

APPENDIX - P

Irrigation and Drainage Plan

APPENDIX - P IRRIGATION AND DRAINAGE PLAN

Table of Contents

	<u>Page</u>
Chapter 1 GENERAL.....	P - 1
Chapter 2 SURVEY AND INVESTIGATION.....	P - 2
2.1 Method of Survey and Investigation.....	P - 2
2.2 Finding of Field Investigation.....	P - 2
2.2.1 Present Conditions of the Existing Irrigation Facilities	P - 2
2.2.2 Evaluation of Farmers' Capacity for Formulation of Rehabilitation Plan	P - 3
Chapter 3 REHABILITATION AND IMPROVEMENT PLAN FOR IRRIGATION FACILITIES AND FARM ROADS	P - 5
3.1 Basic Concept for Rehabilitation and Improvement	P - 5
3.2 Rehabilitation and Improvement of Irrigation Facilities and Farm Roads	P - 5
3.2.1 Nachchaduwa Major Irrigation Scheme	P - 5
3.2.2 Palukadawela Major Irrigation Scheme	P - 6
3.2.3 Periyakulama Medium Irrigation Scheme	P - 6
3.2.4 Mahananneriya Medium Irrigation Scheme	P - 7
3.2.5 Mahananneriya Minor Irrigation Scheme.....	P - 7
3.3 Implementation of Rehabilitation and Improvement Plan.....	P - 8
3.3.1 Investigation, Detailed Design & Tendering	P - 8
3.3.2 Implementation of Rehabilitation and Improvement Work.....	P - 9
3.3.3 Turnover Process of Facilities.....	P - 10
3.3.4 Training for Rehabilitation and Improvement Works	P - 10
Chapter 4 WATER MANAGEMENT AND O&M PLAN	P - 12
4.1 Objective of Water Management and O&M Plan.....	P - 12
4.2 Methodology of the Programme.....	P - 12
4.3 Organisation for the Training Programme	P - 13
4.4 Plan of Operation for the Training Programme.....	P - 13
4.4.1 Training for Water Management	P - 13
4.4.2 Training for O&M	P - 15
4.4.3 Training Programme for the Priority Schemes	P - 16

List of Tables

Table P 3.1	Plan of Operations : Irrigation and Drainage Plan (1/5 - 5/5)	PT - 1
Table P 3.2	Plan of Operations : Water Management and O&M Plan (1/5 - 5/5)....	PT - 6
Table P 3.3	Rehabilitation and Improvement Plan in Nachchduwa Major Scheme (1/4 - 4/4)	PT - 11
Table P 3.4	Rehabilitation and Improvement Plan in Palukadawela Major Scheme (1/2 - 2/2)	PT - 15
Table P 3.5	Rehabilitation and Improvement Plan in Periyakulama Medium Scheme.....	PT - 17
Table P 3.6	Rehabilitation and Improvement Plan in Mahananneriya Medium Scheme.....	PT - 18
Table P 3.7	Rehabilitation and Improvement Plan in Mahananneriya Minor Scheme.....	PT - 19

List of Figure

Figure P 3.1	Rehabilitation and Improvement Plan in Nachchduwa Major Scheme (1/7 - 7/7)	PF - 1
Figure P 3.2	Rehabilitation and Improvement Plan in Periyakulama Medium Scheme.....	PF - 8
Figure P 3.3	Rehabilitation and Improvement Plan in Mahananneriya Medium Scheme.....	PF - 9
Figure P 3.4	Rehabilitation and Improvement Plan in Mahananneriya Minor Scheme (1/2 - 2/2)	PF - 10

APPENDIX - P IRRIGATION AND DRAINAGE PLAN

Chapter 1 GENERAL

This Appendix describes the irrigation and drainage, operation and maintenance plan of the priority schemes in the Study for the Potential Realization of Irrigated Agriculture in the Dry and Intermediate Zones of Sri Lanka (hereinafter referred to as ‘the Study’). Chapter 2 outlines the field survey and investigation conducted by the government staff, farmers as well as the Study Team. Chapter 3 presents the Rehabilitation and improvement plan for Irrigation facilities and farm roads. In chapter 4, finally, water management and O&M plan are proposed.

