

- c. The base-to depth relationship for new canals should not be applied in re-designing existing canals for rehabilitation. The base width is more or less established and should be maintained. The relationships  $b = 3d$  to  $b = 4d$  would result to acceptable values and adopt side slope that is predominant in canal sections.
- d. Earth materials desilted from the canal if suitable shall be placed on the embankment to reduce the quantity of filling materials.
- e. A scoured section of canal at the outlet of an structure following the line of damage should be rip-rapped.

#### 4.5.2. Inspection of Defective Facilities

The WM must report immediately to the Area Engineer if any portion of his canal coverage needs repairs like washed out portions of canal, eroded canal embankment and damages on the facilities by flood/typhoon.

The Area Engineer shall made immediately a detail survey and prepare the inspection report according to the WM's report. Then it shall be submitted to the District Manager.

#### 4.5.3. Preparation of Repair and Improvement Plan

The Area Engineer shall prepare the Repair and Improvement Plan and submit to the District Manager/Operation Manager for approval.

The overall system repair and improvement plan shall be made on the Canal Layout Basic Map for the estimation and preparation of budgetary plan.

#### 4.5.4. Implementation of Repair and Improvement Work

The repair and maintenance works shall be basically executed by the District Office on force account basis. The works divided excavation works, embankment works, maintenance of road, repair works of scour, repair works of structures/gates, etc.

Excavation works, embankment works and maintenance works of road are executed by using O/M equipments. On the other hand, repair works of scour or repair works of structures/gates are implemented by man power.

Excavation works are composed of desilting, widening and drainage excavation and carried out the following procedures;

i) Desilting

Desilting work of downstream canal is basically carried out during suspension of irrigation water. For the heavy silted canal, however the work is implemented by cutting water of the canal. For the main on large scale laterals, the desilting work may be executed under water by using of excavating machine like dragline.

ii) Canal Widening

The works shall principally be executed during suspension period of irrigation water without special cases.

iii) Drainage Excavation

The works shall be executed by excavating machine during dry season. Brush weir or fish trap which prevent flow in the creek shall be taken out.

Embankment works are mainly enheightening works which shall principally be constructed by hauling material.

The maintenance of access/service road, or the maintenance of system drain are indicated in the particle 4.4.3 and 4.4.4.

Usually use a boulder riprap or a grouted riprap for the repairing of scoured canal. Those works are as follows;

i) Boulder Riprap

The work under this includes placing the boulder or precast concrete blocks for riprap on the prepared subgrade. Rocks, boulders or stone materials for riprap shall be hard, dense, durable and free of fissures or defects that would tend to foster deterioration from natural causes.

Boulder riprap shall be placed immediately following repair of the damaged embankment, channel or section of the structure involved. On the prepared gravel blanket or subgrade, the boulder shall be laid and arranged properly to offer maximum resistance to displacement due to high water velocity.

ii) Grouted Riprap

This involves placing appropriate sizes of stones or boulders for riprap and grouting the riprap with cement mortar. Stones for riprap shall be at least 15 cm in diameter and shall be sound, durable, dense and resistant to the combined action of water and air.

#### 4.6. Development of Unirrigated Area

The present irrigation area in the MRIIS is about 71,000 ha in 1986 and the achievement ratio in development is about 73 percent of the targeted irrigation area of 97,400 ha.

It is the most urgent and important subjects to achieve the development target of the irrigation area of 97,400 ha at the early stage by improving the present unirrigated area of about 26,300 ha; otherwise, the project benefit of MRIIS will not be generated any more and increment of irrigation fee collected as the fund for O/M services in the MRIIS, can not be expected.

An unirrigated area is mostly caused by an area undeveloped and without on-farm facilities as shown below;

#### Unirrigated Area as of 1986

(unit: ha)

Area Conditions	District				Total
	I	II	III	IV	
Total Area	25,054	24,468	24,793	24,087	97,402
Irrigated Area in 1986	17,874	20,708	17,403	15,077	71,062
Ratio of Irrigated Area (%)	74	85	70	63	73
Unirrigated Area in 1986					
- Undeveloped	4,330	1,080	2,940	4,870	13,220
- Lack of On-Farm Facility	310	1,270	2,660	2,460	6,700
- High Elevation	-	370	860	-	1,230
- Drainage Problem	130	300	540	830	1,800
- Financial Problem	970	470	-	610	2,050
- Others	440	270	390	240	1,340
<u>Total</u>	<u>6,180</u>	<u>3,760</u>	<u>7,390</u>	<u>9,010</u>	<u>26,340</u>

The improvement status for those areas from 1985 to 1986 is shown in the following tables;

Progress of Unirrigated Area

(unit: ha)

Item	District				Total
	I	II	III	IV	
- Undeveloped Area					
1985	5,760	790	2,950	5,410	15,090
1986	4,330	1,080	2,940	4,870	13,220
<u>Decreased Area</u>	<u>1,430</u>	<u>- 290</u>	<u>10</u>	<u>540</u>	<u>1,870</u>
- Lack of On-Farm Facility					
1985	670	1,070	1,460	1,730	4,930
1986	310	1,270	2,660	2,460	6,700
<u>Decreased Area</u>	<u>360</u>	<u>- 200</u>	<u>-1,200</u>	<u>- 730</u>	<u>-1,770</u>

These data would be monitored every year in Division-wise based on the IA basis (see Form 4-7 in the end of this Chapter).

4.6.1. Land Development

The land development works should be carried out by farmers themselves in principle; however, since the present undeveloped area is mostly located in the service area with undulated topography, the land development works will be rather difficult for farmers and require a long period to complete.

NIA and MRIIS O/M Office must help the related farmers to carry out such land development works through Irrigators' Association (IA) by the following manners;

- Planting and designing for the land development are to be made by the MRIIS O/M Office.
- Construction equipment and operators for the land development should be lent to IA on the repayment basis.
- The MRIIS O/M Office should make annual schedule in each Division of District for the land development and accelerate the farmers' development works in order to achieve the target irrigation area of 97,400 ha.

In order to successfully implement the above land development, following governmental assistances and support will be required;

- Administrative cooperation will be rendered by the governmental agencies concerned such as Ministry of Agrarian Reform (MAR), etc. to allocate the land to the farmers.
- Financial support by government for the land development should be given to the farmers' activities.
- Assistance will be given for establishment of the farmers Irrigators' Associations by NIA and other governmental agencies concerned to the farm land development smoothly.

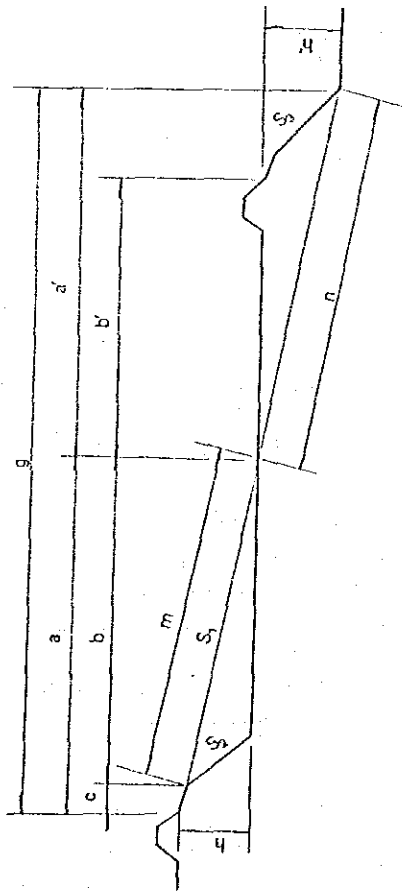
Table 4-3 indicates the standard terrace dimension for land development at the undulated topography.

#### 4.6.2. Provision of On-Farm Facilities

The on-farm facilities at terminal fields covering an area of 20 to 30 ha on average are provided by the farmer's institution as a rule, according to the NIA criteria, however as indicated in the previous table on the progress of unirrigated area, the areas without on-farm facilities have been increased since 1985. The reasons are as follows;

- The on-farm facilities are not properly constructed by farmer's institution due to the lack of technical and financial support by NIA. Therefore, some facilities constructed does not function to deliver the irrigation water from lateral canals to terminals and are easily broken after releasing the irrigation water, especially at the facilities located in undulated hilly area.
- The on-farm facilities are not constructed, while the undeveloped areas are converted to paddy fields, because farmer's institution have no techniques and fund for the construction of facilities.
- Farmer's institution such as Irrigator's Association has not fully established yet in the whole Service Area.

TABLE 4-3. DEFINITION AND DIMENSION FOR LAND DEVELOPMENT



Definition of Symbols:

- g - Total width of terrace; horizontal distance from toe of riser of one terrace to the toe of the riser of the next terrace.
- a - Width of cut; horizontal distance from top of cut to zero point.
- a' - Width of fill; horizontal distance from zero point to toe of riser.
- m - Slope distance from top of cut to zero point.
- n - Slope distance from zero point to toe of riser.
- b - Width of levelled area on cut side; distance from toe of cut to zero point.
- b' - Width of levelled area on fill side; distance of zero point to top of riser.
- c - Width of safety land; horizontal distance from toe of riser of one terrace to cut of next terrace.
- h - Depth of cut
- h' - Height of riser
- S<sub>1</sub> - Ground slope in percent
- S<sub>2</sub> - Cut slope in percent
- S<sub>3</sub> - Riser (fill) slope in percent or in ratio of base to height.

