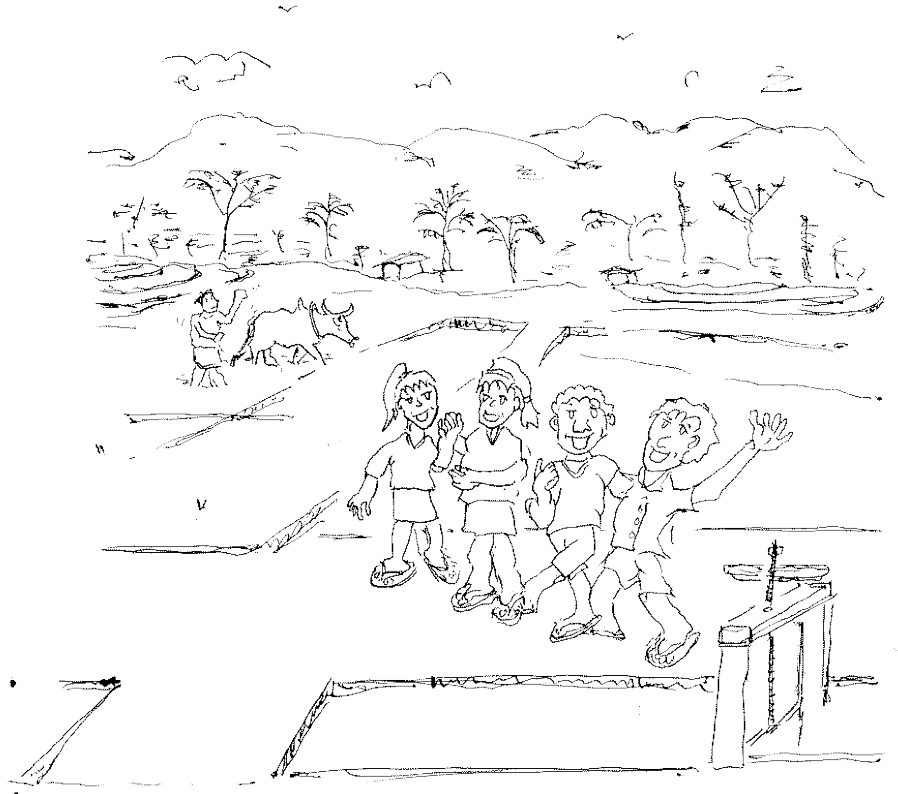


MALIANA I IRRIGATION SCHEME

IRRIGATION MANAGEMENT MANUAL



MARCH 2022

Version 2.0

Ministry of Agriculture and Fisheries (MAF)
Japan International Cooperation Agency (JICA)

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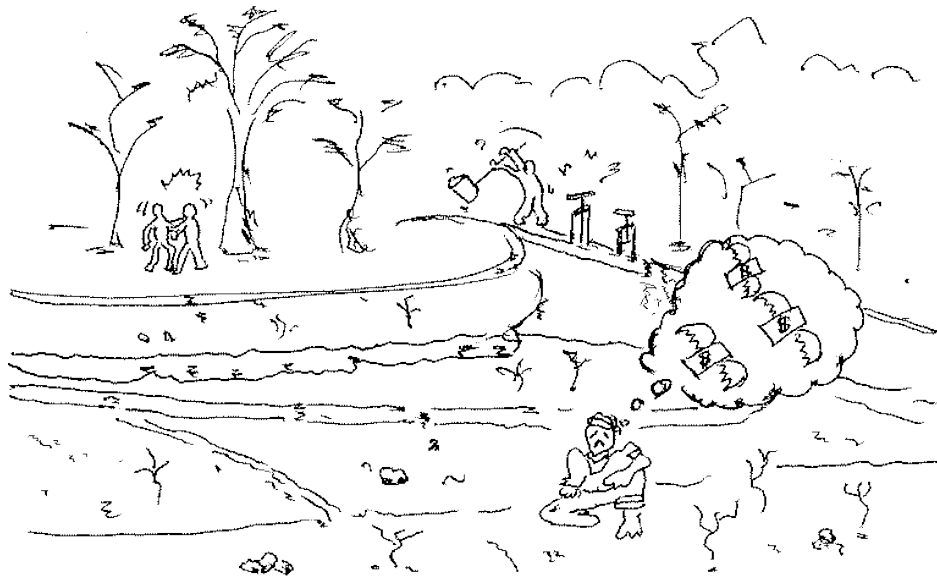
Original manual ;

The Project for Rehabilitation and Improvement of Maliana 1 Irrigation System
 WATER MANAGEMENT MANUAL, February 2009,
 Ministry of Agriculture and Fisheries,

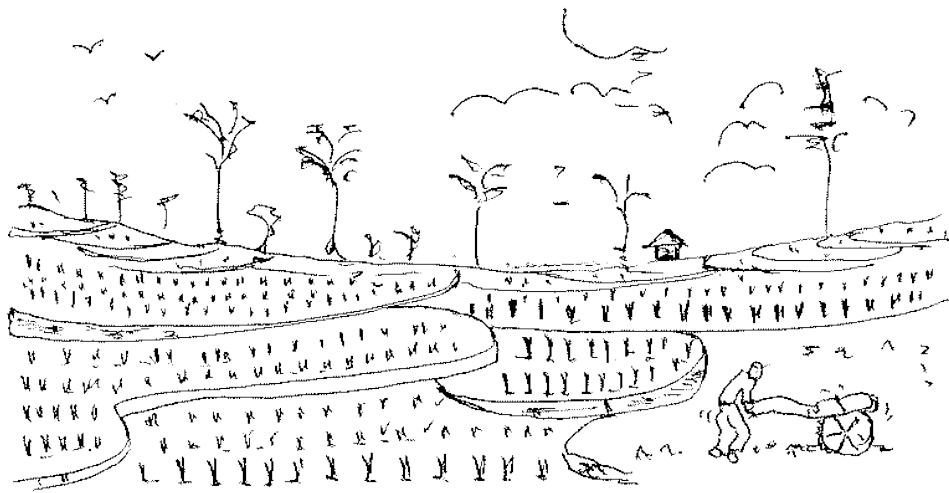
Comparison of Contents

Original in 2009	Updated in 2022
1. Irrigation water Management in Maliana I System	Updated
2. Facility of Irrigation System in Maliana I System	Unchanged
3. Role of Irrigation Facility	
4. Operation	
4.1 Headworks Operation for Gatekeeper	Updated
4.2 Turnout and Stoplog Operation for Farmers	Updated
4.3 Irrigation Schedules for Right Use	Updated
5. Maintenance	Unchanged
5.1 Maintenance of Structures and Daily Inspection	
5.2 Maintenance of Structures and Long-term inspection	

