Table A3-9 Maintenance, Rehabilitation and Improvement (MRI) Plan for Aganan RIS (Region VI)

1. General and Hydrology Information

The general and hydrology informations of NIS are as follows (refer to Part I to III and Table A2-4 in the Maual)

Summary Table of General and Hydrolgy Informations

Description	Unit	Wet Season (June)		Dry Season (Nov.)	
		Designed	Programmed	Designed	Programmed
1. Service area:	ha	5,500	4,472	-	2,000
2. Max. flood discharge:	m^3/sec	830	-	-	-
3. Design intake discharge	m^3/sec	8.25	-	-	-
4. Max. available water resources:	m^3/sec	-	7.52	-	8.56
5. Average available water resources:	m^3/sec	-	1.60	-	2.06
6. Max. water requirement:	m^3/sec	-	7.42	-	1.54
7. Revised design intake discharge:	m^3/sec	7.42		1.54	

Note: Maximum unit land soaking irrigation requirement, wet: 1.66 lit/sec/ha, dry: 0.77 lit/sec/ha

2. Maintenance Plan

2.1 Diversion Dam

2.1.1 General and Structural Dimensions

The general and structural dimensions are picked-up from Table A2-4 (1) in the Manual.

Summary Table of General and Structural Dimensions for Diversion Dam

Description	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Diversion dam	81.50	8.36	-	1
2. Spillway (weir type)	76.90	5.81	52.00	1
3. Sluice way gate (right)	4.60	2.90	-	1
4. Intake gate (right)	1.85	1.45	-	7
5. Protection dike (left)	3.00	5.50	135.70	1
6. Protection dike (right)	3.00	-	-	1
7. Protection sidewall (left)	-	-	-	1
8. Protection sidewall (right)	-	6.25	141.50	1

2.1.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (1) and A3-8 (1) in the Manual.

Summary Table of Maintenance Components for Diversion Dam

Maintenance Component	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Repair of D/S riverbed protection	small	81.50	0.70	50.00	1
2. Repair of sluice way pier	medium	1.50	10.00	8.00	2
3. Repair of intake concrete	medium	15.00	3.00	20.00	1
4. Repair of protection dike (left)	medium	3.00	5.50	135.70	1
5. Repair of sluice way gate	medium	4.60	2.90	-	1
6. Replace of seal rubber for sluice way gate	medium	4.60	2.90	-	1
7. Repainting of sluice way gate	medium	4.60	2.90	-	1
8. Greasing of sluice way gate	medium	4.60	2.90	-	1
9. Repainting of intake gate	medium	1.85	1.45	-	7
10. Greasing of intake gate	medium	1.85	1.45	-	7

2.1.3 Maintenance Cost

The maintenace costs are estimated as follows.

Summary Table of Maintenance Cost for Diversion Dam (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of D/S riverbed protection	small	m^2	400.00	174	69,600
2. Repair of sluice way pier	medium	pc.	1.00	29,300	29,300
3. Repair of intake concrete	medium	lot	1.00	58,540	58,500
4. Repair of protection dike (left)	medium	m	14.00	970	13,600
5. Repair of sluice way gate	medium	set	1.00	68,000	68,000
6. Replace of seal rubber for sluice way gate	medium	set	1.00	1,320	1,300
7. Greasing of sluice way gate	medium	set	1.00	690	700
8. Repainting of sluice way gate	medium	set	1.00	3,650	3,700
9. Repainting of intake gate	medium	set	1.00	1,250	1,300
10. Greasing of intake gate	medium	set	7.00	510	3,600
Total					**244,700**

2.2 Main and Lateral Canal

2.2.1 General and Structural Dimensions

The general and structural dimensions are picked-up from Table A2-4 (3) in the Manual.

Summary Table of General and Structural Dimensions for Main and Lateral Canal

Name of Canal	Service Area (ha)	Discharge (m3/sec)	Rivised Q (m3/sec)	Length (km)	Width (m)	Height (m)	Related Str. (set)
1. Main Canal	4,472	8.25	7.42	11.85	3.25	3.50	11
2. Lateral A	1,379	2.55	2.29	18.31	1.25	1.00	14
3. Lateral B	2,488	4.60	4.13	21.13	2.25	1.75	14
4. Lateral C	147	0.27	0.24	1.17	0.40	0.45	2
5. Lateral D	453	0.86	0.75	5.17	1.15	1.40	4

2.2.2 Maintenance Plan

The maintenance components and scales are picked-up from Table A3-7 (3) and A3-8 (3) in the Manual.

Summary Table of Maintenance Components for Main and Lateral Canal

Maintenance Component	Scale	Length (km)	Width (m)	Height (m)	No.(pc.)
1. Repair of damaged main canal	medium	11.85	3.25	3.50	1
2. Repair of leaked main canal	medium	11.85	3.25	3.50	1
3. Maintenance of related structure of main canal	medium	-	-	-	1
4. Repair of damarged Lateral A	large	18.31	1.25	1.00	1
5. Repair of leaked Lateral A	large	18.31	1.25	1.00	1
6. Maintenance of related structure of Lateral A	large	-	-	-	1
7. Repair of damaged Lateral B	large	21.13	2.25	1.75	1
8. Repair of leaked Lateral B	large	21.13	2.25	1.75	1
9. Maintenance of related structure of Lateral B	large	-	-	-	1
10. Repair of damaged Lateral C	small	1.17	0.40	0.45	1
11. Maintenance of related structure of Lateral C	small	-	-	-	1
12. Repair of damaged Lateral D	medium	5.17	1.15	1.40	1
13. Repair of leaked Lateral D	medium	5.17	1.15	1.40	1

Note: The greasing plan of related canal structure will be included in maintenance plan of related structures.