Terrace Dimension:

(1) Cut Slops (S<sub>2</sub>) = 3/2:1.0, Riser Slops (S<sub>3</sub>) = 1:1.0

S <sub>1</sub> (%)	h (cm)	h' (cm)	a (cm)	m (cm)	a' (cm)	n (cm)	g (cm)	b (cm)	b' (cm)
10	20	20	200	201	205	206	435	190	185
	30	31	300	301	308	309	638	285	277
	40	41	400	402	410	411	840	380	370
	50	51	500	502	512	513	1042	475	462
	60	62	600	603	615	616	1245	570	554
	70	71	700	703	715	716	1447	670	654
15	20	21	133	134	139	141	302	123	118
	30	31	200	202	209	211	439	185	178
	40	42	267	270	278	281	575	247	236
	50	52	333	337	347	351	710	308	295
	60	62	400	404	417	421	847	370	355
	70	72	467	471	485	489	984	435	418
20	20	21	150	153	160	163	340	135	128
	30	32	200	204	213	217	443	180	170
	40	43	250	255	267	272	547	225	214
	50	53	300	306	320	326	650	270	256
	60	64	350	357	373	380	753	315	298
	70	75	400	408	426	434	856	360	341
25	20	21	130	134	140	143	280	105	98
	30	32	165	170	178	183	363	140	130
	40	44	200	206	216	223	446	175	162
	50	54	235	242	253	261	529	210	194
	60	65	270	278	291	300	612	245	226
	70	76	305	314	328	338	695	280	256

(2) Cut Slope (S<sub>2</sub>) = 1/2:1.0, Riser Slope (S<sub>3</sub>) = 1/2:1.0

S <sub>1</sub> (%)	h (cm)	h' (cm)	a (cm)	m (cm)	a' (cm)	n (cm)	g (cm)	b (cm)	b' (cm)
10	20	20	200	201	200	201	430	190	190
	30	30	300	301	300	301	630	285	285
	40	40	400	402	400	402	830	380	380
	50	50	500	502	500	502	1030	475	475
	60	60	600	603	600	603	1230	570	570
	70	70	700	703	700	703	1430	670	670
15	20	20	133	134	133	134	297	123	123
	30	30	200	202	200	202	430	185	185
	40	40	267	270	267	270	563	247	247
	50	50	333	337	333	337	697	308	308
	60	60	400	404	400	404	830	370	370
	70	70	467	471	467	471	963	435	435
20	20	20	150	153	150	153	330	135	135
	30	30	200	204	200	204	430	180	180
	40	40	250	255	250	255	530	225	225
	50	50	300	306	300	306	630	270	270
	60	60	350	357	350	357	730	315	315
	70	70	400	408	400	408	830	360	360
25	20	20	130	134	130	134	270	105	105
	30	30	165	170	165	170	363	140	140
	40	40	200	206	200	206	456	175	175
	50	50	235	242	235	242	549	210	210
	60	60	270	278	270	278	642	245	245
	70	70	305	314	305	314	735	280	280

Such situation in the area is caused by one of the reasons to make trouble of adequate and timely water distribution at on-farm level, occurrence of time-lag between up and downstream areas, difficulty for transportation of agricultural crops and production materials.

In order to exercise the rationalized water and farm managements, on-farm facilities should be provided in accordance with the NIA criteria of on-farm facilities mentioned belows. Figure 4-1 indicates the typical layout for improvement of on-farm facilities.

- Farm ditch : 60 m/ha
- Farm drain : 40 m/ha
- Farm road : 20 m/ha

The construction of on-farm facilities should be carried out in principle by Irrigators' Association. However, NIA and MRIIS O/M Office should carry out technical assistant to construct the on-farm facilities by supplying O/M equipment, materials and operator on the repayment basis, in the same way as those works in land development. In accordance with the NIA assistance for the construction of on-farm facilities, MRIIS O/M Office should monitor an annual progress of on-farm facilities in Division-wise as indicated in Form 4-8.



FIGURE 4-1. IMPROVEMENT OF ON-FARM FACILITIES



**TERMINAL FACILITIES**

SERVICE AREA	: 55.0 ha	
FARM DITCH	: 3.5 km	54.5 m/ha
- M.F.D.	: 1.3 km	
- S.F.D.	: 1.7 km	
FARM DRAIN	: 1.2 km	21.8 m/ha
ROAD	: 2.6 km	47.3 m/ha
- SERVICE ROAD	: 0.7 km	
- ACCESS ROAD	: 0.6 km	
- FARM ROAD	: 1.3 km	

INVENTORY OF IRRIGATION CANAL

CANAL NAME \_\_\_\_\_

STATION	LENGTH L (m)	DISCHARGE Q (m <sup>3</sup> /s)	DEPTH h (m)	AREA A (m <sup>2</sup> )	VELOCITY V (m/sec)	VELOCITY HEAD hv (m)	SURFACE LEVEL SL (m)	BOTTOM LEVEL BL (m)	SECTION	DIMENSION
										b = m H = m 1 = 1/
										b = m H = m 1 = 1/
										b = m H = m 1 = 1/
										b = m H = m 1 = 1/
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										b = m H = m 1 = 1/
										b = m H = m 1 = 1/

INVENTORY OF CANAL STRUCTURE

CANAL NAME \_\_\_\_\_ D-4

STATION	KIND OF STRUCTURE	SIZE	REMARKS
1 + 250	R. C	Box 3.0 x 2.5 m, L = 8.0 m	Concrete Box, Crossing Provincial Road

INVENTORY OF GATE

CANAL NAME \_\_\_\_\_

D - 4

NOTE: CONDITION, F: GOOD FUNCTION  
R: NEED REPAIR, C: NEED REPLACE  
OR NEWLY INSTALL

STATION	KIND OF GATE	TYPE OF GATE	NUMBER OF GATE	SIZE		POWER	CONDITION	REMARKS
				WIDTH (m)	HEIGHT (m)			
0 + 000	Head	Radial	3	3.0	2.5	Manual	F	
3 + 200	Check	Sluice	2	2.5	2.0	-do-	R	Bent Spindle

FORM 4-4.

INVENTORY OF TURN-OUT GATE

CANAL NAME \_\_\_\_\_

D-4

NOTE: CONDITION, F: GOOD FUNCTION  
R: NEED REPAIR, C: NEED REPLACE  
OR NEWLY INSTALL

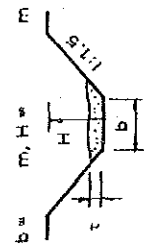
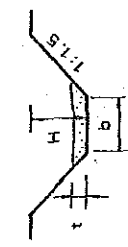
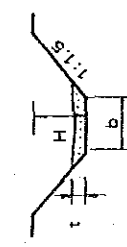
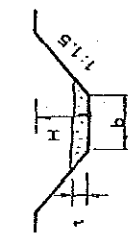
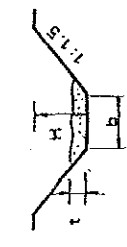
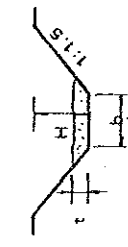
STATION	TYPE OF TURN-OUT	CIRCULAR GATE		RECTANGULAR GATE			REMARKS
		SIZE (d mm)	CONDITION	WIDTH (mm)	HEIGHT (mm)	CONDITION	
0 + 220	Const. H.	600	F	600	300	R	Bent Spindle

CANAL SILTING RECORD

CANAL NAME \_\_\_\_\_

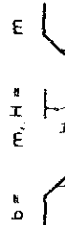
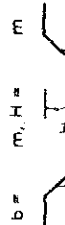
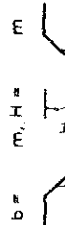
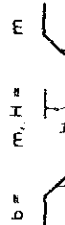
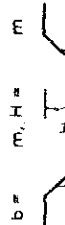
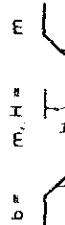
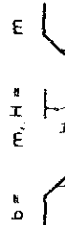
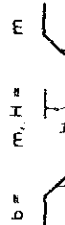
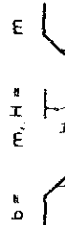
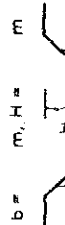
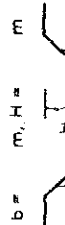
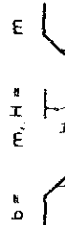
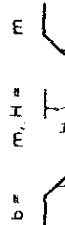
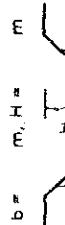
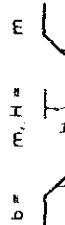
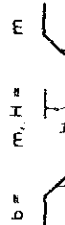
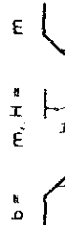
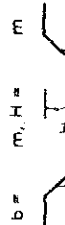
NOTE;

- Ls : Length of Silting Canal
- U : Silt Volume per meter
- V : Total Volume,  $V = U Ls$

STATION	LENGTH L (m)	DISCHARGE Q (m <sup>3</sup> /sec)	SECTION	SILTING VOLUME								
				STATION		Ls (m)	t (m)	U (m <sup>3</sup> /m)	V (m <sup>3</sup> )	REMARKS		
				From	To							
												
												
												
												
												
												

CANAL SCOURING RECORD  
CANAL NAME \_\_\_\_\_

NOTE: Ls : Length of Scoured Canal  
U : Scoured Volume per meter  
V : Total Volume,  $V = U L_s$

STATION	LENGTH L (m)	DISCHARGE Q (m <sup>3</sup> /sec)	SECTION 	SCOURING VOLUME					
				STATION		Ls (m)	U (m <sup>3</sup> /m)	V (m <sup>3</sup> )	REMARKS
				From	To				
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									

FORM 4-7. PROGRESS OF DEVELOPMENT FOR UNIRRIGATED AREA (19 )