1. Irrigation Water Management in Maliana I System

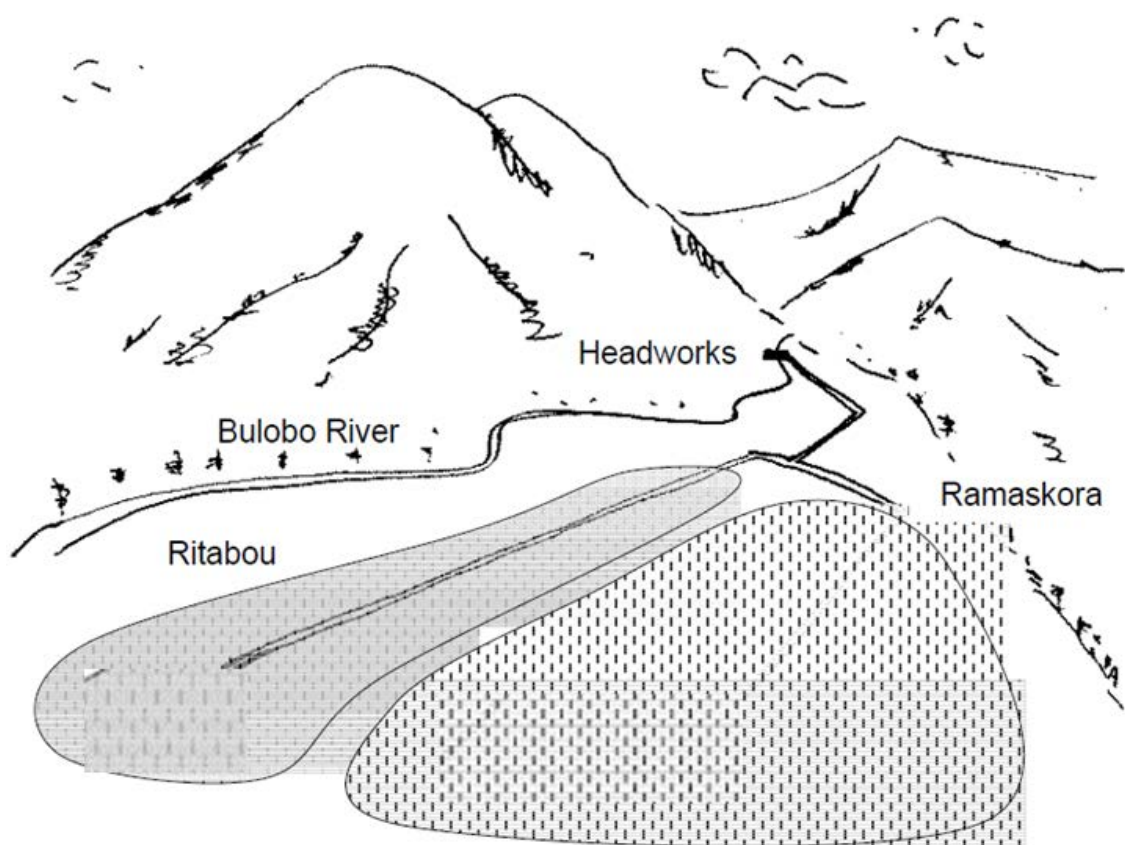


Problem happens when you use irrigation water in wrong way.



Advantage of water use in right way

- Farmers can receive irrigation water equally.
- Prevent the conflict about the water use problems.
- Receive the irrigation water according to the rotation schedule.
- Puddling on time.

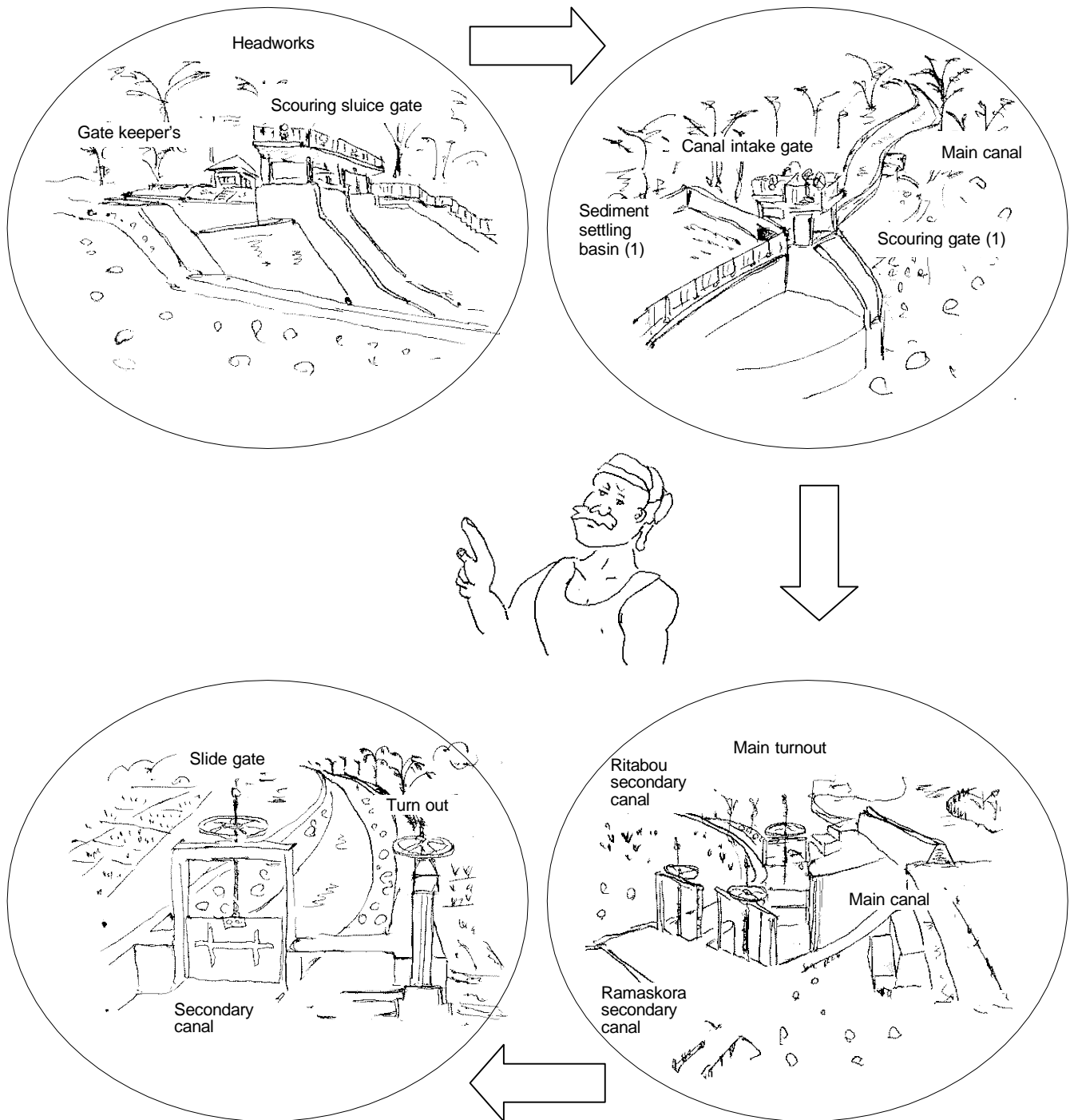


Outline of the Maliana I Irrigation System

Activities	Month												
	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
- Rainy Season		Paddy											
- Dry Season							Paddy						
							Other Crops						