2.2.3 Maintenance Cost

The maintenace costs are estimated as follows.

Summary Table of Maintenance Cost for Main and Lateral Canal (unit: peso)

Maintenance Component	Type	Unit	Quntities	Unit Cost	Amount
1. Repair of damaged main canal	medium	km	1.20	37,500	45,000
2. Repair of leaked main canal	medium	km	1.20	32,600	39,100
3. Maintenance of related structure of main canal	medium	lot	1.00	82,800	82,800
4. Repair of damarged Lateral A	large	km	1.80	37,600	67,700
5. Repair of leaked Lateral A	large	km	1.80	37,600	67,700
6. Maintenance of related structure of Lateral A	large	lot	1.00	33,800	33,800
7. Repair of damaged Lateral B	large	km	2.10	37,600	79,000
8. Repair of leaked Lateral B	large	km	2.10	37,600	79,000
9. Maintenance of related structure of Lateral B	large	lot	1.00	33,800	33,800
10. Repair of damaged Lateral C	small	km	0.10	15,500	1,600
11. Maintenance of related structure of Lateral C	small	lot	1.00	3,200	3,200
12. Repair of damaged Lateral D	medium	km	0.50	22,900	11,500
13. Repair of leaked Lateral D	medium	km	0.50	22,900	11,500
Total					**544,200**

Note: The greasing cost of related canal structure will be included in maintenance cost of related structures.

2.3 Annual Maintenance Cost for Aganan RIS

Summary table of Annual Maintenance Cost (Service area: 4,472 ha, unit: peso)

Description	Main. Cost
1. Diversion Dam	244,700
2. Main/Lateral Canal	544,200
Annual Maintenance Cost	**788,900**
Maintenance Cost / Service area	**176**

< Actural amount: 225 Peso/ha
(see page 4-13 in the Main Report)

3. Rehabilitation and Improvement Plan

3.1 Diversion Dam

3.1.1 Present Conditions of Diversion Dam

The present conditions of diversion dam are picked-up "Severe" from Table A3-8 (1) in the Manual.

Summary Table of Present Conditions for Diversion Dam

Part of Facilitity	Present Conditions	Scale	Width (m)	Height (m)	Length (m)	No.(pc.)
1. Sluice way gate (right)	severe sediment	medium	4.60	2.90	-	1
2. Intake gate (right)	severe sediment	medium	1.85	1.45	-	7

3.1.2 Rehabilitation and Improvement Plan for Diversion Dam

1) Sediment Flushing in Sluice Way

The maintenance plan of sediment flushing in sluice way should be in accordance with the flowchart was shown on page 3-15 in the Manual.

a) Judgement of Sediment Flushing

(1) Sediment depth in the sluice way: 0.80m is more than 0.30m.

(2) Sediment depth in main canal: 0.50m is more than 0.14m of 10% of water depth (= 1.44m)

Then the judgement of sediment flushing is "Yes", go to "2-2 Need Flushing".

b) Judgement of Sand Settling in Sluice Way

$Vs = Qs / (W \times hs)$

Where, Vs: Velocity in sluice way (m/sec)
Qs: Maximum available water resources, Qs = 8.56 m3/sec
W: Width of sluice way, W = 4.60 m
hs: Water depth in sluice way, hs = 2.50 m

$Vs = 8.56 / (4.60 \times 2.50) =$ 0.74 m/sec > 0.40 m/sec

Then the judgement of sand settling is "No", go to "4 To be improved sluice way".

2) Improvement of Sluice Way

a) Required Width of Sluice Way

$Wr = Qs / (Vs \times hs)$

Where, Wr: Required width of sluice way (m)
Qs: Maximum available water resources, Qs = 8.56 m3/sec
Vs: Velocity in sluice way, Vs = 0.40 m/sec
hs: Water depth in sluice way, hs = 2.50 m

$Wr = 8.56 / (0.40 \times 2.50) =$ 8.56 m > 4.60 m (existing width of sluice way)

Therefore, the additional sluice way with 4.60m width will be provided for sand settling.

b) Minimum Diameter of Sediment in Main Canal

The situation of sediment in sluice way are as follows.

Description	unit	Original	Present	Proposed
Design Discharge	m3/sec	8.25	7.52	7.42
Water Depth	m	2.50	2.00	2.50
Sediment Depth	m	0.00	0.50	0.00
Velocity	m/sec	0.36	0.41	0.32
Critical Tractive Particle Size	mm	0.6	0.8	0.5

Therefore, minimum diameter of sediment in main canal is 0.3 mm.

3) Inprovement of Intake Mouth

a) Judgement of Intake Mouth

(1) Gap between sluice way sill and intake sill

$\Delta H = 2.50 - 1.45 = 1.05$ m > Minimum $\Delta H = 1.00$m O.K.