Chapter 2 SURVEY AND INVESTIGATION

2.1 Method of Survey and Investigation

The field investigation to identify condition of the facilities are being carried out the ID staff as well as the farmers. The investigation for the tanks and the main canals and D-canals for major and medium irrigation schemes were conducted by the ID staff while locations necessary for rehabilitation in the D & F-canals for major and medium irrigation schemes as well as all facilities in minor irrigation schemes were identified by the farmers. The results of study include the locations for rehabilitation works, persons engaged, and estimated. It is remarked that rehabilitation / improvement plan of irrigation facilities for each scheme are formulated taking into consideration those results.

2.2 Finding of Field Investigation

2.2.1 Present Conditions of the Existing Irrigation Facilities

Present condition of the existing irrigation facilities revealed through field investigation by the Study Team is shown in the following table. The results of the field investigation are compiled in Appendix - X.

Present condition of irrigation facilities

Scheme	Tank	Irrigation
Nachchaduwa	- No serious problem is observed	- In some portion of canals, slopes inside the canal is scoured, embankment of the canals are broken. - In some portion of D-canals, retaining wall are deteriorated - Most measuring devices installed at the head of the D-canal are broken
Palukadawela	- No serious problem is observed	- Same as the Nachchaduwa scheme
Periyakulama	- Sluice gates are not functioned well	- No structures is provided in the canals
Maha Nanneriya	- No serious problem is observed	- Some structure on the main canal are damaged
Maha Nanneriya minor schemes	- Some of sluice gates are broken	- No structure is provided except the Meilawa scheme

In summary, the work categories the ID officials and the farmers indicated throughout the field survey are outlined below:

Request for rehabilitation and improvement

Category		Description of Works
Tank	Bund	Bund forming, re-filling, rip-rap protection
	Sluice	Replacement of sluice gate
	Spillway	Minor repair
	Miscellaneous	Bathing step, staff gauge
Main canals	Earthwork	Bund forming, re-filling, partial lining, maintenance roads
	Structures	Measuring device, regulator, turnout, culvert, drop, spillway, bathing
D-canals	Earthwork	Bund forming, re-filling, partial lining, maintenance roads
	Structures	Regulator, turnout, culvert, drop, and so on
F-canals	Earthwork	Bund forming, re-filling, partial lining, maintenance roads
	Structures	Farm turnout, culvert
Others		Anicut improvement

2.2.2 Evaluation of Farmers' Capacity for Formulation of Rehabilitation Plan

The farmer's plans on rehabilitation and improvement in D and F canals was evaluated by the Study Team to judge whether their idea could be incorporated into the development plan. The evaluation on the farmers' capacity for plan formulation was carried out based on the following items :

Indicator to Evaluate the Farmers' Capabilities for Rehabilitation Plan

Indicator	Description
Indicator 1	Illustration of FO area map and indication of the rehabilitation locations on the map
Indicator 2	Description of rehabilitation plan for each location
Indicator 3	Details of rehabilitation, such as length of canal and number of structures
Indicator 4	Work quantity calculation and cost estimate

The results of the evaluation are shown in the following table :

Result of Evaluation

Scheme	FO Name	Indicator – 1	Indicator – 2	Indicator – 3	Indicator – 4
Nachchaduwa	Sana Samagi	B	A	A	A
	Mahasen	A	A	A	A
	Parakrama	C	A	A	A
	Samagi	B	A	B	C
	Ranketa	A	A	A	C
	26/27	A	A	C	C
	Ruwanweli	A	A	A	C
	Tissa	C	A	A	B
	Al-aksa	C	A	C	C
	Eksath	B	A	A	A
	Isuru	B	A	A	C
	Rana Mayura	B	A	A	A
	Gemunu	A	A	A	C
	Wijaya	A	A	A	A
Palukadawela	Tract – 1	B	A	A	A
	Tract – 2	A	A	A	A
	Tract – 3	C	A	C	C
	Tract – 4	A	A	A	A
	Tract – 5	A	A	A	A
	Tract – 6	C	A	A	A
	Puranagama	A	A	C	A
Perivakulama	Ekamuthu	B	A	A	A
Mahananneriva	Ekabadda	C	A	A	A
Minor schemes	Nidahas	C	A	A	A
	Samagi	B	A	A	A
	Ekamuthu	A	A	A	A
	Samagi	B	A	A	A
	Eksath	B	A	A	A