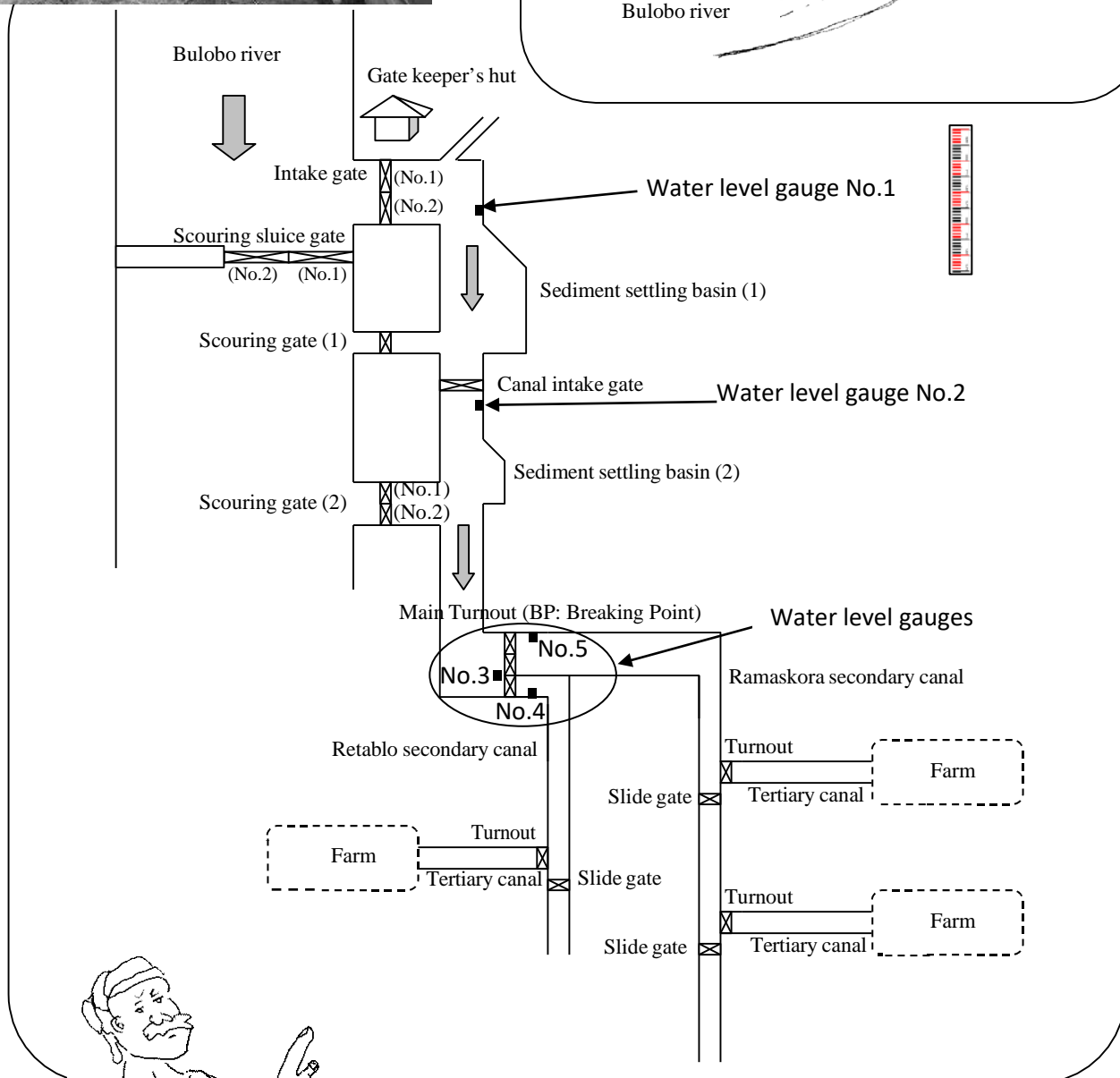
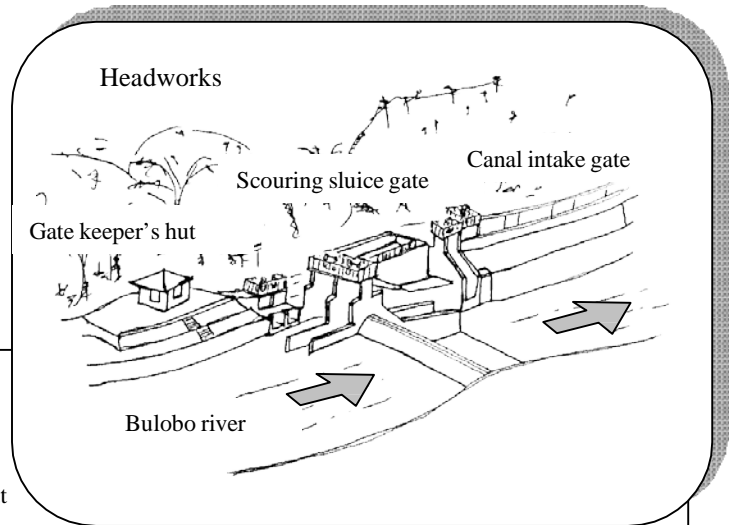
Designed Cropping Schedule

2. Facility of Irrigation System



Scouring sluice gate
(No.2) (No.1)

Gate keeper's hut



Schematic Diagram of Irrigation Facility

3. Role of Irrigation Facility

Headworks Scouring sluice gate



<Headworks>

To divert water from Bulobo river into a main canal for irrigation use.

<Scouring sluice gate>

To prevent inflow of sediment into the main canal.

To remove off sediment settled in front of the intake.

Gate keeper's hut Intake



Screen

<Intake>

To get the irrigation water from Bulobo river.

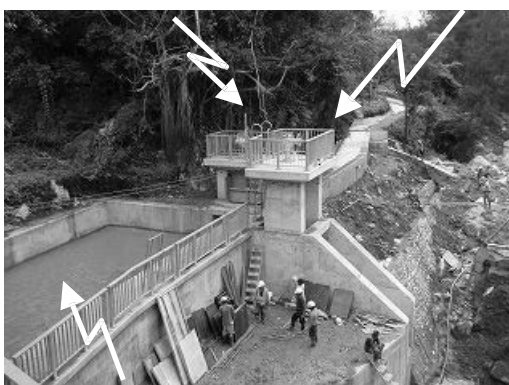
<Screen>

To prevent inflow of trash and floating materials.

< Gate keeper's hut>

The place where gate keepers watch the situation of Bulobo river and the headworks

Canal intake gate Scouring gate (1)



Sediment settling basin (1)

< Sediment settling basin (1)>

To settle the sediment which may flow into the main canal.

< Scouring gate (1)>

To remove off the sediment settled in the basin (1).

< Canal intake gate >

To control irrigation water to inflow into the main canal.

Scouring gate (2)



Sediment settling basin (2)

<Sediment settling basin (2)>

To settle the sediment which may flow into the canal.

< Scouring gate (2)>

To remove off the sediment settled in the basin (2).

Main turnout



<Main turnout>

To divert irrigation water to Ramaskora and Ritabou areas.

Slide gate

Turnout



<Slide gate>

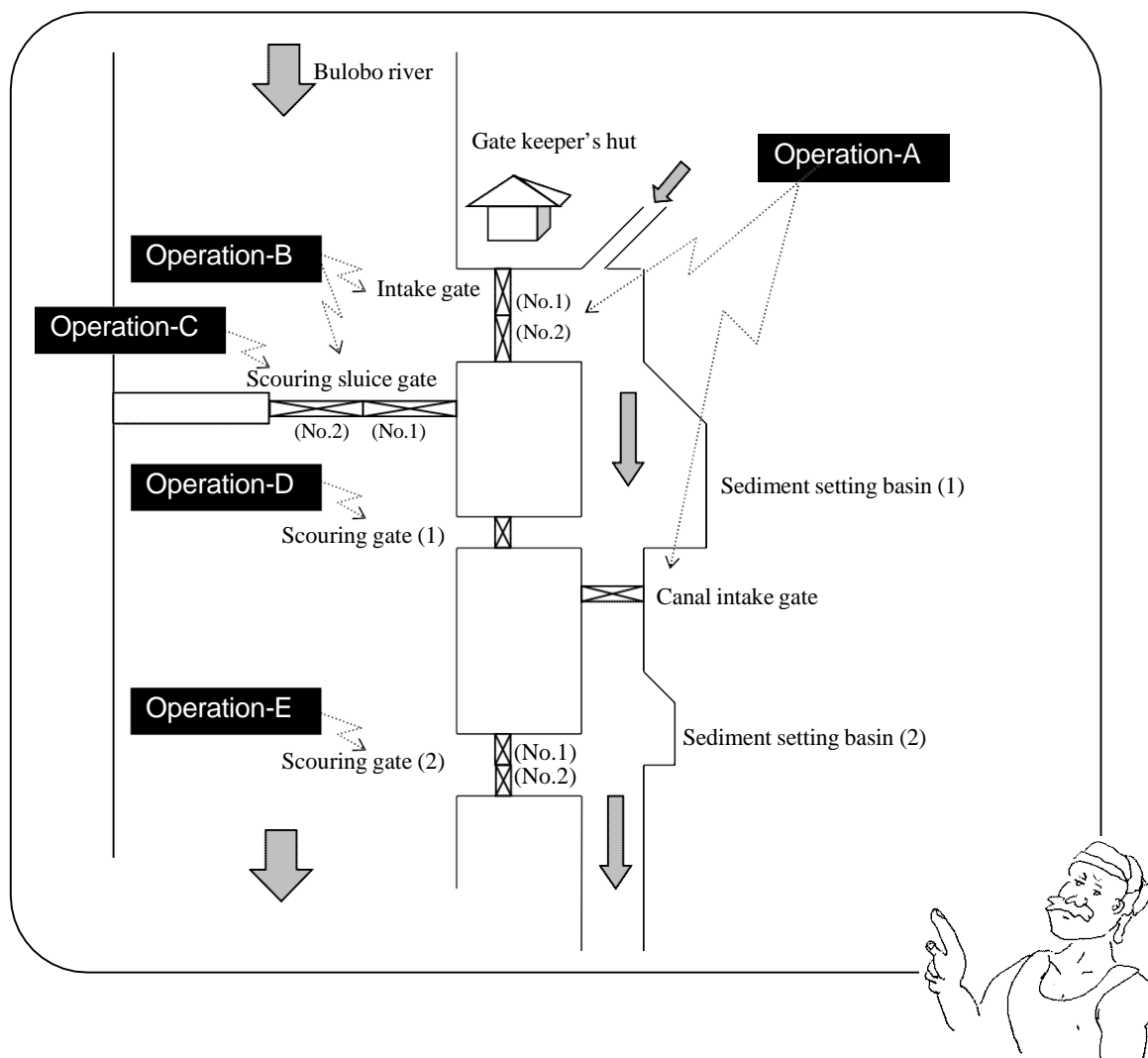
To control the water level in secondary canal.