Division Name: \_\_\_\_\_

IA Name : \_\_\_\_\_

I t e m	Wet Season Paddy (ha)	Dry Season Paddy (ha)	Remarks
Total Area (1)			
Irrigated Area			
Average (ha) (2)			
Ratio (%) (2)/(1)			
Unirrigated Area			
Undeveloped			
Lack of On-Farm Facility			
High Elevation			
Drainage Problem			
Financial Problem			
Others			



FORM 4-8. PROGRESS OF ON-FARM FACILITIES DEVELOPMENT (19 )

Division Name: \_\_\_\_\_

IA Name : \_\_\_\_\_

FIG.	Area (ha)	Turn-Out Type: Q : cu.m/s	Farm Ditch			Farm Road (m)	Farm Drain (m)	Remarks
			Main Farm Ditch (m)	Supplemental Farm Ditch (m)	Total (m)			
1.			(m)	(m)	(m)			
2.		Type: Q : cu.m/s						
3.		Type: Q : cu.m/s						
4.		Type: Q : cu.m/s						
5.		Type: Q : cu.m/s						

FORM 4-9. STATUS OF FARM LEVEL FACILITIES DEVELOPMENT

District \_\_\_\_\_ as of 19 \_\_\_\_\_

Division Number (1)	Service Area (ha)		Length of Farm Ditch (km)			Length of Farm Drain (km)			Length of Farm Road (km)					
	Projected (2)	Irrigated (3)	M.F.D. (4)	S.F.D. (5)	Total (6)	m/ha (7)	M.F.D. (8)	S.F.D. (9)	Total (10)	m/ha (11)	M.F.R. (12)	S.F.R. (13)	Total (14)	m/ha (15)
Area I Sub Total														
Area II Sub Total														
Total														

- Notes:
1. The Operation and Maintenance Section of District Office prepares the data sheet under the direction of Area Engineer, and it is revised annually according to the actual status and accomplishment of development.
  2. The data sheet is reported to Head Office annually and put into annual report prepared by the Head Office.
  3. The data is filed into data bank of Head Office and utilized for monitoring and evaluation of O/M activity in District Office as well as performance of O/M personnel in Division.

## FORM 4-10. STATUS OF SUPPLEMENTARY FARM LEVEL FACILITIES

Division \_\_\_\_\_ of District \_\_\_\_\_ as of 19 \_\_\_\_\_

Main Canal / Laterals (1)	Turnout Number (2)	Service Area		Name of I/A (5)	Name of F.I.G. (6)	Supplementary Farm Ditch			Supplementary Farm Drain			Supplementary Farm Road						
		Project-irrigated (ha) (3)	Irrigated (ha) (4)			Number of Rotational Area (7)	Total Length (m) (8)	Area Served (ha) (9)	Maintenance Status (10)✓	Number of Line (11)	Total Length (m) (12)	Area Served (ha) (13)	Maintenance Status (14)✓	Number of Line (15)	Total Length (m) (16)	Area Served (17)	Maintenance Status (18)✓	

Notes: 1. The data sheet is prepared by Operation and Maintenance Section of District Office under the direction of Area Engineer, and it is revised annually according to the actual status and accomplishment of development.

2. The data sheet is utilized for monitoring and evaluation of IA activity and performance as well as performance of O/M personnel in each Division.

3. The data is reported annually to Engineering and Operation Division of Head Office and filed into the data bank of the Head Office.

Note: ✓ Described in following classification

- A: maintained properly
- B: maintained poorly
- C: need rehabilitation

FORM 4-11. STATUS OF MAIN FARM LEVEL FACILITIES

Division \_\_\_\_\_ of District \_\_\_\_\_ as of 19 \_\_\_\_\_

Main Canal / Laterals (1)	Service Area		Main Farm Ditch			Main Farm Drain			Main Farm Road			Name of I.A. or (F.I.G.) (20)					
	Project Irrigated (ha) (3)	Length (m) (4)	Area Served (ha) (5)	Division Box (7) F R N	Status (8)	Year of Dev./Reh. (9)	Length (m) (10)	Area Served (ha) (11)	Structure (12) F R N	Status (13)	Year of Dev./Reh. (14)		Length (m) (15)	Area Served (ha) (16)	Structure (17) F R N	Status (18)	Year of Dev./Reh. (19)

- Notes:
- The data sheet is prepared by Operation Section of District under the direction of Area Engineer, and it is revised annually according to the actual status and accomplishment of development.
  - The data is utilized for planning and scheduling of the farm level facilities development in connection with budgetary requirement, efficiency and performance of the IA concerned.
  - The data is also utilized for monitoring and evaluation of I.A. activity and performance as well as performance of O/M personnel in each Division.
  - The data is reported annually to Engineering and Operation Division of Head Office and filed into the data bank of the Head Office.

Notes: 1/ Put corresponding number as: 2/ described in following classification

Following Status:  
 F: functional  
 R: need repair  
 N: need newly installed

A: maintained properly  
 B: maintained poorly  
 C: need rehabilitation

## PUMP INSPECTION MANUAL

### 1. Operation Record

The Operation record shall be made to grasp the present condition and to control pump operation accurately, and then any change of machine could be found to prevent accidents from occurring. This record will help to find a cause of trouble when it happens. The record shall be made at a constant interval. In the case of MRIIS pumping station, it is desirable to make the record three times a day. The daily record may be made by Form 4-9, and the points of recordings are as follows:

- i) Name of Pumping Station
- ii) Pump Number
- iii) Date
- iv) Time : Time of start, time of stop shall also be recorded.
- v) Temperature : Temperature in the pump station (°C)
- vi) Intake Water Level: Water level of intake pump (m)
- vii) Outlet Water Level: Water level of outlet pump (m)
- viii) Head : OWL-IWL (m)  
OWL: Outlet Water Level,  
IWL: Intake Water Level
- ix) Electric Current : Indicated on the electric current meter for total or each pump (A)
- x) Voltage : Indicated on the voltage meter (V)
- xi) Acc. Operation Hour: Accumulated operation hour (H)
- xii) Acc. Power : Accumulated power for total or each pump
- xiii) Discharge Water : Obtained from performance curve attached as Figure 4-2, 3 and 4 corresponding with actual total head for each pumping station respectively.

## 2. Daily Inspection

The pump operator carries out the following daily activities and inspections:

i) Cleaning

Cleans dust, ponded water, oil stain and other trash in the station in order to keep clean and dry around the pump itself.

ii) Abnormal Condition of Meter

Check the condition of pressure, water, voltage current, oil surface meter etc. and record if abnormality is discovered on them.

iii) Abnormal Condition of Electric Switch

Check and record if any abnormalities are found on the condition of sequence, limit switch etc. at the time of start and stop the pumps.

iv) Accident Indicator, Emergency Bell

Judge and record if accident indicator or emergency bell move or not.

v) Vibration, Abnormal Sound

Check the condition of motor and pump by the tactual and auditory sense.

vi) Temperature

Check the abnormal temperature of pump, motor or meters by tactual sense.

vii) Leakage

Check the leakage of water or oil from the pump and pipe.

3. Monthly Inspection

In addition to the repairment of defect parts found by daily inspection, the following inspection or maintenance works shall be carried out:

i) Loosen Bolt

Check the loosen bolt by using a spanner at coupling, base of motor, reverse revolution of pump, etc.

ii) Vibration

Vibration shall be inspected by using of vibration meter at the instructed point and the results shall be recorded.

iii) Temperature

Check and record the temperature at the instructed point.

iv) Temporary Repairment of Leakage

Repair temporarily the part of defect found by daily inspection.

v) Repairment or Replacement of Meters

Repair or replace the trouble or defective meters found by daily inspection.

4. Six Month Inspection

In addition to the replacement of defect parts found by monthly inspection, the following inspection or maintenance works shall be undertaken:

i) Exchange of Grease and Lubricant

In case foreign material is mixed, the grease and lubricant shall be renewed once every six month or less.

ii) Supply of Oil or Lubricant to the Appurtenant Facilities

Supply oil and lubricant to the necessary parts of the machine and meters.

iii) Bolt and Nut

The bolt and nut need to be tightened as specified.

iv) Replacement of Grand Packing

In case the leakage is remarkable, the grand packings shall be replaced.

v) Inspection of Inlet and Outlet Pit

Check and clean silt or debris inside the inlet and outlet pit.



vi) Inspection of Tools

Check and clean maintenance tools.

vii) Painting

The condition of painting shall be checked, if any rust found, it shall be repainted.

FORM 4-12.