Note : A = good, B = fair, C = poor

Major findings through the evaluation are as follows :

- The prioritisation of the rehabilitation is incorporated in the farmers' plan. It is also observed that the farmers idea and intention on the rehabilitation of the irrigation facilities and farm roads are within the appropriate ranges.
- The farmers, in general, are able to indicate the rehabilitation locations on the map and to describe the concrete rehabilitation and improvement plan for each location.
- There are some needs to improve the farmers' capability on the cost estimates. It was also revealed that the FO office bearers, who have ever worked in contractors, had experiences to take the quantity calculation as well as the cost estimates.

Taking into consideration the above findings, it is concluded that the planning and design of D and F canal can be carried out by the farmers themselves with a proper technical guidance by the government staff. Further, in this Study, rehabilitation and improvement plan for D and F canals are formulated based on the farmers' idea.

Chapter 3 REHABILITATION AND IMPROVEMENT PLAN FOR IRRIGATION FACILITIES AND FARM ROADS

3.1 Basic Concept for Rehabilitation and Improvement Plan

Taking into consideration the plan submitted by ID and FOs, the basic concept for the rehabilitation and improvement of irrigation facilities and farm roads are set as shown below.

- As for major and medium irrigation schemes, measuring devices are provided at tank sluice and turnout on main canals so as to carry out efficient water management,
- A canal lining with rubble masonry is facilitated in D and F canals for future easier maintenance by farmers,
- Roads along the canals are improved, accompanied with gravelling for transportation of agricultural inputs and products as well as O&M of the facilities,
- De-silting of tank is considered in minor irrigation schemes
- No heightening of tank bund is carried out since it may have a adverse affect on hydrological condition of lower and upper reaches.

The implementing activities for each scheme are shown in Table P 3.1 and P 3.2.

3.2 Rehabilitation and Improvement of Irrigation Facilities And Farm Roads

3.2.1 Nachchaduwa Major Irrigation Scheme

The rehabilitation and improvement works in the Nachchaduwa major scheme is as follows :

Rehabilitation and Improvement Plan

	Item	Quantity	Description of works
Tank	Bund	L.S.	Embankment, Gravelling, Rip-rap, Filter toe drain
	Sluice	L.S.	Repair of concrete works, protection of downstream,
	Spillway	L.S.	Repair of concrete works
	Others	L.S.	O&M Road
Main canal	Earthworks	15 km	Embankment, De-silting
	Lining	7 km	Masonry Lining
	Structures	180 Nos.	Turnout, Regulator, Bathing steps, Bridge, Culvert etc.
	O&M Road	26 km	Earth filling, Gravelling
D-canals	Earthworks	16 km	Embankment, De-silting
	Lining	21 km	Masonry Lining
	Structures	230 Nos.	Turnout, Drop, Culvert
	O&M Road	18 km	Earth filling, Gravelling
F-canals	Earthworks	17 km	Embankment, De-silting
	Lining	38 km	Masonry Lining
	Structures	122 Nos.	Farm turnout, Culvert, Drop
	O&M Road	45 km	Earth filling, Gravelling
Others	Small Tank	11 Nos.	Minor repair
	Feeder	L.S.	Repair of feeder canal from Kala Wewa

The major works on the main canals include the rehabilitation of the off-takes, and new construction of bridges. The masonry lining will be provided in most of the D-canals and 20% of the F-canals in length. As for the O&M road, earthworks with gravelling are proposed for easier vehicle transportation in rainy season. Details of rehabilitation plan in the Nachchaduwa major scheme are shown in Table P 3.3 and Figure P.3.1.

