROAD MAINTENANCE EXPENSES (8% OF 4.)	34	40	46	404
6. AVAILABLE FUND FOR THE PROJECT (50% OF 5.)	17	20	23	202
CASE 2.: 4% GROWTH RATE OF GDP				
1. GDP (4% GROWTH)	809,253	984,580	1,197,892	10,104,618
2. NATIONAL BUDGET (22% OF 1.)	178,036	216,608	263,536	2,223,016
3. BUDGET TO MTC (5.5% OF 2.)	9,792	11,913	14,494	122,266
4. PUBLIC INVESTMENT IN MERIDA STATE (4.5% OF 3.)	441	536	652	5,502
5. ROAD MAINTENANCE EXPENSES (8% OF 4.)	35	43	52	440
6. AVAILABLE FUND FOR THE PROJECT (50% OF 5.)	18	21	26	220

Table IX-25   ANNUAL REPAYMENT SCHEDULE OF ACTION PLAN
UNDER THE CONDITION OF 50% FUNDED BY LOAN

UNIT: million Bs.

YEAR (1)	LOAN (2)	AMORTIZA-TION (3)	ACCUMULA-TION (4)	INTEREST (5)	LOCAL FUND (6)	DISBURSE-MENT (7)
			[Σ(2)-Σ(3)]	[(4)x8%]		[(3)+(5)+(6)]
1991	9.50		9.50	0.76	9.50	10.26
1992	11.25		20.75	1.66	11.25	12.91
1993	81.80		102.55	8.20	81.80	90.00
1994	98.79		201.34	16.11	98.79	114.90
1995	69.99		271.33	21.71	69.99	91.70
1996	49.06	0.63	319.76	25.58	49.06	75.28
1997	48.30	1.38	366.68	29.33	48.30	79.02
1998	61.42	6.84	421.27	33.70	61.42	101.96
1999	69.25	13.42	477.10	38.17	69.25	120.84
2000	51.88	18.09	510.89	40.87	51.88	110.84
2001		21.36	489.53	39.16		60.52
2002		24.58	464.95	37.20		61.78
2003		28.67	436.28	34.90		63.58
2004		33.29	402.99	32.24		65.53
2005		36.75	366.24	29.30		66.05
2006		36.75	329.49	26.36		63.11
2007		36.75	292.73	23.42		60.17
2008		36.75	255.98	20.48		57.23
2009		36.75	219.23	17.54		54.29
2010		36.75	182.48	14.60		51.35
2011		36.12	146.37	11.71		47.83
2012		35.37	111.00	8.88		44.25
2013		29.91	81.08	6.49		36.40
2014		23.33	57.76	4.62		27.95
2015		18.66	39.10	3.13		21.79
2016		15.39	23.71	1.90		17.29
2017		12.17	11.53	0.92		13.09
2018		8.08	3.46	0.28		8.35
2019		3.46	0.00	0.00		3.46
2020		0.00	0.00	0.00		0.00
TOTAL	551.3	551.3	6,615.1	529.2	551.3	1,631.7