OPERATION RECORD OF PUMP

- 1. Pumping Station \_\_\_\_\_
- 2. Pump Number \_\_\_\_\_
- 3. Date \_\_\_\_\_ Month \_\_\_\_\_ 19\_\_\_\_

4. Time	Hr	Min.			
5. Temperature	°C				
6. Intake Water Level	m				
7. Outlet Water Level	m				
8. Head	m				
9. Electric Current	Station	A			
	Pump	A			
10. Voltage	V				
	Station	KW			
11. Power	Pump	KW			
	12. Acc. Operation Hour		H		
13. Acc. Power	Station	KWH			
	Pump	KWH			
14. Discharge Water	m <sup>3</sup> /min.				
15. Remarks			Start		Stop

FIGURE 4-2. PUMP PERFORMANCE CURVE No. 1 PUMPING STATION

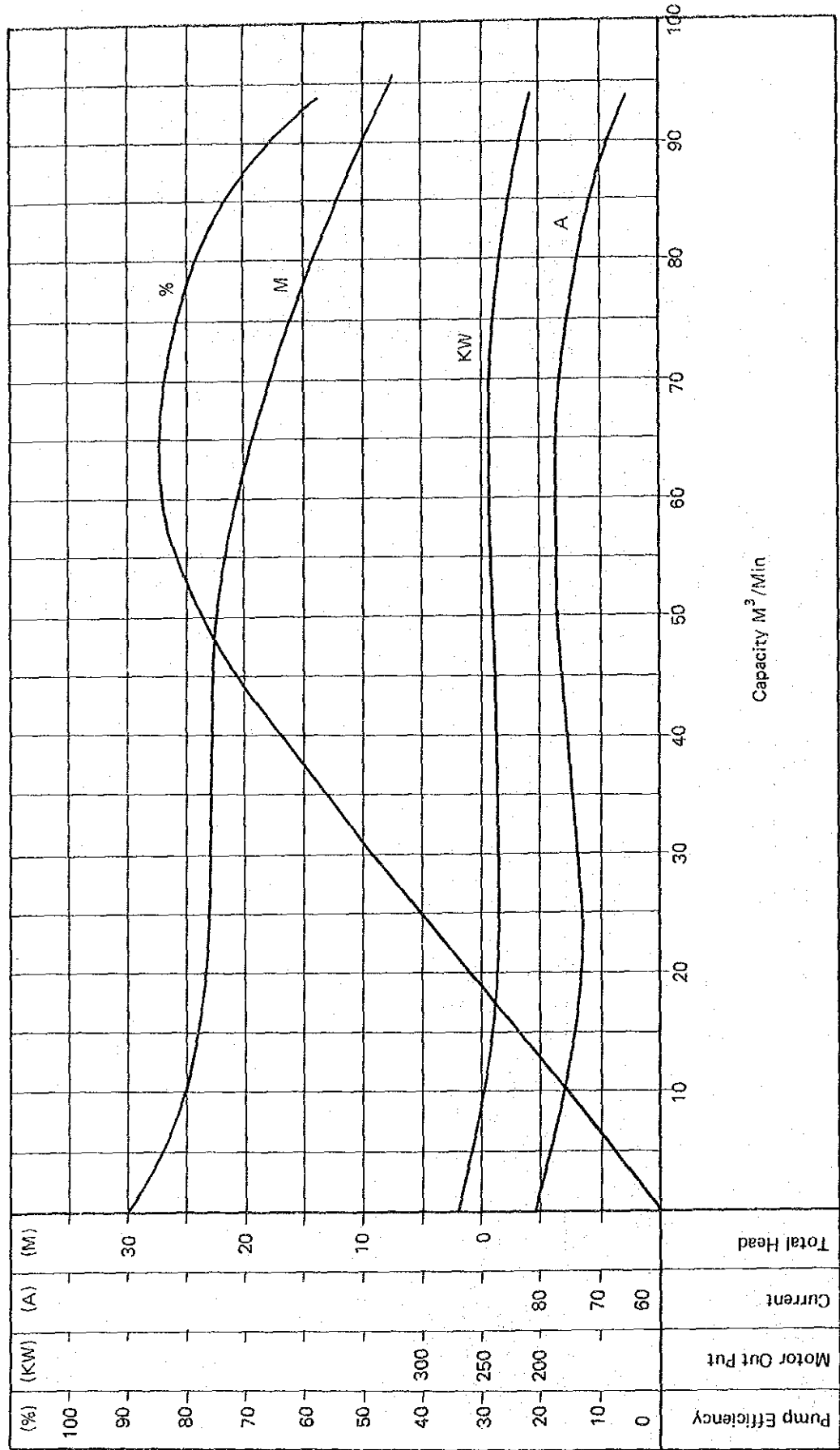


FIGURE 4-3. No. 3 STATION PERFORMANCE CURVE

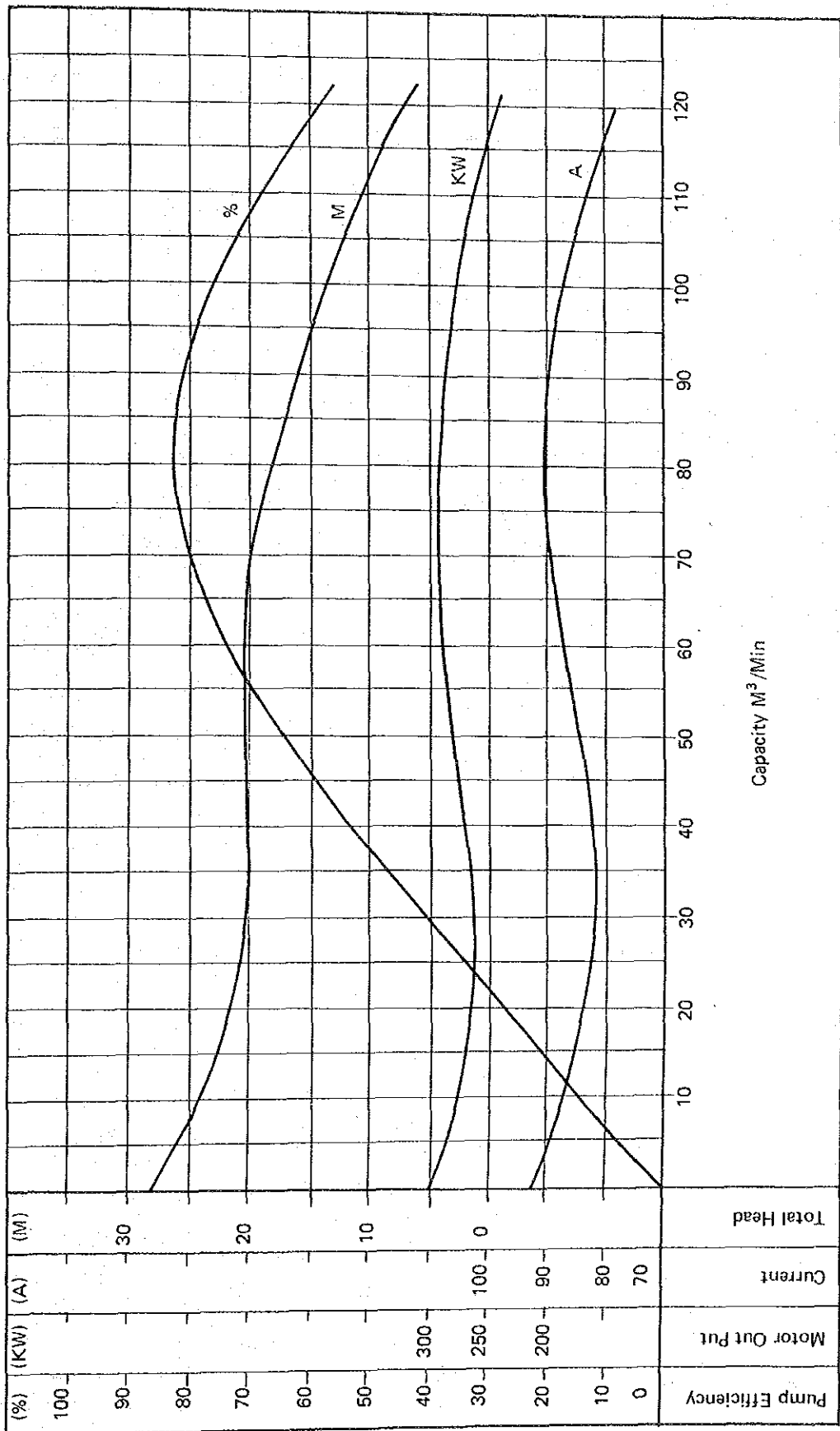
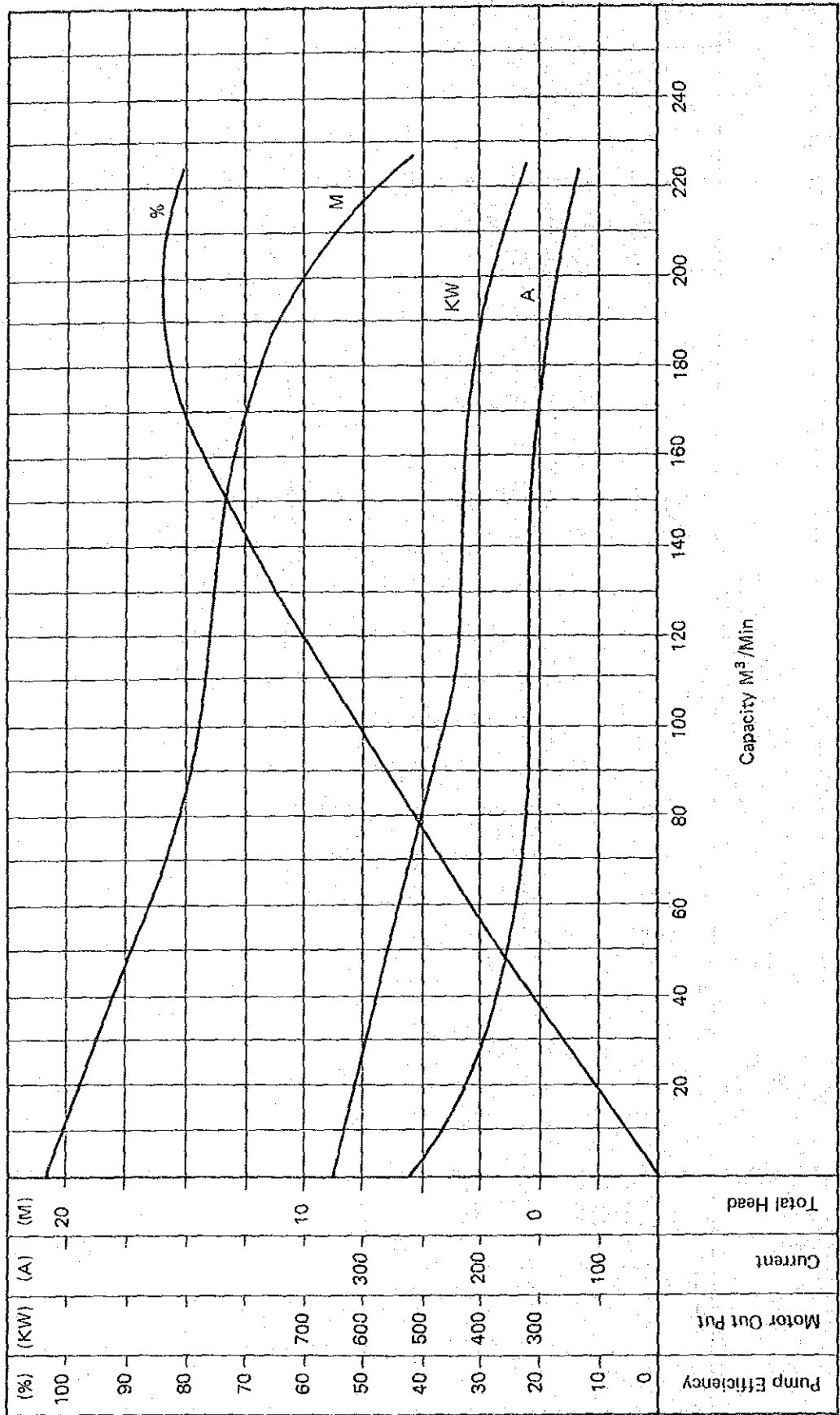