3.2.2 Palukadawela Major Irrigation Scheme

The rehabilitation and improvement works in the Palukadawela major scheme is presented below.

Rehabilitation and Improvement Plan for Palukadawela Major Scheme

Category	Item	Quantity	Description of works
Tank	Bund	L.S.	Earth filling, Gravelling, Rip-rap, Filter
	Sluice	L.S.	Minor repair, Downstream protection, Measuring device
	Spillway	L.S.	Minor repair
	Others	L.S.	Bathing step
Main canal	Earthworks	16.3 km	Earth filling, De-silting
	Lining	16 Nos.	Masonry Lining around structures
	Structures	78 Nos.	Turnout, Regulator, Bathing step, Bridge, Culvert
	O&M Road	16.3 km	Earth filling, Gravelling
D-canals	Earthworks	11.2 km	Earth filling, de-silting
	Lining	5 Nos.	Masonry Lining around structures
	Structures	96 Nos.	Turnout, Regulator, Culvert
	O&M Road	11.2 km	Earth filling, Gravelling
F-canals	Earthworks	0.6 km	Earth filling, De-silting
	Lining	0.8 km	Masonry Lining
	Structures	71 Nos.	Farm turnout, Culvert, Drop etc.
	O&M Road	20.7 km	Earth filling, Gravelling
Others	Anicuts	18 Nos.	Improvement of Anicuts in Traditional village
	Feeder canal	L.S.	Improvement of feeder canal from Attaragala Wewa

On the main canal, some structures are proposed, those are off-takes to the D-canals, bathing steps, bridges, culverts, and so on. As for the D-canals, partially masonry lining will be provided. Earthworks and gravelling are proposed roads along the canals. In the traditional village area, on the other hand, the rehabilitation of anicut will be provided. Details of rehabilitation plan in the Palukadawela major scheme are shown in Table P 3.4.

3.2.3 Periyakulama Medium Irrigation Scheme

The rehabilitation and improvement works in the Periyakulama medium scheme is outlined below.

Rehabilitation and Improvement Plan for Periyakulama Medium Scheme

Category	Item	Quantity	Description of works
Tank	Bund	L.S.	Slope protection, Gravelling
	Sluice	3 Nos.	Replacement of sluices
	Spillway	L.S.	Rehabilitation of downstream channel
	Others	L.S.	
Main canal	Earthworks	900 m	Earth filling
	Lining	330 m	Masonry lining
	Structures	24 Nos.	Turnout, Regulator, Culvert
	O&M Road	330 m	Earth filling, Gravelling
D-canals	Earthworks	3,500 m	Earth filling
	Structures	47 Nos.	Turnout, Culvert
F-canals	Earthworks	2,500 m	Earth filling
	Structures	22 Nos.	Turnout, Regulator, Culvert
Others	Drain	600 m	Excavation

The deteriorated three sluice structures in the tank are replaced. Off-takes with gate are provided on the main canal. Other works includes masonry lining in the canal and O&M road along the main canal. Details of rehabilitation plan in the Periyakulma medium scheme are shown in Table P 3.5 and Figure P.3.2.

3.2.4 Mahananneriya Medium Irrigation Scheme

Rehabilitation and improvement works for Mahananneriya medium schemes includes the following items :

Rehabilitation and Improvement Plan for Mahananneriya Medium Scheme

Category	Item	Quantity	Description of works
Tanks	Bund	L.S.	Earth filling, Gravelling, Rip-rap, Filter,
	Sluice	L.S.	Minor repair, Downstream protection, Measuring device
	Spillway	L.S.	Concrete repair works
Main canal	Earthworks	3,500 m	Earth filling, De-silting
	Lining	90 m	Masonry Lining
	Structures	60 Nos.	Turnout, Regulator, Drop, Culvert etc.
	O&M Road	2300 m	Earth filling, gravelling, Culvert
Others	Anicuts	7 Nos.	Improvement of anicuts

The major rehabilitation and improvement works in the Mahananneriya medium scheme are in the tank and the main canal, and the O&M roads. No rehabilitation works is proposed for the field canals. Details of rehabilitation plan in the Mahananneriya medium scheme are shown in Table P 3.6 and Figure P.3.3.