(2) Velocity through the intake mouth

Vi = Qi / (Wi x hi)

Where, Vi: Velocity through the intake mouth, Standard Vi = 0.60m/sec to 1.00m/sec
Qi: Reviced design intake discharge, Qi = 7.42 m3/sec
Wi: Width of intake mouth, Wi = 1.85m x 7sets = 12.95 m
hi: Water depth in intake mouth, hi = 1.45m

Vi = 7.42 / (12.95 x 1.45) = 0.40 m/sec < Standard Vi = 0.60 to 1.00m/sec O.K.

Therefore, the existing intake mouth is good design to prevent sediment into the intake.

4) Proposed Sand Settling Basin

a) Maximum Diameter of Sediment in Main canal

The situation of sediment in main canal are as follows.

Description	unit	Original	Present	Proposed
Design Discharge	m3/sec	8.25	5.43	7.42
Water Depth	m	1.44	1.01	1.31
Sediment Depth	m	0.00	0.43	0.13
Velocity	m/sec	0.81	0.69	0.77
Critical Tractive Particle Size	mm	3.2	2.5	3.0

Therefore, maximum diameter of sediment in main canal is 2.5 mm.

b) Width and Depth in Sedimentation Ditch

W = Q / (U x h)

Where, W: Required width of sedimentation ditch (m)
Q: Proposed design discharge, Q = 7.42 m3/sec
U: Velocity in sedimentation ditch, U = 0.25 m/sec
h: Water depth in sedimentation ditch, h = 2.50 m

W = 7.42 / (0.25 x 2.50) = 11.87 m < 4.00m x 3 rows = 12.00 m

c) Length of Settling Basin

L = K・h / Vg・U

Where, L: Required length of settling basin (m)
K: Safety factor, K = 1.5 to 2.0
h: Water depth in sedimentation ditch, h = 2.50 m
Vg: Critical settling velocity, dmin. = 0.3 mm, then Vg = 0.025 m/sec
U: Velocity in sedimentation ditch, U = 0.25 m/sec

L = (1.5 to 2.0) x 2.50 / 0.025 x 0.25 = 37.50 to 50.00 m

Therefore, the length of settling basin will provided 40.00m.

5) Summary of Rehabilitation and Improvement Plan for Diversion Dam

The summary of rehabilitation and improvement plan for diversion dam are as follows.

Summary Table of rehabilitation and Improvement for Diversion Dam

Rehabilitation and Improvement Component	Scale	Width (m)	Height (m)	Length (m)	No.(lot)
1. Improvement of sluice way	medium	4.60	2.90	10.00	1
2. Proposed sand settling basin	medium	4.00m x 3row	4.40	65.60	1

6) Rehabilitation and Improvement Cost

The rehabilitation and improvement costs are estimated as follows.

Summary Table of Rehabilitation and Improvement for Diversion Dam (unit: peso)

Rehabilitation and improvement Component	Type	Unit	Quntities	Unit Cost	Amount
1. Improvement of sluice way	medium	lot	1.00	11,600,000	11,600,000
2. Proposed sand settling basin	medium	lot	1.00	32,500,000	32,500,000
Total					**44,100,000**

Note: The R/I Coat for Aganan Diversion Dam in "The Rehabilitation Project of Aganan RIS" is Pesos 34,100,000.

3.2 Main and Lateral Canal

3.2.1 Present Conditions of Main and Lateral Canal

The present conditions of main and lateral canal are picked-up "Severe"in Table A3-8 (3) in the Manual.

Summary Table of Present Conditions for Main and Lateral Canals

Part of Facilitity	Present Conditions	Scale	Length (m)	Width (m)	Height (m)	No.(pc.)
1. Desilting of main canal	severe sediment	medium	11.85	3.25	3.50	1
2. Impr. of related structure of M.C	severe sediment and rust	medium	-	-	-	10
3. Desilting of Lat. A	severe sediment	large	18.31	1.25	1.00	1
4. Impr. of related structure of Lat.	severe sediment and rust	large	-	-	-	9
5. Desilting of Lat. B	severe sediment	large	21.13	2.25	1.75	1
6. Impr. of related structure of Lat.	severe sediment and rust	large	-	-	-	13
7. Desilting of Lat. D	severe sediment	medium	5.17	1.15	1.40	1
8. Impr. of related structure of Lat.	severe sediment and rust	medium	-	-	-	4

3.2.2 Rehabilitation and Improvement Plan for Main and Lateral Canal

1) Desilting in Main and Lateral Canals

The desilting in main and lateral canals should be in accordance with the flowchart was shown on page 3-19 in the Manual.

a) Judgement of Desilting

(1) Sediment depth in main canal: 0.53m is more than 0.17m of 10% of water depth (= 1.73m)

(2) Sediment depth in Lateral canal (large): 0.29m is more than 0.087m of 10% of water depth (= 0.87m)

(3) Sediment depth in Lateral canal (medium): 0.25m is more than 0.077m of 10% of water depth (= 0.77m)

(4) Sediment depth in Lateral canal (small): 0.24m is more than 0.066m of 10% of water depth (= 0.66m)

Then the judgement of desilting is "Yes", go to "2. Revised Design Discharge".

b) Revised Design Discharge

The revised design discharges are as follows.