<Turnout>

To divert irrigation water to tertiary canal.

4. Operation

4.1 Headworks Operation for Gatekeeper



Type of Gate Operation

Type of Operation		Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
A	Daily basic operation	To get the irrigation water from the Intake gate						
B	To prevent inflow of sediment into the main canal in heavy rain	Start gate operation , when the water level of Bulobo river increase by heavy rain.						
C	Scouring sluice gate	16:00	16:00	16:00	16:00	16:00	16:00	16:00
D	Scouring gate(1)	9:00	9:00	9:00	9:00	9:00	9:00	9:00
E	Scouring gate(2)	-	10:00	-	-	-	-	-

Daily basic operation <Operation-A>

- Purpose : To get irrigation water from the Bulobo river
- Operation : Intake gate, Canal intake gate

a) To get 1.35m³/s irrigation water (for 1,050ha)

Stage \ Gate	Scouring sluice gate at headworks	Operation-A Intake gate	Scouring Gate	Operation-A Canal Intake gate	Scouring gate
	No.1,No.2	No.1,No.2			No.1,No.2
Daily basic Operation	Closed	Open	Closed	Open (200mm)	Closed

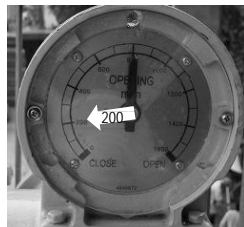
NOTE) ☐ indicates the operational gate.

b) To get 0.60m³/s irrigation water (for 450ha)

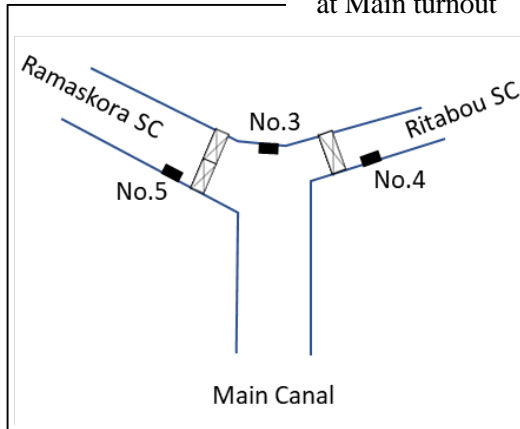
Stage \ Gate	Scouring sluice gate at headworks	Operation-A Intake gate	Scouring Gate	Operation-A Canal Intake gate	Scouring gate
	No.1,No.2	No.1,No.2			No.1,No.2
Daily basic Operation	Closed	Open	Closed	Open (100mm)	Closed

NOTE) ☐ indicates the operational gate.

Canal intake gate
: 200mm (a) / 100mm (b)



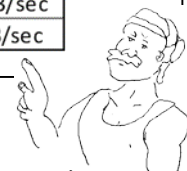
Water level gage
at Main turnout



Gate keepers and WUA should check the amount of water by these gages. These gages can be used for the decision of the irrigation water volume between Ramaskora and Ritabou areas.

Rough indication at Intake

Gauge Reading	Gauge 1
70 cm	1.35 m ³ /sec
40 cm	0.5 m ³ /sec
Gauge Reading	Gauge 2
50 cm	1.35 m ³ /sec
30 cm	0.5 m ³ /sec



Rough indication at Main Turnout

Gauge Reading	Main turnout Gauge 3	Ritabou Gauge 4	Ramaskora Gauge 5
40 cm	1.35 m ³ /sec	0.40 m ³ /sec	0.90 m ³ /sec
20 cm	0.6 m ³ /sec	0.2 m ³ /sec	0.4 m ³ /sec

Flood operation < Operation-B >

- Situation : When the water level of the Bulobo river increases by heavy rain.
- Purpose : To prevent inflow of sediment into the main canal.
To remove off sediment settled in front of the intake.
- Operation : Scouring sluice gate , Intake gate

Operation-B					
Stage \ Gate	Scouring sluice gate at headworks	Intake gate	Scouring gate	Canal Intake gate	Scouring gate
	No.1,No.2	No.1,No.2			No.1,No.2
Daily basic Operation	Closed	Open	Closed	Open	Closed
<div>↓</div> When the water level of Bulobo river increases by heavy rain.					
1 st step	Closed	<input type="checkbox"/> Closed	Closed	Open	Closed
2 nd step	<input type="checkbox"/> Open	Closed	Closed	Open	Closed
When the water level of Bulobo river decreases.					
3 rd step	<input type="checkbox"/> Closed	Closed	Closed	Open	Closed
4 th step	Closed	<input type="checkbox"/> Open	Closed	Open	Closed

NOTE) ☐ indicates the operational gate.

If there is no gate keepers, flooding happens in everywhere because of the heavy rain.

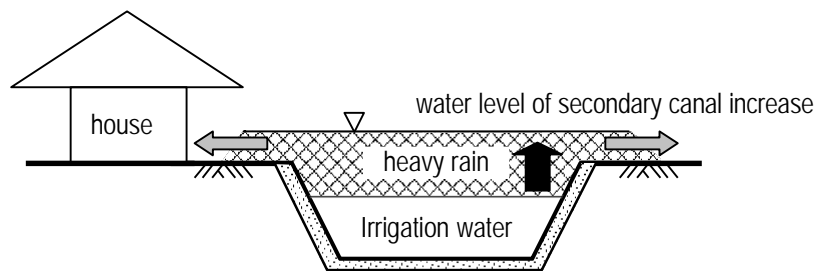


Image of the cross section of secondary canal

Daily evening operation < Operation-C >

- Purpose : To remove off sediment settled in front of the intake.
- Operation : Scouring sluice gate

Operation-C						
Stage \ Gate	Scouring sluice gate at headworks		Intake gate	Scouring Gate	Canal Intake gate	Scouring gate
	No.1	No.2	No.1,No.2			No.1,No.2
Daily basic Operation	Closed	Closed	Open	Closed	Open	Closed
↓						
1 st step	Open	Closed	Open	Closed	Open	Closed
2 nd step	Closed	Closed	Open	Closed	Open	Closed
3 rd step	Closed	Open	Open	Closed	Open	Closed
4 th step (Daily basic Operation)	Closed	Closed	Open	Closed	Open	Closed

NOTE) ☐ indicates the operational gate.