FIGURE 4-4. No. 2 STATION PERFORMANCE CURVE



CHAPTER V. INSTITUTIONAL DEVELOPMENT



## CHAPTER V. INSTITUTIONAL DEVELOPMENT

### 5.1. Organization and Definition

#### 5.1.1. Institutional Development Division (IDD)

As a support division of the system, the general functions of the IDD are to attend to the judicious use of water and land resources for optimum economic benefits and overall farmers development in the system's service area through the organization and institutionalization of farmers groups, technical education and trainings, farm extension services, agricultural information, dissemination and agri-business projects, tie-up program with other Government instrumentalities and the private sector, monitoring and evaluation of programs and coordination works for integration of resources.

#### 5.1.2. Agricultural Development Coordinating Council (ADCC)

The project ADCC was organized in compliance with the requirement of the loan to improve agricultural development output in the service area.

Specifically, the council aims to:

- (a) Integrate and coordinate the delivery of agricultural support services to the farmers,
- (b) Integrate efficient utilization of farm credit and repayment of financing institutions; and
- (c) Promote a systematic approach in marketing farm produce.

#### Members of the Council

15 officers formed the nucleus of the council with the Governor of Isabela as Honorary Chairman, MRIIS O/M Manager as Chairman and the TDD Division Manager as Executive Secretary.



### 5.1.3. Irrigators' Association (IA)

This is a canal-based pre-cooperative organization having juridical personality whose membership includes all members of FIGs in a lateral or secondary level using irrigation water as an effective tool to continue and instill discipline among water-users serve by the lateral. It operates along cooperative principles and practices and structures like a cooperative. It performs the simplest economic and service function's for its members.

#### (1) Organizational Objectives

The IA generally aims to provide farmers better identity and dignified level of economic and social existence in the mainstream of our society. By getting farmers to effectively organize and work together in solving farm problems, the program aspires to improve member quality of life by providing the incentives and motivation to attain the following:

- (a) Educate/train farmers to work as a group with proper water management for increase production and income.
- (b) Establish a homogenous common-interest-motivated group where essential agricultural farm services could be channelled under a proper approach.
- (c) Develop an instrument for setting up means of generating and building up capital that ensures operational development and survival of farmers' groups.
- (d) Serve as channel for continuing education and training of members on agri-institutional modules needed for advancement.
- (e) Develop modules that would teach water users govern their affairs and
- (f) Establish a stable step toward the formation of strong farmers association/cooperatives in the future.

## (2) Organizational Framework

IAs are organized from a nucleus of 2-3 adjacent FIGs with a minimum membership of 25. It operates as a non-stock corporation registered with the Securities and Exchange Commission (SEC).

### 5.1.4. Farmers Organization

The protracted search for a credible farmer development program has spawned four major schemes into a well defined and simplified strategies. These are the Supervised Credit Program (M-99); Agrarian Reform Program; Cooperative Development Program (SN); and the Irrigation Development Program.

These programs are not, however, sure fire solutions to the nagging problems of how to provide our farmers a dignified social and economic existence and institutionalize them into strong dynamic groups. They are only antidotes and are wracked with certain limitations.

On this score, the MRMP thru its Irrigation Development Program shared its efforts to the three complimenting programs particularly along cooperative and institutionalized concept.

In 1975, the organization of Farmers Irrigators Groups (FIG) within every 50 ha unit serve by one turnout basically initiated a two-way working relationship between the irrigation water users and the various agricultural support agencies. However, a semblance of organizational viability cannot be fully attained because the FIG are devoid of the juridical personality to undertake socio-economic activities vital to its survival.

This situation prodded the ADCC to undertake the transformation of FIGs into formel cooperative farmers group called Irrigators Association (IA) in 1980.

The program aimed to provide these farmer organizations the juridical personality to undertake socio-economic activities based in the assumption that irrigation water is an important economic commodity which can be used as the best rallying instrument to instill individual and group discipline to promote cooperative endeavours among water users.

## 5.2. Farmers Organization and Institutional Development

### 5.2.1. Organization and Development Activities

The organization, development and maintenance activities for the remaining and existing FIGs and IAs in the service area has to be accelerated to be able to meet the objective of covering at least 50 percent of the service area with strong Irrigators Association by 1988. Present accomplishment (ending December 1985) indicated 237 IAs organized covering about 40,766 ha which is approximately 42 percent of the target service area. There remains about 60 IAs more to be organized to meet the objective. Prior to the organization of IAs, however, there are series of preparatory activities needed among them the conduct of orientation, training of farmers, organization of FIGs and coordination works.

The retrenchment policy of the agency is expected to affect the pace of the organization work. It must be noted that it took project personnel three (3) years to organize 168 IAs with full personnel force for an average of 56 IAs organized per year. It follows there fore that with a reduced personnel the remaining 60 IAs may not be organized and developed by 1987. The one alternative solution is for the O&M staff to assume full responsibilities over the supervision, development and maintenance of strong IAs in order to allow the IDD personnel to concentrate on the organization and strengthening of the other IAs.

### 5.2.2. The Lateral Turnover Program

#### (1) Definition of NIA-IA Lateral Turnover

When the duties and responsibilities of clearing and maintaining of canal sections are transferred from a ditchtender to

a registered Irrigators Association through a bilateral agreement signed by NIA and IA, the term used is Lateral Turnover.

(2) Objectives

The principal objective of the program are:

- (a) to develop the active participation of farmers in water management,
- (b) to promote mass payment of irrigation service fees in order to reduce the expenses on collection,
- (c) to facilitate the development of group discipline among IA members, and
- (d) to reduce the cost of maintaining irrigation canals.

(3) Scope

Normally, an IA is awarded one DT section only of 3.5 km. However, there are cases when an IA accepts less than one or more than one DT section. The DT occupying the area is transferred to another section after the agreement is signed. In newly generated areas, ditchtender sections are immediately awarded to interested IAs.

Clearing of the DT section is done by the IA members through group work. The agreement does not allow the IA to reward the work to anybody.

The contracting IAs receives ₱7,200.00 per DT's section per annum for maintaining a DT section. Payments are usually made monthly and after the accomplishments are properly evaluated and corresponding reports are submitted to the billing office.

IAs participating in the program are also entitled to commissions in the collection of irrigation service fees (ISF) from its members. For 100 percent collection of ISF the IA gets 3 percent commission.

The IA is permitted to operate the turnout gates and is responsible in the allocation and distribution of water in their area.

Every year, the agreement is renewed, however, it can be terminated anytime with the consent of both parties.

#### (4) Benefits

Both NIA and IAs benefits from the program in the following manners;

- (a) The lateral turnover serves as an important tool for the development of individual and cooperative discipline among IA members through periodic communal work.
- (b) It is also a sure source of income for capital building up of the association.
- (c) It serves as an important linkage between the farmers and the member agencies of the ADCC.
- (d) It reduces the NIA's expenses of maintaining a ditchtender section by an average of ₱ 8,000.00 per annum.
- (e) It also increase the percentage of irrigation fee collection and reduces the cost of ISF collection through mass payment of members.

### 5.2.3. Preparation of Master List of IA

Master List of irrigation area by lot has been prepared manually through preparing a parcellary map. Some data needed for irrigation fee collection is computerized on the basis of the above Master List. Further computerized data management for the preparation/renewal of Master List will be required because of the following reasons;

- (i) The volume of data managed on the number of lots, landowners, and water users are too large to maintain in the manual method, while most of those data shall be renewal season by season.
- (ii) The existing Master List data is managed only plot by plot but is not retrieved from water users. Therefore, no data management from the aspect of personal jurisdiction could be carried out principally. It makes impossible the effective institutional development because of the difficulty of water-users based data management.

For a trial to introduce the proposed computerized data management in the selected IA areas, Form 5-1 to 5-5 are prepared aiming not only to prepare Master Lists of irrigation service area and water users but also to utilize the Master List data for assessment of on-farm facilities and for irrigation fee collection. The explanation on the proposed data-form for Form 5-1 to 5-5 is as follows;

<u>Form No.</u>	<u>Title</u>	<u>Explanation</u>
5-1.	Land data basic card.	Lot information is indicated lot by lot in each card.
5-2.	Master list of irrigation service area.	Summary of above data by FIG.