NOTE : Loan conditions are; annual interest = 8%,
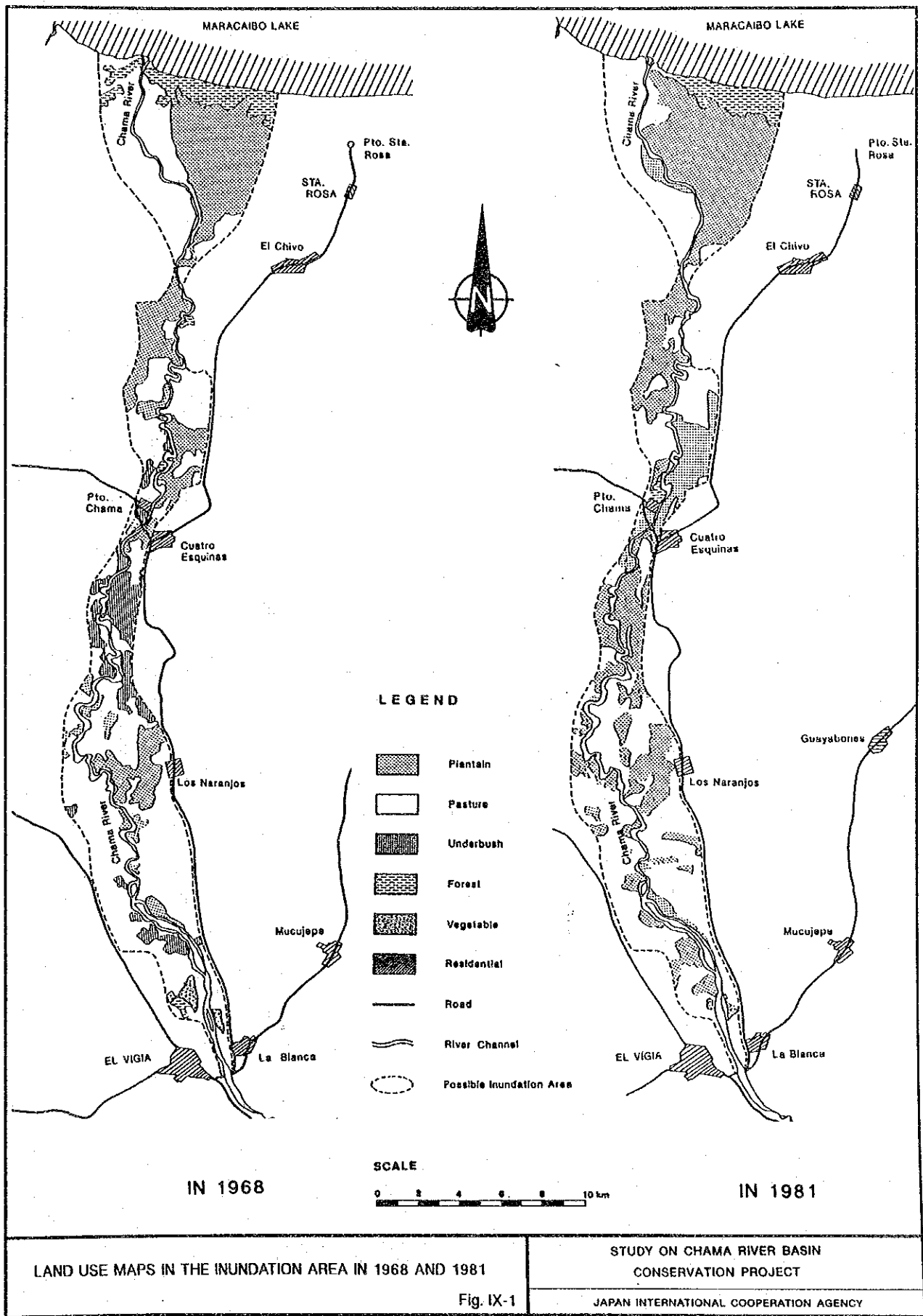repayment period = 20 years including a 5-year grace period.

MARACAIBO LAKE

Pto. Sta. Rosa

STA. ROSA

El Chivo

Pto. Chama

Cuatro Esquinas

Los Naranjos

Chama River

Mucujepe

EL VIGIA   La Blanca

IN 1968

MARACAIBO LAKE

Pto. Sta. Rosa

STA. ROSA

El Chivo

Pto. Chama

Cuatro Esquinas

Guayabones

Los Naranjos

Chama River

Mucujepe

EL VIGIA   La Blanca

IN 1981

LEGEND

Plantain

Pasture

Underbush

Forest

Vegetable

Residential

Road

River Channel

Possible Inundation Area

SCALE

0   2   4   6   8   10 km

LAND USE MAPS IN THE INUNDATION AREA IN 1968 AND 1981	STUDY ON CHAMA RIVER BASIN CONSERVATION PROJECT
Fig. IX-1	JAPAN INTERNATIONAL COOPERATION AGENCY

JICA