3.2.5 Mahananneriya Minor Irrigation Schemes

Rehabilitation and improvement works for Mahananneriya minor schemes are shown in the following table:

Rehabilitation and Improvement Plan for Mahananneriya Minor Schemes

Category	Item	Quantity	Description of works
Tank	Bund	L.S.	Widening bund, Slope protection, Earth filling
	Sluice	L.S.	Repair and replacement of sluices
	Spillway	L.S.	Minor repair, Downstream protection
	Others	L.S.	De-silting, Bathing step
Main canals	Earthworks	3,300 m	Embankment
	Structures	52 Nos.	Turnout
	O&M Road	2,000 m	Earth filling, Gravelling

Most of the rehabilitation and improvement works in the minor irrigation schemes are carried out for tank. In Ihala Nanneriya scheme, de-silting of the tank reservoir area is conducted. Details of rehabilitation plan in the Mahananneriya minor schemes are shown in Table P 3.7 and Figure P.3.4.

3.3 Implementation of Rehabilitation and Improvement Plan

3.3.1 Investigation, Detailed Design & Tendering

In order to promote farmers' participation in the rehabilitation and improvement of irrigation and drainage facilities, the following procedure will be followed:

- Guidance on participatory planning for the farmers
- Survey and Investigation in co-operation with farmers
- Workshops with farmers to formulate rehabilitation and improvement plans
- Detailed design and cost estimate by ID or PED
- Agreement on implementation of work with farmers
- Tendering & Contracting
- Training on construction management for farmers for proper monitoring of the work
- Agreement on farmers' contribution to rehabilitation work

The meetings held three times during the survey, investigation, and design period are featured by the workshops, in which components of the rehabilitation works with its cost will be discussed and decided. All farmers are entitled to attend the meetings so as to express their intention for the works. The decisions should be documented and presented in the public area to ensure the transparency of the process of the works.

The survey and investigation, such as the inventory survey of the existing facilities, canal route survey, will be conducted by the government staff in co-operation with the farmers as much as possible. The farmers intention where the facilities are rehabilitated / improved shall be collected throughout the survey and the workshops and they will be incorporated in the plan. Once the basic consent by farmers to the

plan is obtained, the design with cost estimate will be carried out and discussed in the workshop, where a decision will be made how the total cost will be shared between the government and farmers.

In the major and medium irrigation schemes, the rehabilitation / improvement works of the distributary and field canal systems will be carried out by farmers while those of headworks and main canal systems will be carried out by a private contractor while those for the distributary and field canals will be contracted to a farmers' organisation. The minor irrigation schemes will be rehabilitated / improved by the farmers' organisation. The contract for 10% contribution by the farmers will also be made like the other foreign funded projects.

Before awarding to farmers' organisations, the training programme for rehabilitation works will be implemented to them.

3.3.2 Implementation of Rehabilitation and Improvement Work

The progress of the rehabilitation / improvement works will be monitored by ID and PED in each Province. The monitored data will be forwarded and compiled to the Sub-unit Construction of PMU to grasp overall status of the programmes, such as:

- a) Overall progress of rehabilitation / improvement of scheme facilities,
- b) Quality of rehabilitation works done by the farmers' organisations, and
- c) Cost invested to the programmes.

In line with the concept for the participatory approach, the rehabilitation / improvement works for the distributary and field canals will be contracted out to farmers' organisations as much as possible, with some of the costs covered by them providing labour. In such case, it will be required that the government staff would takes necessary quality control measures to keep the works implemented by farmers up to a normally acceptable level.

The quality of the farmer's rehabilitation works will be monitored with those progress through the monitoring system. Then, based upon the result of monitoring and evaluation, necessary technical guidance will be provided to farmers' organisations during the rehabilitation works.