<u>Form No.</u>	<u>Title</u>	<u>Explanation</u>
5-3.	List of irrigation service area by cultivator.	Cultivator (water user) information is indicated in each card.
5-4.	Master list of cultivator.	Summary of above data by FIG.
5-5.	Area by assessed score on the on-farm/paddy drying facilities.	Assessment form on the on-farm facilities and also the paddy drying facilities by FIG.

#### 5.2.4. Acceleration of IA Organization

- Formulation of Model Irrigators' Association Federation (IAF)-

##### (1) Improvement of Irrigators' Association (IA)

The present IA does not carry out its important function related to the water management on IA area basis. The following IA works shall be made sufficiently and accurately in accordance with the guidance and coordination with the Water Master.

- To judge and summarize the actual service area to be irrigated under the IA guiding and instructing FIG and to report its result to the Water Master.
- To judge and arrange the irrigation area and irrigation schedule requested by farmers through FIG on weekly basis and to report the Water Master.
- To manage the allocated water which is instructed by the Water Master on weekly basis so as to distribute it equally to each turn-out controlled by FIG taking into account the rotation irrigation water supply.
- To report the Water Master any change and problem relevant to the water management during irrigation water supply.



- To cooperate the MRIIS O/M Office for collection of irrigation fee.
- To maintain the turn-overed canal by the MRIIS O/M Office in good condition.
- To borrow the required fund to manage IA.

## (2) Concept of Model IA Federation

The farmers engaging the rice cultivation in the MRIIS area are placed still low income level, even if they receive sufficient irrigation water and increase the paddy production, so that the farm management on the contract basis with dealer prevailing in the MRIIS area shall be improved.

In order to improve the present farm management, especially to improve the agro-service works carried by dealers to retrench the production cost, it is necessary to establish the IA Federation consisting of three to four IAs which manage the agro-dealers, because individual farmer or one IA cannot have power to provide complete agro-service facilities by his or its own financial scale taking into account the investment cost of the facilities.

As for the scale of IA Federation, a little large scale federation consisting of three IAs covering the area of about 1,000 ha, 30 FIG and 700 farm households will be ideal from viewpoint of the present organized Division by MRIIS O/M and the organization power to fulfill the following function;

- To request the cooperation for training of water management, the repair and improvement of on-farm facilities, repair of agro-service equipment, etc. to MRIIS O/M Office.
- To request the fund for procurement and operation of agro-service facilities to Banks and NFA.
- To request the improvement of farming practices and the introduction of new farming technology to extension service staff dispatched by MAF to MRIIS area.

- To negotiate with dealers to procure agricultural equipment and input materials as well as to keep the high selling price of paddy product.
- To borrow the required fund to manage IA.

The organization of IA Federation should be composed of the presidents of IA and its representative is selected among them.

Since the IA Federation will be established to have only function to consider farmer's benefits, it should be operated with only farmers own intension without direct instruction and intension of the governmental agencies concerned, which have only function to carry out the supporting services to the Federation.

NIA should become the core of the supporting agency for IA Federation, because MRIIS O/M Office is the biggest and the most important agency for farmers in the service area and has established, organized and guided to IA for not only the purpose of irrigation water supply but practical farming activity and farming community.

In addition, MRIIS O/M Office can easily support the following services to IA Federation under the present O/M organization;

- Repair of agro-service equipment facilitated in IA Federation could be made at O/M motor pool with low cost compared with market repairing cost.
- On-farm facility improvement required by IA Federation could be made with the support of the O/M equipment and staff.

The concept of IA Federation is the first trial in the Philippines, so that the Model of IA Federation should be established at first with the following reasons;

- Prior to establishment of the IA Federation and carrying out the successful operation in the Federation, the consolidated IA with many farmer's members and supported by them should be organized. There are, however, a few consolidated IA at present in the MRIIS area, because IA was established only recently. In this connection, the Model of IA Federation should be proceeded with selecting the consolidated IA.
- The operation of IA Federation may have such procedure so that the Model should be improved in accordance with its operation result and then the most proper IA Federation will be expanded to the service area.

The Model will be operated and monitored with full support of governmental agencies, especially with NIA Central Office and MRIIS O/M Office in order to achieve the successful result.

In case IA Federation is rather difficult to be established at once due to lack of the consolidated IA groups in MRIIS area, the Model will be made with only one IA at first and then gradually expanded to three to four IAs covering about 1,000 ha in one unit.

### (3) Agro-Service Facilities Provided in IA Federation

The following agro-service facilities will be required for IA Federation in order to retrench the production cost of paddy and to keep the good selling price of paddy.

- Drying pavement to dry up the harvested paddy by solar method is constructed at each Barangay to carry out the work by farmer's family members.
- Mechanical dryer for about 50 percent of the wet season paddy is provided at warehouse on IA basis, because of a few fine days in the wet season.
- Power tiller for land preparation is provided at each Barangay, because of farmers convenience to operate it in the field.
- Power thresher for paddy threshing works at the field is provided on IA basis and lending to farmer in harvesting season.

- Warehouse is constructed near IA President in Barangay to keep the dried paddy in good condition by house-keepers.
- Jeepney is provided on IA basis to transport agricultural input materials and harvested paddy as well as transportation of construction material for improvement of on-farm works. Jeepney is also used for communication purposes between town and Barangay.

Although the agro-service facilities above mentioned are planned on one IA basis, it will be economized if mechanical dryer, power thresher, warehouse and Jeepney are managed by the IA Federation basis, because number of equipment including spare one and number of staff to control them could be reduced in case of large area management.

### 5.3. Monitoring of Farming Activity

Monitoring of farming activity on the basis of the data form in Form 5-6 to 5-11 is proposed. The explanation of data form sheets is as follows;

<u>Form No.</u>	<u>Title</u>	<u>Explanation</u>
5-6.	Plan of farming activity by week.	The form of farming activity by week, which will be fixed at FIG level prior to water distribution in each cropping season.
5-7.	Monitoring of actual farming progress.  (If it is impossible to prepare this form, this form will be omitted)	Monitoring form on actual farming schedule and irrigation fee collection (The form to submit above data to District Office)
5-8.	Record of farming activity.	Record of farming activity to prepare the above form, which is prepared and hold by WM.
5-9.	Weekly report on irrigated and planted area.	The form to repair the planted area and the expected harvest date.
5-10.	Monitoring of irrigated and unirrigated area.	Monitoring form on the irrigated and unirrigated area by cropping season.
5-11.	Monitoring of cropping intensity and paddy production.	Monitoring form on the cropping intensity and paddy production.

BASIC CARD ON LAND DATA

Serial Land Number	Municipality	Barangay	Block No.	Lot No.	Parcel No.	Name of Farmers' Organization	
	Address			WM/FIG. No. :	IA No. & Name:		
Address and Land Owner Name	Municipality	Barangay	Block No.	Lot No.	Code No.	Name	
	Address			Form of Land Holding		Ownership/Title	
Land Registration	Registered	Actual	Registered	Land Area (m <sup>2</sup> )	Map No.	Canal	
	Land Area	Service Area	Cadastral	Parcellary	Main	Lateral	Sub-lateral
Irrigation Fee Imposing Land	Land Area	Imposing Rate	Assessment of On-farm Facilities				
	For Imposing Land	Exempted	Irrigation	Drainage	Roads		
Date Revised	Date 19 / (Month) / (Date)		Prepared by: _____				
			Checked by: _____				

MASTER LIST OF IRRIGATION SERVICE AREA

Main/Lateral Canal:										Irrigation Block No.:			District No.:							
Turn-out No.	Lot & Parcel No.	Land Category	Service Area		Land Owner			Cultivator			Assessment of On-farm Facilities									
			Full Area	Fee Exempted	Owner	Title	Name	Address	Tenure Status	Name	Address	Irrigation	Drainage	Road						

Code No. of Cultivator:

LIST OF IRRIGATION SERVICE AREA BY CULTIVATOR

1. Name of Cultivator: \_\_\_\_\_
2. Address: \_\_\_\_\_
3. IA and IA Position: \_\_\_\_\_

Season & Year	FIG No.	Parcel No.	Land Category		Area		Land Owner			Revise of Data				
			Registered	Actual	Registered	Service Area	Ownership	Title	Name	Address	Tennual Status	Date of Revise	Cause	



FORM 5-4. MASTER LIST OF CULTIVATOR

TURN-OUT (T.A.) NO.: \_\_\_\_\_

		Cultivator			Service Area			District/WM Division No.:	
No.	Code No.	Name	Address	Tenuat Type	Total	Service Area		Date of Entry	
						Inside T.A. Area	Outside T.A. Code No.		