Canal Name	Original Design Discharge Qo (m^3/sec)	Avaiable Discharge Qa (m^3/sec)	Max. Water Requirement Qr (m^3/sec)	Revised Design Discharge Qd (m^3/sec)
(1) Main Canal	8.25	7.52	7.42	7.42
(2) Lateral A	2.55	2.32	2.29	2.29
(3) Lateral B	4.60	4.18	4.13	4.13
(4) Lateral C	0.27	0.25	0.24	0.24
(5) Lateral D	0.86	0.76	0.75	0.75

c) Present Canal Capacities

The present canal capacities are as follows.

(1) Main Canal (large scale)

Canal Capacities of Main Canal (large scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	30.00	20.00	27.00
Bottom width	m	8.00	10.00	8.65
Water depth	m	2.35	1.68	2.13
Flow area	m^2	27.03	21.03	25.23
Velocity	m/sec	1.11	0.96	1.07

The present sedimentation is 6.00 m^3/m (= 27.03 - 21.03) and the desilting volume is 4.20 m^3/m (= 25.23 - 21.03).

(2) Main Canal (medium scale)

Canal Capacities of Main Canal (medium scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	8.00	5.00	7.20
Bottom width	m	3.00	4.59	3.57
Water depth	m	1.73	1.20	1.54
Flow area	m^2	9.68	7.67	9.06
Velocity	m/sec	0.83	0.72	0.80

The present sedimentation is 2.01 m^3/m (= 9.68 - 7.67) and the desilting volume is 1.39 m^3/m (= 9.06 - 7.67).

(3) Main Canal (small scale)

Canal Capacities of Main Canal (small scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	2.00	1.30	1.80
Bottom width	m	1.50	2.51	1.79
Water depth	m	0.96	0.62	0.86
Flow area	m^2	2.81	2.13	2.65
Velocity	m/sec	0.71	0.61	0.69

The present sedimentation is 0.68 m^3/m (= 2.81 - 2.13) and the desilting volume is 0.52 m^3/m (= 2.65 - 2.13).

(4) Lateral Canal (large scale)

Canal Capacities of Lateral Canal (large scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	2.00	1.30	1.80
Bottom width	m	2.00	2.87	2.27
Water depth	m	0.87	0.58	0.78
Flow area	m^2	2.88	2.17	2.68
Velocity	m/sec	0.70	0.60	0.67

The present sedimentation is 0.71 m^3/m (= 2.88 - 2.17) and the desilting volume is 0.51 m^3/m (= 2.68 - 2.17).

(5) Lateral Canal (medium scale)

Canal Capacities of Lateral Canal (medium scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	1.00	0.70	0.90
Bottom width	m	1.00	1.75	1.27
Water depth	m	0.77	0.52	0.68
Flow area	m^2	1.66	1.32	1.56
Velocity	m/sec	0.60	0.53	0.58

The present sedimentation is 0.34 m^3/m (= 1.66 - 1.32) and the desilting volume is 0.24 m^3/m (= 1.56 - 1.32).

(6) Lateral Canal (small scale)

Canal Capacities of Lateral Canal (small scale)

Description	unit	Original Design	Present Situation	Proposed Design
Design discharge	m^3/sec	0.50	0.35	0.45
Bottom width	m	0.50	1.22	0.83
Water depth	m	0.66	0.42	0.55
Flow area	m^2	0.98	0.78	0.91
Velocity	m/sec	0.50	0.45	0.49

The present sedimentation is 0.20 m^3/m (= 0.98 - 0.78) and the desilting volume is 0.13 m^3/m (= 0.91 - 0.78).

d) Selection of Desilting Method

The criteria of selection of desilting method are as follows.

(1) Manual: desilting volume is small (less than 0.50 m^3/m).

(2) Equipment: desilting volume is medium or large (more than 0.50m^3/m)

Canal Name	Sedimentation		Desilting		Desilting Method
	Depth (m)	Volume (m^3/m)	Depth (m)	Volume (m^3/m)	
(1) Main Canal (large)	0.67	6.00	0.45	4.20 (70 %)	by Equipment
(2) Main Canal (mediu	0.53	2.01	0.34	1.39 (69 %)	by Equipment
(3) Main Canal (small)	0.34	0.68	0.24	0.52 (76 %)	by Equipment
(4) Lateral Canal (large	0.29	0.71	0.20	0.51 (72 %)	by Equipment
(5) Lateral Canal (medi	0.25	0.34	0.16	0.24 (71 %)	by Manual
(6) Lateral Canal (small	0.24	0.20	0.13	0.13 (65 %)	by Manual

2) Summary of Rehabilitation and Improvement Plan for Main and Lateral Canal

The summary of rehabilitation and improvement plan for main and lateral canals are as follows.