In case that the rehabilitation works are carried out by a private contractor, as soon as the works is completed and water issue is commenced, a joint inspection should be carried out by a team consisting of the Engineer's Representative, who is responsible for supervision of the rehabilitation of irrigation facilities, and farmers' representative so as to check irrigation defects and clarify work to be done during the defects liability period. The inspection results should be agreed mutually and

record kept in proper manner. This inspection is essential for turnover of O&M to the farmers. At first, for about one year, the irrigation facilities would be operated and maintained jointly by both the government staff and farmers' organisations. Throughout such operation, the O&M skills should be transferred to the farmers.

On the other hand, in the case of the irrigation schemes, which rehabilitation works are carried out by farmers themselves, the period of joint operation would be not considered but O&M by farmers will commence immediately.

3.3.3 Turnover Process of Facilities

The following steps are to be taken so that irrigation facilities can be handed over to the satisfaction of farmers:

- Joint inspection by the government officials and farmers to identify defects made by the contractor,
- Rectification work, if any,
- Preparation of documents for the hand-over, such as agreement, irrigation diagram, maps, and so on,
- Hand-over of facilities to farmers.

The turnover is carried out carefully taking progress of outstanding works and capability of the farmers' organisation into account. The documents necessary for the turnover, such as description of the canals with their related structures, water issue trees, shall be compiled by the engineers attached to the ID and PED offices.

3.3.4 Training for Rehabilitation and Improvement Works

The training courses for rehabilitation and improvement works are programmed in order to reflect farmers' intention to the works as much as possible, and to carry out the works by the farmers themselves. The training course for the government staff and the farmers are outlined below.

Training Programme for Rehabilitation and Improvement Works

	Session	Period	Lecturer	Subject of training
Training for the government staff	First	1day	RATPA	Participatory planning Communication with farmers
	Second	1day	ID	Skill of technology transfer to farmers
	Third	1day	ID	Hand-over of O&M responsibility to farmers Follow-up programme
Training for farmers	First	2days	RATPA	Participatory planning Field investigation, design and cost estimate
	Second	2day	ID	Contract for rehabilitation works Farmers' contribution
	Third	1day	ID	Quality control for earthworks and concrete Preparation of document for rehabilitation Field inspection
	Fourth	1day	ID	Follow-up programme

Participants for the training course are TA and WS of ID, and FO office bearers and the sub-committee members of O&M in FO.

The proposed number of the training course for each schemes are indicated below

Proposed Training Courses for Construction Management

Name of Scheme(s)	Government staff	Farmers	Remarks
Nachchaduwa	1	7	One course for two FOs
Palukadawela	1	4	One course for two FOs, and traditional village
Periyakulama	1	1	
Maha Nanneriya	1	1	
Maha Nanneriya Minor Schemes	-	3	One course for two FO

Chapter 4 WATER MANAGEMENT AND O&M PLAN

4.1 Objective of Water Management and O&M Plan

The objective of the plan is to strengthen the farmers' organisation as well as the government staff in water management and O&M of the irrigation facilities and to lead FO to participatory O&M. In order to achieve the targets, the improvement of the present condition of communication among the government staff and farmers will be the key issue. Further, it is essential to train the staff and farmers on water management and O&M activities.

4.2 Methodology of the Programme

The proposed training programme for proper and efficient operation and maintenance of irrigation facilities are as follows:

Proposed Training Programme for O&M

Category of Scheme	Major schemes		Medium schemes		Minor schemes	
	ID	Farmers	ID	Farmers	ID	Farmers
1. Awareness programme for O&M	●	●	●	●	-	●
2. Communication	●	●	●	●	-	●
3. Irrigation scheduling and planning	●	●	●	●	-	●
4. Water distribution	●	●	●	●	-	●
5. Maintenance	●	●	●	●	-	●
6. Field research	●	-	-	-	-	-
7. Monitoring and evaluation	●	●	●	●	-	●

The proposed subjects of the training course are as follows.