Note: Tenuat type will be classified as follows;

- Full owner --- Ex. owner, amortizing owner with CLT, amortizing owner CLT under verification
- Part owner --- Ex. owner/lessee, amortizing owner with CLT/lessee etc.
- Lessee, Share Cropper

AREA BY ASSESSED SCORE ON ON-FARM/PADDY DRYING FACILITIES

MC/Laterals:		WM Division No.:			Irrigation Block No.:			District No.:						
Turn-Out No.	Service Area	On-Farm Facilities						Remarks						
		Irrigation		Drainage		Road			Drying Pavement					
		1	2	3	1	2	3			1	2	3		

Note: 1. The data on the service area by assessed score is provided in accordance with the land data in Form No.1.  
 2. The scoring means as follows:  
 1--- Excellent/Good or no problems    2--- Slightly poor but used for production  
 3--- Poor or non-used for production

FORM 5-6. PLAN OF FARMING ACTIVITY BY WEEK

District : \_\_\_\_\_ NW: \_\_\_\_\_

Season and Year: \_\_\_\_\_

No.	FIG No.	Service Area Programmed Area		Area by Farming Activity for Paddy														Area by Farming Activity for Other Crops																				
		Paddy	Others	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Crop Area	No. of Week			

Legend: 

L.S.	L.P.	C.M.
------	------	------

 L.S.: Land Soaking L.P.: Land Preparation C.M.: Crop Maintenance

MONITORING OF ACTUAL FARMING PROGRESS FOR 19\_\_\_\_, \_\_\_\_\_ CROP

MC/Laterals:		Turn-out No.:		Division No.:		GK:		WM:		District Number:	
Farm Lot Number (1)	Name of Cultivator (2)	Programmed Irrigated (3)	Irrigation Accomplished (4)	Planted (5)	Collectible (6)	Exempted Date (7)	L.S. (8)	L.P. (9)	Planting (10)	T.D. (11)	Harvest (12)

Date of Registration by \_\_\_\_\_ Date: \_\_\_\_\_  
 Head Office \_\_\_\_\_ Sign: \_\_\_\_\_

- Note:
1. The data sheet, of which the data in the columns from (1) to (3) are put into by Engineering & Operation Division (E.O.D) of Head Office, is distributed to WM at least 20 days before programmed irrigation practice.
  2. The actual farming activity on the farm lot basis is monitored by FIG and GK under the direction of WM and recorded on the daily basis.
  3. The data sheet is hold in each Division, and Engineering & Operation Division of Head Office for monitoring the data time to time as required.
  4. The data on the actual irrigation accomplishment and farming progress are used to estimate collectible amount of irrigation service fee instead of data.





MONITORING OF IRRIGATED AND UNIRRIGATED AREA

MC/Laterals:		Irrigated Area				Unirrigated Area (Wet Season)				District No.:			
Year	Turn-Out No.	Service Area	Dry Season		Wet Season		Total	Undeveloped	Lack of on-farm Facilities	High Elevation	Drainage Problems	Financial Problems	Others
			Area	%	Area	%							
		(ha)	(ha)		(ha)		(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)

WM Division No.:

Irrigation Block No.:

MORITORING OF CROPPING INTENSITY AND PADDY PRODUCTION

MC/Lateral:	WM Division No.:										District No.:					
	Turn- Out No.	Service Area	Cropping Inten- sity	Total			First Crop (Dry)			Second Crop (Dry)			Third Crop			
Planted Area				Produc- tion	Yield	Planted Area	Produc- tion	Yield	Planted Area	Produc- tion	Yield	Planted Area	Produc- tion	Yield		
	(ha)	(%)	(ha)	(ton)	(ton/ha)	(ha)	(ton)	(ton/ha)	(ha)	(ton)	(ton/ha)	(ha)	(ton)	(ton/ha)	(ha)	(ton/ha)

Note: Weight of paddy ----- converted weight of dry paddy (14% moisture content)



#### 5.4. Monitoring of Farm Economy

For confirming the crop earning and farm income level in the MRIIS Area, the farm economic survey of sample household must be executed once a year. Due to the vastness of the Service Area, it is necessary that at least 50 of beneficial farm households shall be selected by random sampling method.

Monitoring of farm economy will be implemented by the data form of Form 5-12 which includes the following items:

1. Family composition and working state
2. Area of land holding
3. Crop production
4. Crop production cost
5. Use of crop products
6. Farm-gate prices of agricultural products
7. Inventory of livestock and poultry
8. Inventory of capital investment
9. Non-farm income source
10. Farm Debt
11. Household expenditure

Farm No.	—
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MAGAT River Integrated Irrigation System, Philippines

Name of Farmer \_\_\_\_\_ Date interviewed: \_\_\_\_\_

Address: Barangay : \_\_\_\_\_ Enumerator: \_\_\_\_\_

Municipality: \_\_\_\_\_

Province : \_\_\_\_\_ District No.: \_\_\_\_\_

Region : II WM No.: \_\_\_\_\_

I. Family Composition and Working State

No.	Family Composition at Present				Working State (Apr., 1985 – Mar., 1986)							
	Age	Sex		Student	Days Worked on Own-farm Occupation	Other Farm Occupation			Non-farm Occupation			
		Male	Female			Kind *1	Days Worked	Gross Annual Income *2	Place *3	Kind *4	Days Worked	Gross Annual Income
(1)	(2)	(3)	(4)	(5) days	(6)	(7) days	(8)	(9)	(10)	(11) days	(12)	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

Note: \*1 . . . Kind of work: Paddy transplanting = 1, Paddy harvesting = 2, Other work of paddy cultivation = 3, Others = 4

\*2 . . . Income in cash and kind (ex. ₱1,500, Paddy 50 kg).

\*3 . . . Place of worked: Inside the municipality = 1, Outside the municipality = 2, In and around Manila City = 3, Other provinces = 4, Other country = 5

\*4 . . . Kind of work: Cotage industry = 1, Transport = 2, Peddling = 3, Sea fishing = 4, Inland fishing = 5, Forestry = 6, Construction works = 7, Others = 8

2. Area of Land Holding (at Present)

(Unit: ha )

Land Items	Owned (1)	Rented (2)	Leased (3)	Total (4)
1. Paddy Field				
2. Upland Field				
3. Field for Permanent Crops*				
4. Pasture Land				
5. Wood Land				
6. House Lot				
7. Others (Specify : )				
Total				

Note: \* ... included orchard

3. Rent and Leased Fee of Land (Apr., 1985 - Mar., 1986)

Items	1. Paddy	2. Upland Field	3. Field for Orchard or Permanent Crops	4. Others*	Total
<u>1. Rent fee per year</u>					
a. Payed in cash (₱) (1)					
b. Payed in Kind					
°Paddy (kg) (2)					
°White rice (kg) (3)					
°Others ( ) (4)					
<u>2. Leased fee per year</u>					
a. Received in cash (₱) (5)					
b. Received in Kind					
°Paddy (kg) (6)					
°White rice (kg) (7)					
°Others ( ) (8)					

Note: \* ... included the area of pasture and wood land, house lot and others.

4. Crop Production and Production Inputs

Name of Crop (Planted period*1 in the normal year)	Crop Production					Main Source of Irrigation Water*2	Seeds or Seedling	Total Inputs (Apr., 1985 - Mar., 1986)			Animal or Machinery Land Preparation Other Works
	Crop Year (Apr. - Mar.)	Total Area (4) ha	Planted Area (5) ha	Harvested Area (6) ha	Production (7) kg			Fertilizer	Pesticide		
									Name or Total Amount / Value	Name or Total Amount / Value	
1. Paddy ( - )	1983/84 (1)										(14)/(15) hrs [A], [M]*3
	1984/85 (2)						1.				[A], [M]
	1985/86 (3)						2.				[A], [M]
2. ( - )	1983/84						1.				[A], [M]
	1984/85						2.				[A], [M]
	1985/86						3.				[A], [M]
3. ( - )	1983/84						1.				[A], [M]
	1984/85						2.				[A], [M]
	1985/86						3.				[A], [M]
4. ( - )	1983/84						1.				[A], [M]
	1984/85						2.				[A], [M]
	1985/86						3.				[A], [M]
5. ( - )	1983/84						1.				[A], [M]
	1984/85						2.				[A], [M]
	1985/86						3.				[A], [M]

Note: \*1... Planted period: ex. (Mid. Jul. - Last Nov.)  
 \*2... Irrigation water source: Rain = 1, River = 2, Swamp or pond = 3, Irrigation canal = 4, Well = 5, Others = 6  
 \*3... Check animal or machinery, Animal A, Machinery M

Farm Economic Survey, JICA

4-1. Total Labor Input of Crop Production (Apr. 1985 - Mar. 1986)

Farm No.

Master Plan Study on the Operation and Maintenance of MAGAT River Integrated Irrigation System, Philippines

Crop Name: \_\_\_\_\_ (month) (day) (month) (day)  
 Variety: \_\_\_\_\_  
 Planted Area: \_\_\_\_\_ ha Harvested Area: \_\_\_\_\_ ha

ha

Operation	Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Total			
	Fam	ily	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.	F.	H.		
1. Seed ° Man-days ° Animal-days ° Tractor ( )																												
2. Plowing ° Man-days ° Animal-days ° Tractor ( )																												
3. Harrowing & Leveling ° Man-days ° Animal-days ° Tractor ( )																												
4. Trans- planting ° Man-days ° Animal-days ° Machine ( )																												
5. Weeding ° Man-days ° Weeding Machine																												
6. Fertilizing ° Man-days																												
7. Spraying ° Man-days ° Sprayer ( )																												
8. Water Management ° Man-days ° Irrigation Pump																												
9. Harvesting ° Man-days ° Machine ( )																												
10. Threshing ° Man-days ° Animal-days ° Thresher ( )																												
11. Transport (House Field) ° Man-days ° Animal-days ° Machine ( )																												

5. Use of Crop Products (Apr., 1985 – Mar., 1986)

Items	1.	2.	3.	4.	5.
	kg	kg	kg	kg	kg
1. Sold					
2. Family consumption					
3. Seeds					
4. Feeds					
5. Payment for farm works					
6. Stock					
7. Others (Specify)					

6. Quantity and Farm-gate Price of Sold Crop Products (Apr., 1985 – Mar., 1986)

Crops to Whom sold	Merchant			Others ( )		
	Quantity	Total value	Form of products*	Quantity	Total value	Form of products*
	(1) kg	(2) ₱	(3)	(4)	(5) ₱	(6)
1.						
2.						
3.						
4.						

Note: \* ... Form of products: paddy, white rice, fresh, dried, with shell, etc.