Summary of Rehabilitation and Improvement Plan for Main and Lateral Canals

Rehabilitation and Improvement Component	Scale	Length (m)	Width (m)	Height (m)	No.(pc.)
1. Desilting of main canal (R/ I)	medium	11.85	3.25	3.50	1
2. Improvement of related structure of main canal (R/I)	medium	-	-	-	4
3. Desilting of Lat. A (R/I)	large	18.31	1.25	1.00	1
4. Improvement of related structure of Lat. A (R/I)	large	-	-	-	3
5. Desilting of Lat. B	large	21.13	2.25	1.75	1
6. Impr. of related structure of Lat. B	large	-	-	-	5
7. Desilting of Lat. D	medium	5.17	1.15	1.40	1
8. Impr. of related structure of Lat. D	medium	-	-	-	2

6) Rehabilitation and Improvement Cost

The rehabilitation and improvement costs are estimated as follows.

Summary table of Rehabilitation and Improvement Cost for Main and Lateral Canals (unit: peso)

Rehabilitation and Improvement Component	Type	unit	Quantities	Unit Cost	Amount
1. Desilting of main canal (R/ I)	medium	km	1.20	152,000	182,400
2. Improvement of related structure of main canal (R/I)	medium	place	2.00	498,000	996,000
3. Desilting of Lat. A (R/I)	large	km	1.80	55,600	100,100
4. Improvement of related structure of Lat. A (R/I)	large	place	1.00	256,000	256,000
5. Desilting of Lat. B	large	km	2.10	55,600	116,800
6. Improvement of related structure of Lat. B	large	place	2.00	256,000	512,000
7. Desilting of Lat. D	medium	km	0.50	26,200	13,100
8. Improvement of related structure of Lat. D	medium	place	1.00	108,000	108,000
Total					**2,284,400**

3.3 Rehabilitation and Improvemen Cost for Aganan RIS

Summary Table of Rehabilitation and Improvement Cost (Service area: 4,472 ha, unit: peso)

Description	Main. Cost
1. Diversion Dam	44,100,000
2. Main/Lateral Canal	2,284,400
Rehabilitation and Improvement Cost	**46,384,400**
R/I Cost / Service area	**10,372**

< Actural amount: 462 Peso/ha/year x 25 years
= 11,600 Peso/ha (see page 4-13 in the Main Report)

Table A3-10 Summary of Maintenance Cost (205 NISs)