Daily morning operation < Operation-D >

- Situation : To remove off sediment settled at sediment settling basin(1).
- Operation : Scouring gate(1)

Operation-D					
Stage \ Gate	Scouring sluice gate at headworks	Intake gate	Scouring Gate	Canal Intake gate	Scouring gate
	No.1,No.2	No.1,No.2			No.1,No.2
Daily basic Operation	Closed	Open	Closed	Open	Closed
↓					
1 st step	Closed	Open	Open (800mm)	Open	Closed
2 nd step (Daily Basic Operation)	Closed	Open	Closed	Open	Closed

NOTE) ☐ indicates the operational gate.

Weekly operation <Operation-E>

- Situation : To remove off sediment settled at sediment settling basin(2).
- Operation : Scouring gate(2)

Stage	Gate	Scouring Sluice Gate at Headworks	Intake Gate	Scouring Gate(2)	Canal Intake Gate	Operation-E Scouring Gate(2)
		No.1,No.2	No.1,No.2			No.1,No.2
Daily basic Operation		Closed	Open	Closed	Open	Closed
1 st step		Closed	Open	Closed	Open	Open
2 nd step (Daily Basic Operation)		Closed	Open	Closed	Open	Closed

NOTE) ☐ indicates the operational gate.

Gate Operation Record



Recording Form 1

Operation Record at Headworks

Record-keeping is the first step to enhance accountability and transparency. In accordance with the Regulations, Gatekeepers shall regularly (preferably monthly) inform present O&M status to the MAF Bobonaro office. Each document shall be duly prepared by the gate-keepers.

Year / Tinan; _____ Month/Fulan; _____

Date / Data	Time / Oras	Scoring Sluice gate / Portoun sathan bee mota		Intake Gate / Portoun Intake		Scouring Gate (1)	Scouring Gate (2)		Canal Intake Gate	Main Turnout		Gauge No.1 at Intake (cm)	Water Level / Nivel-bee			Signature / Asinatura
		No 1	No 2	No 1	No 2		No 1	No 2		BP of Ritabou	BP of Ramaskola		No.3	No.4 Ritabou	No.5 Ramaskora	

Note:			
Status of gate:	"Open" or "Close"	Estatutu hosi portoun:	"Loke" ka "Taka"
Observation:	Please write in other issue related O&M	Observasaun:	Favor Hakerek asuntu seluk iha relasaun ho O&M
	Flushing time, for example, "15minutes in the morning"		Tempu fase, exemplu; "Minutu is iha dader"
	Remove rubbish, for example "remove rubbish in the morning"		Hasai foer, exemplu "Hasai foer iha dader"
	Flood, for example, "Flood at the last night"		Bee ulun/inundasaun, exemplu "inundasaun iha kalan"

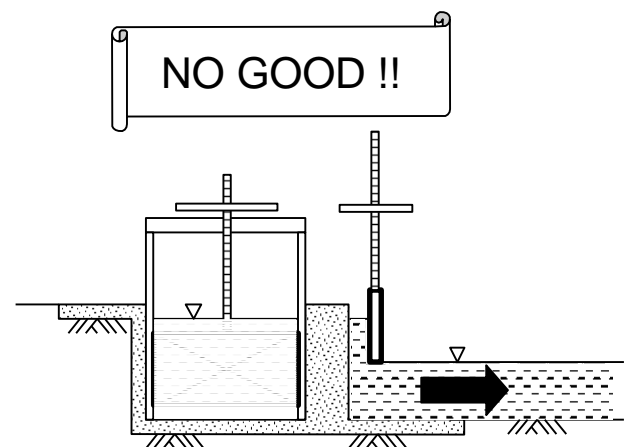
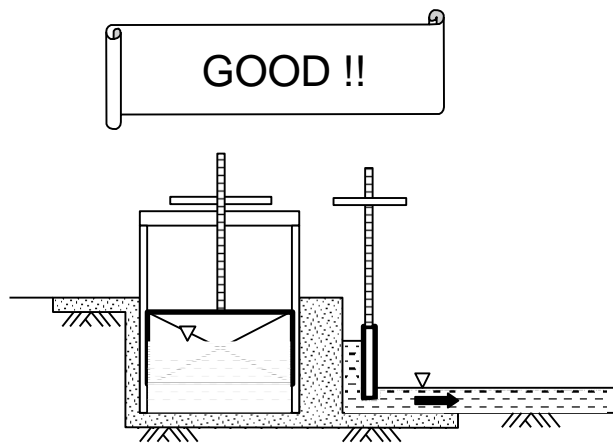
4.2 Turnout and Stoplog Operation for Farmers

(1) Turnout

Slide gate



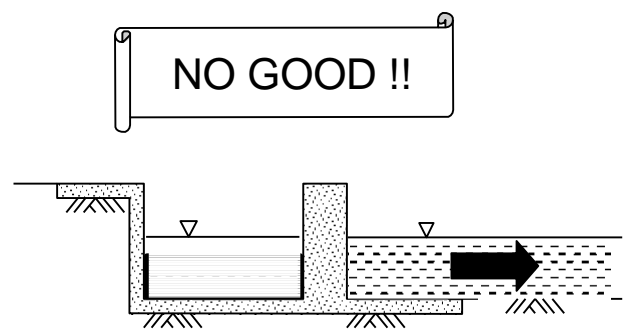
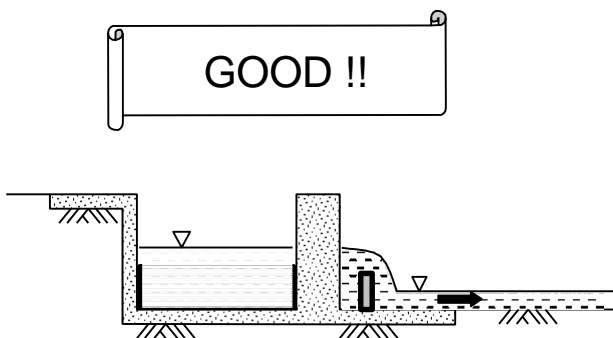
Turnout

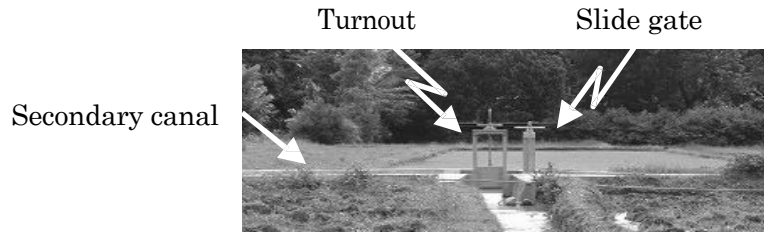


(2) Stoplog



Stop log





GOOD !!