7. Wage Rate in the Project Area (Apr., 1985 – Mar., 1986)

Items	Male Labor				Female Labor			
	With Meal		Without Meal		With Meal		Without Meal	
	Wage in Cash	Wage in Kind*	Wage in Cash	Wage in Kind*	Wage in Cash	Wage in Kind*	Wage in Cash	Wage in Kind*
	₱		₱	₱		₱		₱
1. Paddy cultivation								
a. Transplanting								
b. Harvesting								
c. Others ( )								
2. Others ( )								
3. Others ( )								

Note: \* ... Wage in kind: ex. ... paddy 50 kg

8. Inventory of Livestock and Poultry

Items	Unit	1. Buffalo	2. Cattle	3. Hogs	4. Chickens	5. Ducks	6. Others ( )
First of Apr., 1985	No. (1)						
Bought	No. (2)						
	Value* (3)						
Born	No. (4)						
Sold	No. (5)						
	Value* (6)						
Dead	No. (7)						
Consumed at home	No. (8)						
Others	No. (9)						
End of Mar., 1986	No. (10)						

Note: Value\* . . . Value of livestock and poultry (ex. . . . ₱1,500, Paddy . . . 50 kg)

9. Inventory of Capital Investment at Present

Items	Number	Used Years	Price *1
1. House (dwelling)			₱
2. Warehouse for rice storage			
3. Shed for animals			
4. Tractor*2, 4 wheel, horse power ... ( HP)			
5. Hand tractor*2, horse power ... ( HP)			
6. Irrigation pump set			
7. Sprayer			
8. Other machineries for cropping			
a. (name) (capacity)			
b. ( , )			
c. ( , )			
9. Plow for animal			
10. Harrow for animal			
11. Bull cart			
12. Thresher, by man-power, by engine			
13. Rice mills, capacity ( )			
14. Truck quantity of ventilation ... ( cc)			
15. Private car, quantity of ventilation ... ( cc)			
16. Others			

Note: \*1 ... present price of new one

\*2 ... included accessories



10. Non-farm Income Source (Apr., 1985 – Mar., 1986)

Source	Annual Income	
	in Cash	in Kind
1. Hire of work animals to others		
2. Hire of farm machineries and/or accessories to others		
3. Interest earned on money loaned to others		
4. Allowance from family members		
5. Receipt of gift from relative and others		
6. Others ( )		
Total		

11. Farm Debt (Apr., 1985 – Mar., 1986)

Purpose	Source of Loan*1	Total Loan		Annual Repaid Loan		Remained Debt*2	
1. Crop Production*3							
a.							
b.							
2. Land Loan							
3. Household Facilities							
a.							
b.							
4. Education							
5. Others (Specify)							
a.							
b.							
Total							

Note: \*1 . . . Obtain a loan from whom: Merchant = 1, Landowner = 2, Relative = 3, Neighbors = 4, Others = 5

\*2 . . . Remained debt to be repayed at present.

\*3 . . . Debt for crop production: ex. fertilizers for paddy.

12. Household Expenditure

Items		Amount		Amount per year	
		Payed in Cash	Payed in Kind		
		₱		₱	
1. Food per month	a. Rice and other grains				
	b. Beans				
	c. Eggs				
	d. Meat	i. Beef			
		ii. Pork			
		iii. Chicken			
		iv. Duck			
		v. Others ( )			
		total			
	e. Fish	i. Freshwater fish			
		ii. Marin fish			
		total			
	f. Vegetable				
	g. Other viands				
	Sub - total				
2. Soft drinks, beverages and etc per month					
3. Tobacco / Cigarettes per month					
4. Housing per year	a. House rent				
	b. House improvement				
	c. House operation				
	d. House furnishing and equipment				
		Sub - total			
5. Fuel light and water per year					
6. Clothing per year					
7. Personal and medical care per year					
8. Transportation and communication per year					
9. Recreation per year					
10. Education per year *					
11. Tax per year					
12. Others per year ( )					
Total					

Note : \* ... including allowance for student.



## CHAPTER VI. TRAINING



## CHAPTER VI. TRAINING

### 6.1. Importance of Training Program

Irrigation people nationwide recognized that economic, social, cultural or political development depend on physical and human resource. The development of human resources is the most basic requirement of total development.

In irrigation operation, the development of knowledge, skills and capacities of people engaged in the management and operation of irrigation system is indispensable because they assume certain responsibilities in irrigation planning and operation. Also, experience tells us that complete and improved irrigation structures and facilities does not insure conservation of irrigation water and reduction in operation cost but have to be coupled with supervision of well trained, job oriented, capable and dedicated operation personnel and the positive response and support of water beneficiaries.

### 6.2. Objectives

The objectives of the training program are:

- a. Professional development of effective operation's personnel and
- b. Farmer's development - skills, positive behaviors, attitudes and direction.

### 6.3. Training Aspects

The main feature of the program is to develop skills and capabilities of system personnel and farmers in the irrigation

process specifically the responsibilities in planning, developing and executing irrigation schedule and better understanding and support on all operation and maintenance activities. To achieve this, several important aspects are deeply considered as follows:

- a. Irrigation Water Management will cover planning and implementation of water deliveries, data collection such as rainfall, evaporation, seepage and percolation rates, reading and recording data from control and measuring devices, determination of water requirements and accounting of water used, cropping pattern/calendar development, supervision and control of water deliveries, control of surface drainage/losses and assessment of farm and system efficiencies.
- b. Irrigated crop production and management will involve primarily rice cultural practices; pest and disease control, weed control, fertilize management, farm credit and related inputs.
- c. Human Resource Management - trainees will develop and put to use the effective approaches of planning, organizing, leading and controlling his resources. Subjects will include management process, levels of communication, leadership and human relations, reports and records keeping and office policies.
- d. Institutional Development

Three major phases are considered essential under this aspect and these are organization activities, development activities, and maintenance activities.

#### 6.4. Training Methodology

The training program for O & M personnel and farmer water users are categorized as follows:

- a. Regular Trainings
- b. Orientation Courses
- c. Refresher Courses
- d. Seminar Workshops
- e. Educational Trips
- f. Pilot Demonstration Areas

Designing any program falling under the six (6) categories mentioned will be primarily based on the following elements:

- a. General/specific objectives
- b. The desired/expected performance
- d. Measurement of actual performance or efficiency/deficiency

##### 6.4.1. Regular Training Program

This is provided especially when a new job, idea, objective, position or status is desired to be attained.

- a. Area Engineer - Training Scheme
  - Phase I - Two weeks live-in seminar-workshop
  - Phase II - Consist of one crop (5 months) of on-the-job practice
  - Phase III - Consist of performance and program evaluation
  
- b. Assistant Water Management Technicians/IA Advisers
  - Phase I - Two weeks orientation field practice
  - Phase II - Two weeks live-in seminar training
  - Phase IIIa - One crop (5 months) on-the-job practice
  - Phase IIIb - Two weeks live-in seminar-training
  - Phase IV - Performance and program evaluation



- c. Gate Keepers/Ditchtenders - this consist of two-day tell-show-do activity in the classroom and in the field. Evaluation is made in the field on the first crop of development.
- d. Farmers - They are categorized in two, namely:
  - a) Officers of Farmers Organization (Farmer-Leaders)
  - b) Members

The growth and development of irrigated agriculture is dependent on farmers group action.

The organization and training of farmer water users into Irrigators Group or Irrigators Association will greatly enhance the participation and involvement of farmers in implementing any irrigation program.

The training period will be variable ranging from 2-5 days seminar-workshop followed by one crop performance monitoring. Method of presentation will follow a tell-show-do process.

In the irrigation water management aspect, emphasis will be on water distribution from the turn-out to the individual lots.

Since it is quite difficult to formally train all farmers, the farmer-leaders, GK/DT, WM will, after acquiring training skills/knowledge, handle training of farmers within their area of responsibility.

#### 6.4.2. Methods of Instruction

During the conduct of the training course, methods of instruction will vary depending on the objectives of the course. These are:

- a. Lecture and open forum;
- b. Workshop and group discussions;
- c. Buzz sessions;
- d. Practice sessions and field demonstrations;
- e. Case studies; and
- f. Field trips

To hasten the learning of the trainees lecture handouts, reading materials and programmed text shall be provided in advance.

#### 6.5. Venue of Training

Regular trainings and other courses that are live-in nature will be conducted at the MRIIS Integrated Training Center at Echague, Isabela.

On crop on-the-job training will be conducted in designated district or laboratory areas in the four districts of the system for intensive supervision of the program.

Short duration courses usually with one day duration may be likewise conducted as the need arises.

#### 6.6. Organization and Management of the Training Program

The overall responsibility for the conduct of the Training Program lies on the Engineering and Operations and the Institutional Development Divisions.

The training staff shall be drawn from the two Division although resource speakers from the Central Office or other agencies may be invited if needed.

For the on-the-job phase of the training, district laboratory areas will be established in the three districts where trainees will undergo field practices.

While on the training, trainees will be under the joint technical supervision of the District and Institutional Development Division. However, the Engineering and Operation Division will strongly support the program.

#### 6.7. Evaluation of the Training Program

Evaluation will be performance - oriented and will be concentrated on the measures attached to the objectives. Efficiency and effectiveness of the training program will be assessed on the basis of process and result evaluation.

To evaluate the effectiveness of the training and the performance of trainees is a difficult task because of the complexity of inter-related factors involved, such as farmers cooperative and participation in water distribution, condition and function of farm structures and facilities, inter-agency coordination, equitable distribution of irrigation water, implementation of irrigation schedules and others.

In this regard, weekly field visits will be conducted and a system of continuously improving the correct practice will be done.

#### 6.8. Progress Reports

Progress reports covering the program will be made. Action program will be prepared and evaluation of the training program will be carried out on a continuing basis.



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