No.	Reg.	NIS Name	FUSA	Estimated Maintenance Cost						Nat'l Ave.	Difference
				Dam	Pump Station	Canal	Canal Str.	Total	Unit Cost	Maint.Cost	(11)-(10)
			(ha)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(P/ha)	(P/ha)	(P/ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	CAR	Upper Chico	15,258	1,591,983	0	2,842,045	6,134,500	10,568,529	693	489	(-204)
2		Hapid	2,800	0	0	0		0	0	489	489
3		West Apayao Abulog	4,564	0	0	0		0	0	489	489
4	Region I	Bonga PIS-1	170	0	3270	0	0	3,270	19	489	470
5		Bonga PIS-2	545	0	246950	90,319	284,200	621,469	1,140	489	(-651)
6		Bonga PIS-3	157	0	287950	37,291	151,700	476,941	3,038	489	(-2,549)
7		Laoag Vintar	2,286	302,148	0	51,739	86,700	440,587	193	489	296
8		Nmc Pasuquin	630	85,920	0	212,260	639,200	937,380	1,488	489	(-999)
9		Dingras	1,004	271,120	0	131,744	3,657,400	4,060,264	4,044	489	(-3,555)
10		Bolo	364	279,711	0	112,490	9,600	401,801	1,104	489	(-615)
11		Cura	550	510	0	125,583	9,600	135,693	247	489	242
12		Nueva Era	386	2,040	0	13,605	3,200	18,845	49	489	440
13		Madongan Area	2,933	182,546	0	58,488	961,700	1,202,733	410	489	79
14		Solsona Area	1,340	271,938	0	13,868	769,200	1,055,006	787	489	(-298)
15		Labugaon Area	1,470	122,084	0	127,452	749,000	998,536	679	489	(-190)
16		Papa Area	2,337	278,304	0	93,900	414,000	786,204	336	489	153
17		Sta. Maria-Burgos	914	165,733	0	83,390	252,000	501,123	548	489	(-59)
18		Sta. Lucia-Candon	1,555	102,900	0	110,720	252,000	465,620	299	489	190
19		Tagudin	1,313	311,126	0	0	0	311,126	237	489	252
20		Amburayan	3,289	209,550	0	423,135	379,300	1,011,985	308	489	181
21		Ambayoan	3,945	8,656	0	574,546	152,400	735,602	186	489	303
22		Ambayoan-Extension	100	0	0	0		0	0	489	489
23		Dipalo	2,002	403,576	0	82,757	63,500	549,834	275	489	214
24		Masalip	1,548	685,125	0	225,570	379,300	1,289,995	833	489	(-344)
25		Lower Agno	4,134	212,320	0	1,467,412	4,012,900	5,692,632	1,377	489	(-888)
26		San Fabian	2,026	157,190	0	128,783	413,000	698,973	345	489	144
27		Dumuloc	1,232	500,716	0	189,565	219,200	909,481	738	489	(-249)
28		Agno	9,467	8,958	0	1,172,013		1,180,971	125	489	364
29		Sinolacan	2,570	815,360	0	266,228		1,081,588	421	489	68
30	Region II	Visitacion	1,400	0	0	0		0	0	489	489
31		Baua	1,867	223,041	0	50,448	273,800	547,288	293	489	196
32		Banurbur Creek	1,087	518,048	0	124,726	562,300	1,205,074	1,109	489	(-620)
33		Magapit PIS	10,046	0	503300	632,661		1,135,961	113	489	376
34		Apayao-Abulog	8,175	290,800	0	1,368,474	1,725,800	3,385,074	414	489	75
35		Pamplona	2,314	0	0	0		0	0	489	489
36		Dummun	1,502	3,987	0	165,878	1,312,000	1,481,865	987	489	(-498)
37		Zinundungan	2,045	14,899	0	221,318	1,312,000	1,548,217	757	489	(-268)
38		Baggao	2,467	12,780	0	93,982	248,400	355,162	144	489	345
39		Iguig-Alcala-Amulung PIS	1,974	0	0	0	0	0	0	489	489
40		Lower Chico	1,404	0	0	245,327	321,200	566,527	404	489	85
41		Solana PIS	2,777	0	35350	206,850	672,000	914,200	329	489	160
42		Pinacanauan	880	1,530	0	97,754	1,076,200	1,175,484	1,336	489	(-847)
43		San Pablo Cabagan	1,365	0	0	157,945	1,491,900	1,649,845	1,209	489	(-720)
44		Tumauini	3,020	4,220	0	335,221	262,200	601,641	199	489	290
45		Mallig	2,419	359,232	0	294,423	827,500	1,481,155	612	489	(-123)
46		Bagabag	2,010	236,710	0	255,017	254,500	746,227	371	489	118
47	MRIIS	MRIIS Distric I	20,904	1,326,140	0	3,392,078		4,718,218	226	489	263
48		MRIIS Distric II	22,676	0	0	1,714,553		1,714,553	76	489	413
49		MRIIS Distric III	21,703	1,046,202	4641930	2,852,631	30,421,600	38,962,363	1,795	489	(-1,306)
50		MRIIS Distric IV	19,512	0	869070	1,832,792		2,701,862	138	489	351
51	Region III	Nayom	1,835	0	0	0		0	0	489	489
52		Bayto		0	0	0		0	0	489	489
53		Camiling	8,229	498,453	0	1,384,835	382,900	2,266,187	275	489	214
54		Tarlac	4,500	1,173,971	0	621,264		1,795,235	399	489	90
55		San Miguel		0	0	0		0	399	489	90
56		Bucao	2,144	418,303	0	0		418,303	195	489	294
57		NEPIS	403	0	0	0		0	0	489	489
58		Pampanga Dalta	9,303	0	0	0		0	0	489	489
59		Porac	1,668	154,221	0	3,414	236,600	394,235	236	489	253
60		Gumain	1,997	246,245	0	23,400	74,000	343,645	172	489	317
61		Colo	863	0	0	0	0	0	0	489	489
62		Caulaman		0	0	0	0	0	0	489	489
63		Angat	26,791	88,026	0	4,285,429	5,819,800	10,193,255	380	489	109
64		Maasim	3,457	636,385	716260	123,412	76,200	1,552,257	449	489	40
65		Disalit Creek	485	62,347	0	0	85,900	148,247	306	489	183
66	UPRIIS	UPRIIS District I	20,700	309,722	0	593,499	4,005,600	4,908,821	237	489	252
67		UPRIIS District II	22,302	697,588	0	171,747		869,335	39	489	450
68		UPRIIS District III	24,449	723,454	0	1,296,838		2,020,292	88	489	401
69		UPRIIS District III (Vaca)		17,110	0	116,710		133,820	88	489	401
70		UPRIIS District IV	21,293	256,640	38530	2,006,615	3,358,900	5,660,685	266	489	223
71	Region IV	Molino	8,490	0	0	0		0	0	489	489
72		Embarcadero-Baluctot		0	0	0	0	0	0	489	489
73		Luksuhin-Makuling		0	0	0	0	0	0	489	489
74		Pasong Kastila-Julian		0	0	0	0	0	0	489	489
75		Bankud		0	0	0	0	0	0	489	489
76		Butas Marcelo		0	0	0	0	0	0	489	489
77		Plucena-Bayan		0	0	0	0	0	0	489	489
78		Butas-Lawang Bato		0	0	0	0	0	0	489	489
79		Navarro		0	0	0	0	0	0	489	489
80		Matanda		0	0	0	0	0	0	489	489
81		Balayungan		0	0	0	0	0	0	489	489
82		Tres Cruses		0	0	0	0	0	0	489	489
83		San Agustin-Pasong Buaya		0	0	0	0	0	0	489	489
84		Culong-Culong		0	0	0	0	0	0	489	489
85		Sahing		0	0	0	0	0	0	489	489
86		Agos	1,232	0	0	176,036		176,036	143	489	346
87		Palico	835	0	0	0		0	0	489	489
88		Cabuyao PIS	549	131,255	0	43,377		174,631	318	489	171
89		San Cristobal	414	238,770	0	67,144		305,914	739	489	(-250)
90		Diezmo PIS	693	143,715	0	74,233		217,948	314	489	175
91		Macabling	679	314,971	248620	56,811		620,402	914	489	(-425)
92		San Juan	552	143,295	0	67,501		210,796	382	489	107
93		Sta. Maria	1,349	0	0	92,200		92,200	103	489	386
94		Mayor		0	0	46,998		46,998	103	489	386
95		Dambo PIS		0	0	0		0	103	489	386
96		Sta. Cruz	2,184	98,179	0	336,763	33,800	468,742	215	489	274
97		Mabacan	272	170,364	0	0		170,364	626	489	(-137)
98		Balanac	1,000	271,991	0	81,682		353,673	354	489	135
99		Lumban	57	3,080	0	0		3,080	54	489	435
100		Malaunod	174	162,189	0	0		162,189	932	489	(-443)
101		Dumacaa	1,840	209,522	0	554,536	1,187,600	1,951,658	1,061	489	(-572)
102		Hanagdong	280	114,904	0	26,362	127,900	269,166	961	489	(-472)
103		Lagnas	640	322,546	0	62,586	260,100	645,232	1,008	489	(-519)