Secondary canal: water level is high at each slide gate
 Tertiary canal : easy to get appropriate amount of water at each turnout

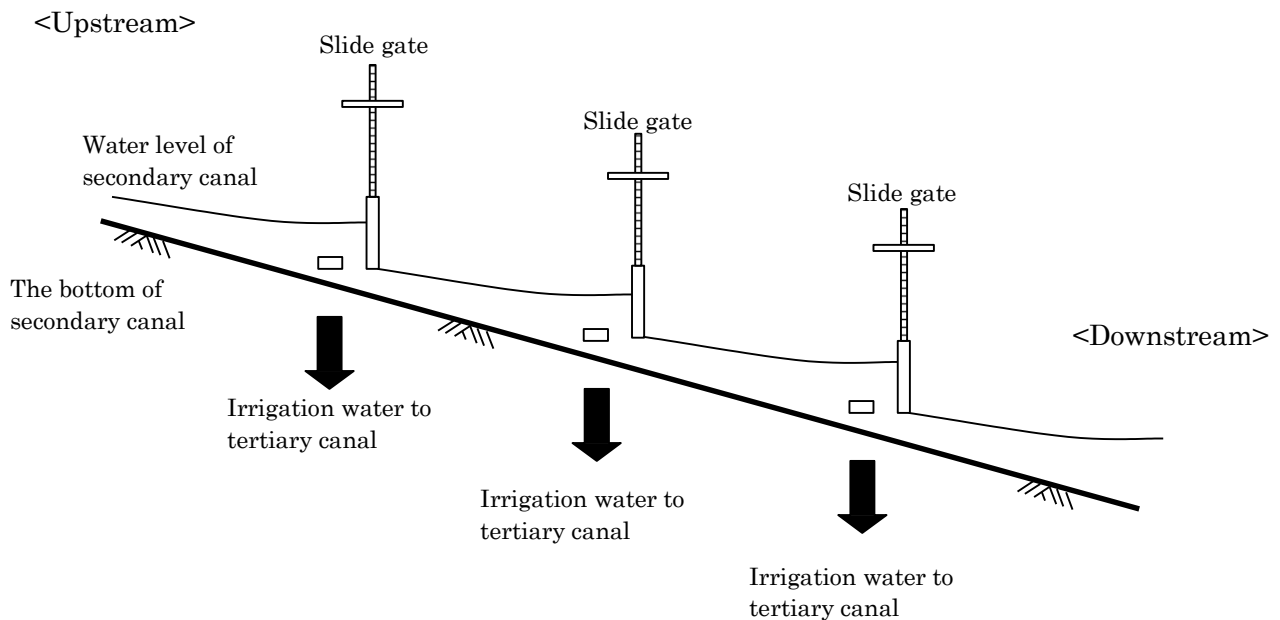
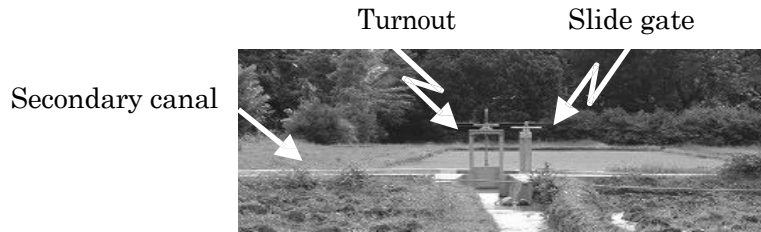


Image of the cross section of secondary canal

Each slide gate and turnout has an appropriate water level for operation.

- (1) Control the secondary canal's water level high.
- (2) Control the amount of the irrigation water for tertiary canal by turnout.
- (3) Operate to keep the secondary canal's water level at upstream by the slide gate.
- (4) Only authorized person (Gatekeepers) is allowed to operate the gates



NO GOOD !!

Secondary canal: water level in canal is too high at upstream area
 Tertiary canal : too much irrigation water is used at upstream area

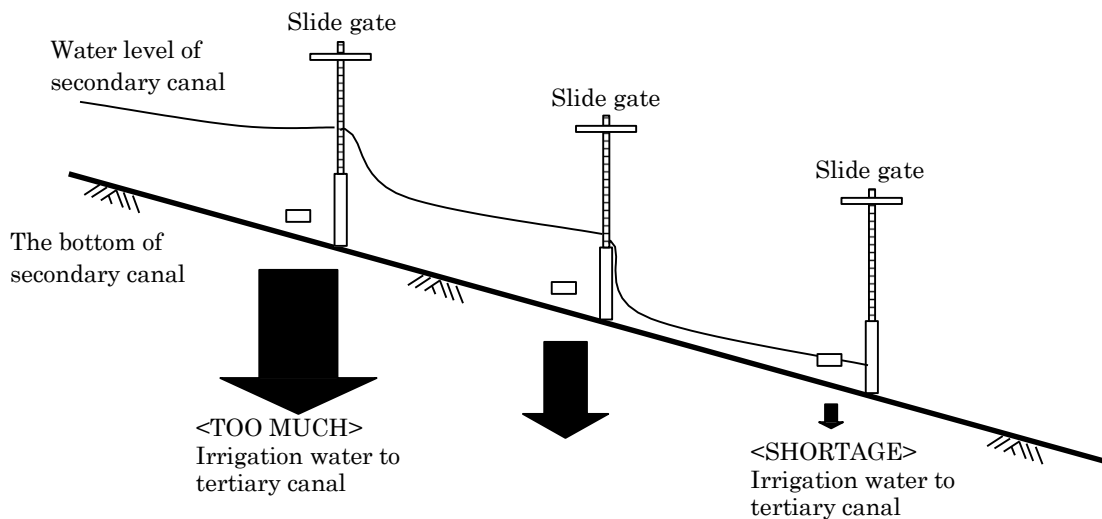


Image of the Crosssection of Secondary Canal

High water level in secondary canal causes following problems ...

- shortage of water at downstream areas
- easy to cause the flood at upstream town area by small rain
- easy to destroy earth lining bank at the tertiary canal
- waste Maliana I irrigation water resources

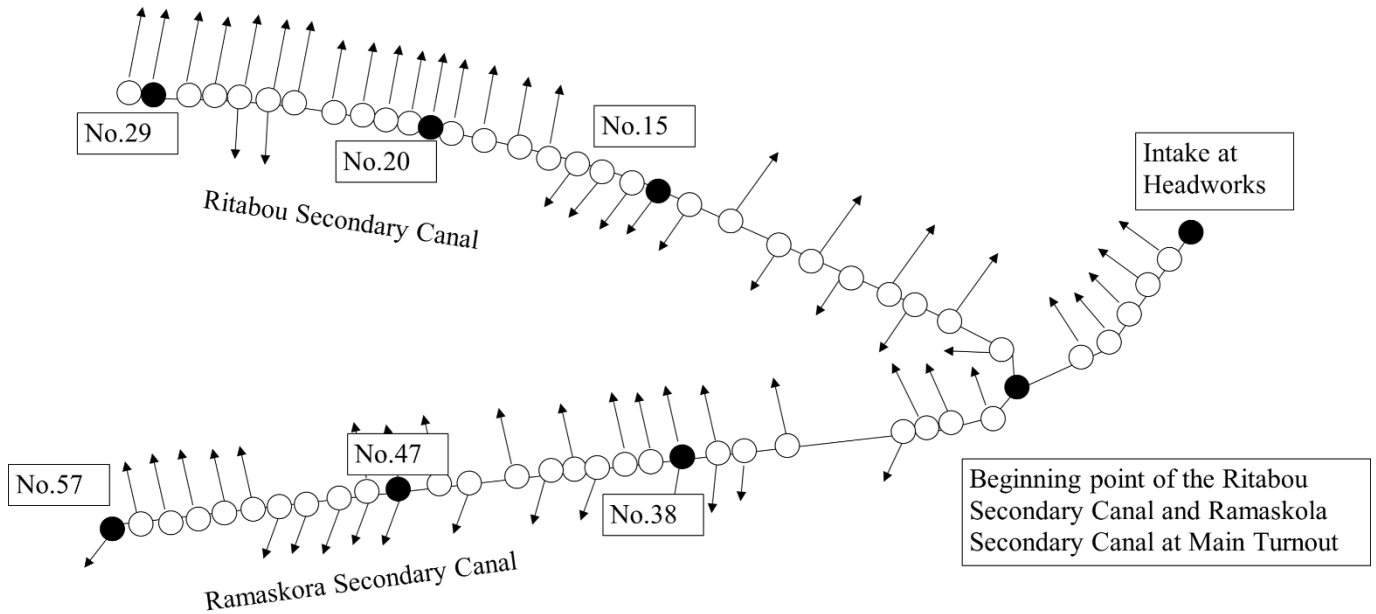
Be careful!