No.	Reg.	NIS Name	FUSA	Estimated Maintenance Cost						Nat'l Ave.	Difference
				Dam	Pump Station	Canal	Canal Str.	Total	Unit Cost	Maint.Cost	(11)-(10)
			(ha)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(P/ha)	(P/ha)	(P/ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
104	Region IV	Pagbahan	773	28,650	0	89,836		118,486	153	489	336
105		Baco Bucayao	4,032	397,763	0	3,162		400,925	99	489	390
106		Mag-Asawang Tubig	668	397,763	0	0		397,763	595	489	(-106)
107		Amnay-Patric	1,628	178,760	0	0		178,760	110	489	379
108		Mongpong		0	0	0		0	110	489	379
109		Pula	3,830	0	0	0		0	6	489	483
110		Bansud		0	0	23,569		23,569	6	489	483
111		Lumintao	1,021	0	0	14,250		14,250	14	489	475
112		Caguray	1,990	6,820	0	12,481		19,301	10	489	479
113		Cantingas	284	0	0	0		0	0	489	489
114		Batang-Batang	3,062	190,060	0	310,604	1,816,900	2,317,564	757	489	(-268)
115		Malatgao	3,014	750,201	0	399,756	680,800	1,830,757	607	489	(-118)
116	Region V	Daet Talisay	2,603	0	0	4,645		4,645	2	489	487
117		Malogdon	300	570,967	0	129,017		699,984	2,333	489	(-1,844)
118		Libmanan Cabusao PIS	2,076	0	0	0		0	0	489	489
119		Tigman-Hinagyanan	3,542	444,077	0	591,991		1,036,068	341	489	148
120		Inarihan		102,296	0	71,202		173,498	341	489	148
121		Cagaycay	1,577	86,680	0	149,889		236,569	150	489	339
122		Barit	5,738	0	0	0		0	0	489	489
123		Rida		0	0	0		0	0	489	489
124		Buhi-Lalo		0	0	0		0	0	489	489
125		Mahaba	1,946	114,554	0	61,621		176,175	470	489	19
126		Nasisi		191,978	0	0		191,978	470	489	19
127		Ogsong		272,877	0	0		272,877	470	489	19
128		Hibiga		201,931	0	71,276		273,207	470	489	19
129		San Francisco	950	0	0	81,552		81,552	152	489	337
130		San Ramon		0	0	62,686		62,686	152	489	337
131	Region VI	Aklan	3,891	323,916	0	368,406	635,800	1,328,122	341	489	148
132		Panakuyan	504	165,424	0	72,197	28,600	266,221	528	489	(-39)
133		Sibalom-San Jose	3,969	840,044	0	186,728	544,500	1,571,272	396	489	93
134		Mambusao	1,420	208,935	0	194,745	1,238,000	1,641,680	1,156	489	(-667)
135		Jalaur-Proper	8,208	2,242,284	389980	1,055,545	5,740,000	9,427,809	1,149	489	(-660)
136		Jaluar- Extension	2,144	201,412	0	480,974	1,859,900	2,542,286	1,186	489	(-697)
137		Suague	2,453	162,050	0	0	368,400	530,450	216	489	273
138		Sibalom-Tigbuan	2,019	92,330	0	198,096	424,000	714,426	354	489	135
139		Aganan	4,467	273,908	0	405,149	148,400	827,457	185	489	304
140		Sta. Barbara	3,062	9,363	0	289,967	1,616,200	1,915,530	626	489	(-137)
141		Barotac Viejo	1,700	208,231	5700	270,323	1,221,700	1,705,954	1,004	489	(-515)
142		Bago	13,277	327,050	0	995,669	5,041,800	6,364,519	479	489	10
143		Pangiplan	1,168	293,337	0	105,148	136,800	535,286	458	489	31
144	Region VII	Bohol	4,973	11,040	0	0		11,040	2	489	487
145		Capayas	539	0	0	0		0	0	489	489
146	Region VIII	Mainit	2,161	340,783	0	82,975	322,500	746,257	345	489	144
147		Pongso	780	318,120	0	42,904	275,400	636,424	816	489	(-327)
148		Bao	2,185	224,145	0	254,217	407,200	885,562	405	489	84
149		Binahaan North	1,934	0	0	0		0	0	489	489
150		Binahan South	1,410	0	0	102,229		102,229	73	489	416
151		Lower Binahaan	1,200	2,040	0	0		2,040	2	489	487
152		Tibak	1,630	2,995	0	131,086		134,081	82	489	407
153		Daguitan	916	151,740	0	76,899	160,000	388,639	424	489	65
154		Gumarona	646	69,710	0	0	15,900	85,610	133	489	356
155		Balire North	300	73,360	0	0	109,200	182,560	609	489	(-120)
156		Balire South	396	1,200	0	423	47,700	49,323	125	489	364
157		Ibawon	281	338,671	0	7,488	55,100	401,259	1,428	489	(-939)
158		Gibuya	738	247,996	0	22,878	437,300	708,173	960	489	(-471)
159		Bito	1,602	690	0	133,958		134,648	84	489	405
160		Hindang-Hilongos	720	1,200	0	0	41,600	42,800	59	489	430
161		Das-Ay	396	11,410	0	3,416	69,000	83,826	212	489	277
162	Region IX	Sibuguey Valley	2,642	3,060	0	0	403,000	406,060	154	489	335
163		Dipolo	1,571	702,147	0	77,412	160,400	939,958	598	489	(-109)
164		Salug	6,485	729,930	0	8,166	3,634,000	4,372,096	674	489	(-185)
165		Labangan	2,720	419,387	0	370,109	863,200	1,652,696	608	489	(-119)
166	Region X	Bubunawan	380	0	0	0		0	0	489	489
167		Manupali	1,554	184,770	0	4,906	638,800	828,476	533	489	(-44)
168		Pulangui	10,557	50,642	0	742,783	2,126,000	2,919,426	277	489	212
169		Roxas-Kuya	806	9,694	0	1,457	410,300	421,451	523	489	(-34)
170		Muleta	1,610	16,270	0	445	67,200	83,915	52	489	437
171		Rugnan	2,500	0	0	0		0	0	489	489
172		Maranding	4,808	29,000	0	344,156		373,156	78	489	411
173	Region XI	Lupon	2,450	186,409	0	433,963	0	620,372	253	489	236
174		Batutu	2,700	1,139,360	0	346,960	56,200	1,542,520	571	489	(-82)
175		Saug	4,177	341,429	0	642,910	624,400	1,608,738	385	489	104
176		Libunganon-Left	708	314,368	0	74,252	496,800	885,420	1,251	489	(-762)
177		Lasang	4,726	61,796	0	484,479		546,275	116	489	373
178		Libunganon-Right	7,031	159,976	0	691,317	248,400	1,099,693	156	489	333
179		Kipaliku	2,344	344,803	0	1,085,295		1,430,098	610	489	(-121)
180		Mal	2,635	213,210	0	82,669	166,800	462,679	176	489	313
181		Padada	2,519	104,030	0	0	157,200	261,230	104	489	385
182	Region XII	Alip	3,101	172,644	0	226,994	256,800	656,437	212	489	277
183		Talayan	700	0	0	45,162		45,162	65	489	424
184		Maridagao	5,562	0	0	0		0	0	489	489
185		Libungan	9,168	73,310	0	569,204	309,200	951,714	104	489	385
186		Kabulnan	8,983	0	0	0		0	0	489	489
187		Kabacan	4,423	225,561	0	441,265	926,200	1,593,026	360	489	129
188		Pagalungan	703	1,020	0	22,296	0	23,316	33	489	456
189		Mlang	3,177	0	0	0		0	0	489	489
190		Malasila	4,013	76,390	0	81,240	421,700	579,330	144	489	345
191		Lambayong	11,343	278,702	0	528,910	1,112,400	1,920,012	169	489	320
192		Tacurong (Dumaguil)	1,762	63,561	0	40,519	121,600	225,680	128	489	361
193		Allah-1	4,751	132,253	0	678,019		810,272	171	489	318
194		Allah-2	7,296	962,365	0	934,416		1,896,781	260	489	229
195		Banga	2,554	157,490	0	66,429	472,500	696,419	273	489	216
196		Marbel-1	1,856	151,503	0	93,850	26,500	271,853	146	489	343
197		Marbel-2	1,676	39,912	0	69,948	29,700	139,561	83	489	406
198		Siluay	780	2,400	0	11,520	25,600	39,520	51	489	438
199		Buayan	680	19,301	0	167,243	76,800	263,344	387	489	102
200	Region XIII	Cabadbaran-Taguibo	2,500	399,024	0	109,092	1,316,800	1,824,916	730	489	(-241)
201		Cantillan	1,825	59,050	0	273,743	0	332,793	182	489	307
202		Tago	3,716	412,970	0	555,421	2,897,700	3,866,091	1,040	489	(-551)
203		Andanan	3,500	435,031	0	427,467	529,200	1,391,698	398	489	91
204		Gibong	1,723	111,166	0	6,902	3,200	121,267	70	489	419
205		Simulao	2,540	37,816	0	45,339		83,155	33	489	456
Total			637,473	38,514,855	7,986,910	53,335,582	118,425,600	218,262,947	342	489	147