Flow Monitoring and Recording for the Main and Secondary Canals

Flow Monitoring Check Points

- ✓ The gatekeeper should check the flow conditions every day, reading water level gauge.
- ✓ If the gauge is not available, just mark “Flow” or “No”



Recording Form 2

Flow Monitoring Record at Intake and Secondary Canals

Year: _____

[illegible]

Note : If the gauge is not available, just mark “Flow” or “No“

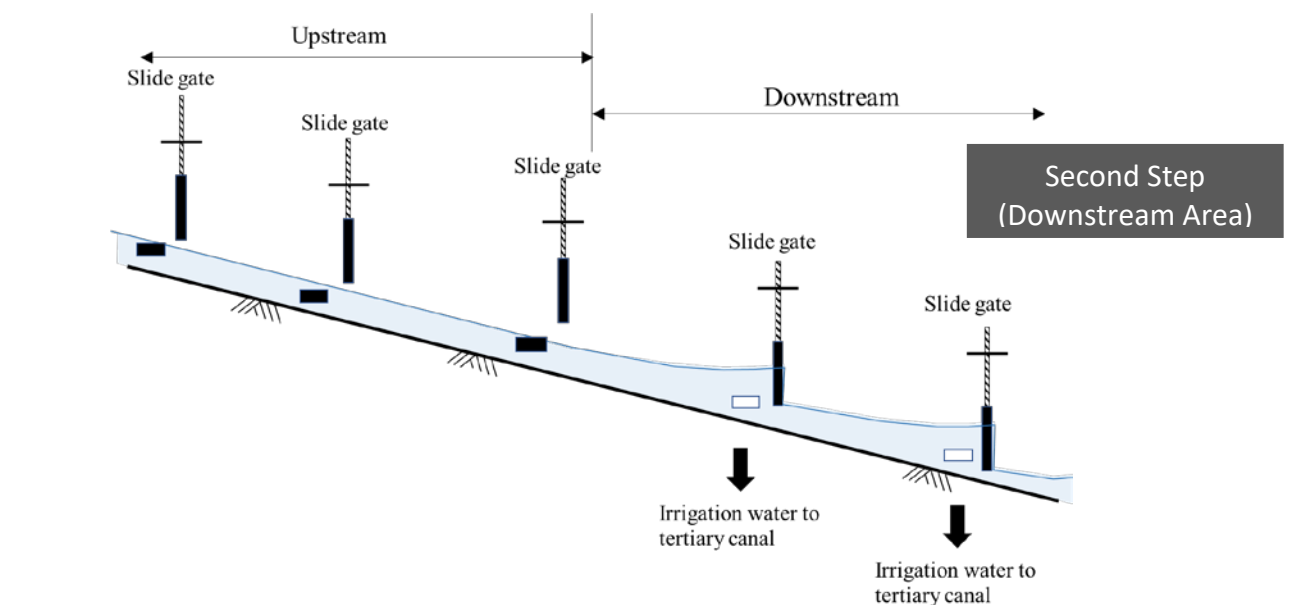
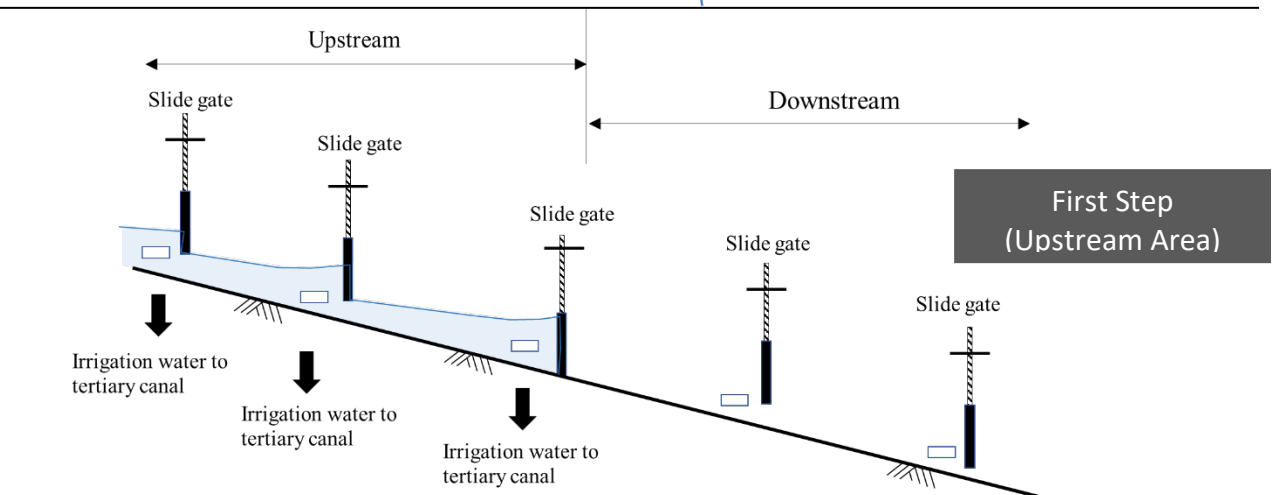
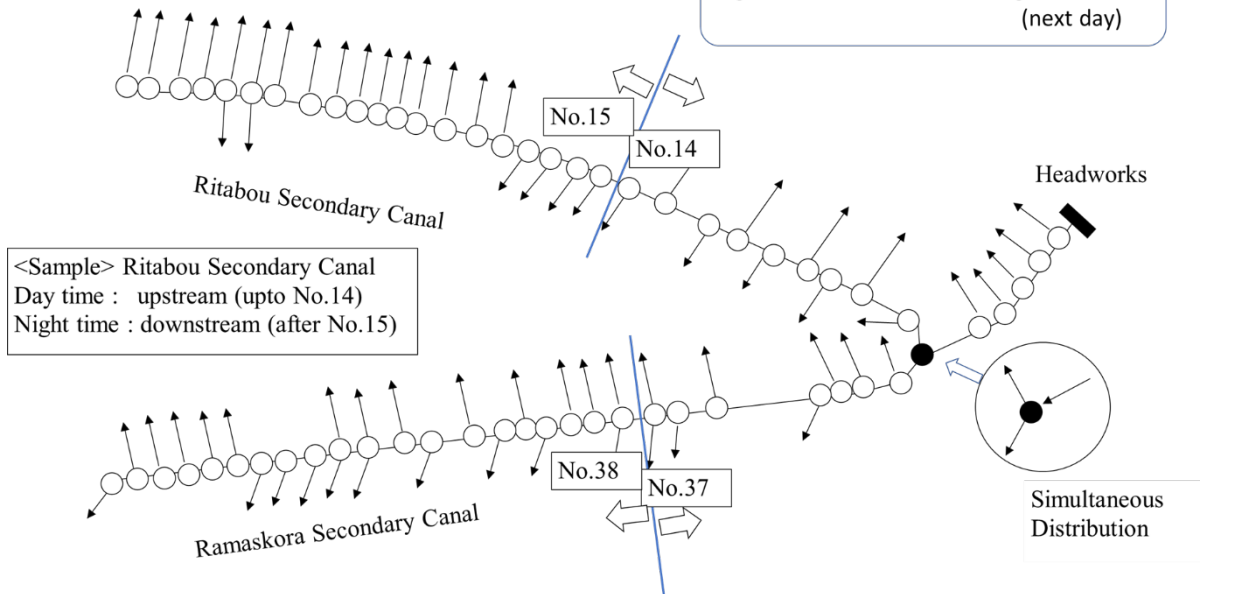
Rotational Irrigation

- Rotational use between upstream and downstream

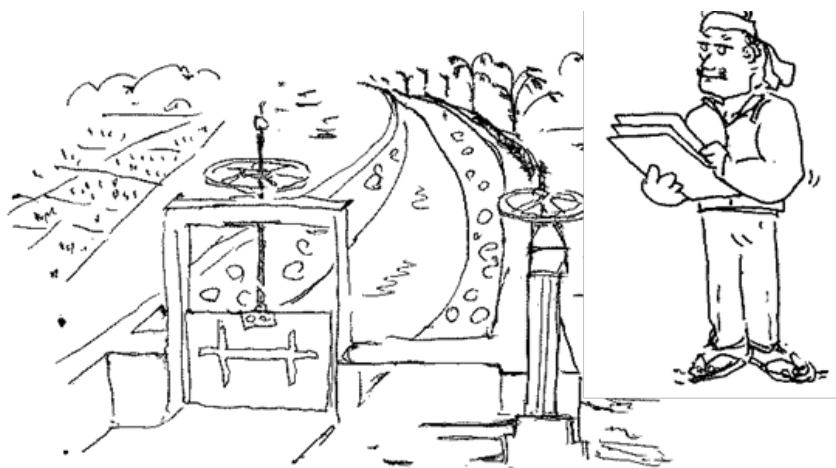


Rotational operation can be applied mainly in March, April and May when the less river water is available.

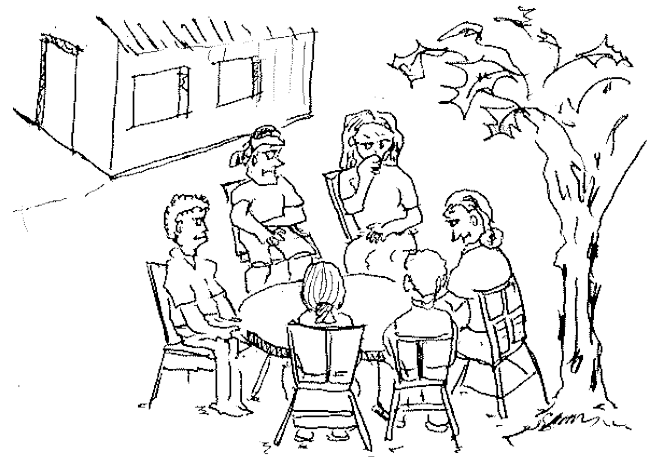
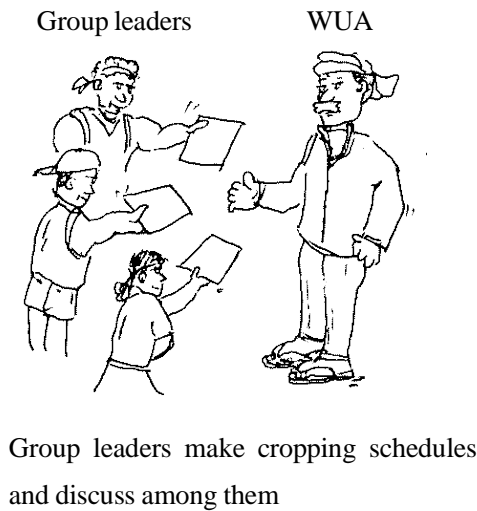
Day time : From 6:00 through 18:00
Night time : From 18:00 through 6:00 (next day)



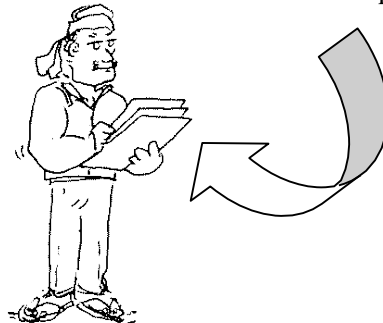
Rotational Operation Record

[illegible]

4.3 Irrigation Schedules for Right Use



Group leader hold a meeting within each secondary canal
- Especially in puddling season and dry season.



WUA finalize a water distribution schedule

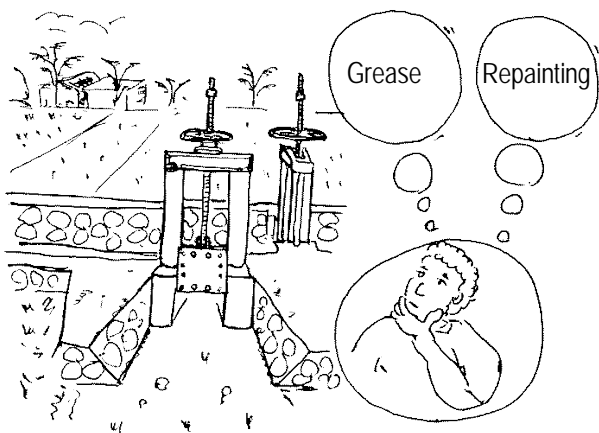
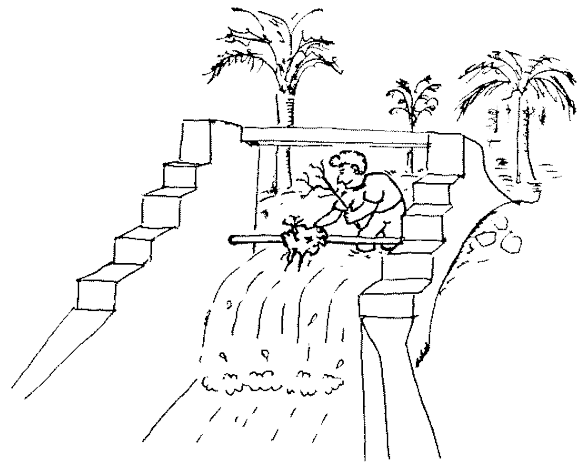
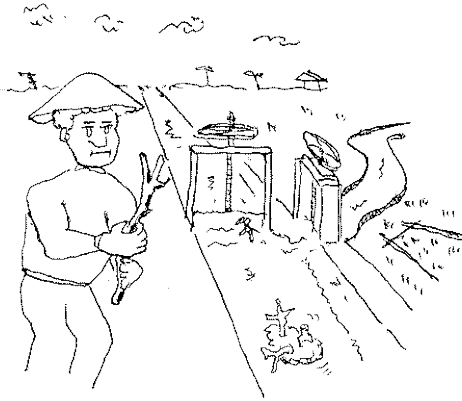
Example (Standard) of a Cropping Schedule in Each Group

Atividade sira	Month												
	Dez	Jan	Fev.	Mar.	Abr.	Maiu	Jun	Jul.	Ago.	Set.	Out.	Nov.	Dez
Tempu Preparasaun													
Tempu uدان													
Tempu Bailoro													

Hare XX ha (from Jan to May)
 uدان been iha natar sei iha (from Jan to May)
 Rotasaun Irigasaun (from Mar to May)
 Hare XX ha Ai-horis sira sehuk XX ha (from Jun to Nov)

5. Maintenance

5.1 Maintenance of Structures and Daily Inspection



5.2 Maintenance of Structures and Long-term Inspection



Recommended Maintenance cycle for Irrigation facilities

Maintenance works	Time(s) per year(s)
Gate	
- Repainting partially	1 times / year (in Nov.)
- Greasing	2 times / year (in Nov. /Apr.)
Canal	
- Silt clearance(at any time, if required)	1 times / year (in Nov.)
- Reshaping of canals and repairs of cracks	1 times / year (in Nov.)
- Weeds clearance	2 times / year (in Nov. /Apr.)

Note : For bank erosion it should be repaired immediately

Tentative Gate Operation at the Headworks until Replacement of Broken Gates

As of February 2022, only the scouring gate (1) is functioning, while all the other gates are out of order and not operational. Therefore, water flow into the main canal can be controlled only by opening or closing the scouring gate (1).