Training courses for O&M

Category of Scheme	Description of Training
1. Awareness programme for O&M	Understanding of the basic concepts of the Project
	Understanding duties and responsibilities of the staff/officers and farmers
	Understanding participatory planning
2. Communication	Knowledge on how the irrigation problems are communicated to higher level authorities effectively.
	Knowledge on how decisions from higher level authorities are communicated downwards
	Knowledge on how to contact relevant officials
	Knowledge on how to contact and co-operate with other FOs
3. Irrigation schedule and planning	Knowledge about irrigation methods
	Methods of estimating irrigation water requirement
	Methods of preparing irrigation schedules
	Methods of preparing the irrigation water orders
4. Water distribution	Knowledge about the water management facilities
	Methods of operating the water management facilities
	Methods of conducting rotational irrigation
5. Maintenance system	Knowledge about maintenance system
	Methods of conducting an inventory survey to check defects of facilities
	Methods of preparing the annual maintenance programmes
	Methods of preparing maintenance schedule and cost estimate
	Methods of informing damage to facilities in an emergency
	Methods of keeping maintenance records
6. Field research	Methods of conducting preventive maintenance
	Knowledge on field research equipment
	Knowledge on operating field research equipment
	Methods of analysing the results of the field surveys
7. Monitoring & evaluation	Methods of conducting discharge measurement
	Knowledge about monitoring and evaluation procedures on water management
	Knowledge about administrative reporting procedures
	Methods of preparing reports

4.3 Organisation for the Training Programme

The technical assistants (TA) and work supervisor (WS) as well as farmers, who are engaged in the O&M work in FOs, will attend the training courses. The lecturers will be entrusted to the Training Institutes of the Irrigation Department in Galgamuwa or any external organisations, that are the members of RATPA.

4.4 Plan of Operation for the Training Programme

4.4.1 Training for Water Management

(1) General

The training for water management for the government staff and farmers are proposed as follows:

Training Programme for Water Management

Activities	Session	Period	Lecturer	Subject of training
Training for the government staff	First	1day	RATPA	Awareness programme Communication with farmers
	Second	1.5days	ID	Estimation of water requirement Preparation of water distribution programme Skill for gate operation of tank and off-takes Flow measurement and flow monitoring Skill of technology transfer to farmers
	Third	1 day	ID	Follow-up programme
Training for farmers	First	1day	RATPA	Awareness programme Communication with government staff Communication among farmers Communication with other FOs
	Second	1.5days	ID	Preparation of water distribution programme Skill for gate operation of tank and off-takes
	Third	1day	ID	Follow-up programme

The training course consists of three sessions; namely, awareness programme, irrigation scheduling knowledge and water distribution skill, and follow-up programme. Participants for the training course are TA and WS of ID, and FO office bearers and the sub-committee members of O&M in FO.

(2) First session

Before implementation of rehabilitation and improvement works, the awareness programme on water management is to be carried out. It should be stressed that the programmes for the farmers should be carefully implemented to let them understand water saving agriculture with cultivation of OFCs, the importance of water management of the D-canals and F-canals, which should be carried out by themselves. The following issues would be taken into consideration in terms of above:

- on-farm water management under the ‘self-management concept’,
- crops as per the soil type,
- irrigation schedules and methods,
- participation in training course undertaken by ID, and
- establishment of FOs and attendance to FO meeting.

(3) Second session

After the completion of the rehabilitation and improvement works, the second session of the training is conducted in order to get the knowledge of preparation of water requirement and irrigation scheduling, and skill for gate operation. The government staff is given for knowledge and skill for managing tanks and main irrigation systems and skill of technology transfer to farmers. The training for farmers includes the knowledge and skill necessary for water management for D and F-canals.

(4) Third session

The water management activities by farmers and the government staff will be monitored during the joint operation period. Based on the monitoring records, the contents of the follow-up training course will be decided to improve the capabilities of the farmers as well as the government staff.

4.4.2 Training for O&M

(1) General

The training for water management for the government staff and farmers are proposed as follows:

Training Programme for O&M

Activities	Session	Period	Lecturer	Subject of training
Training for the government staff	First	1day	RATPA	Awareness programme Communication with farmers
	Second	1.5days	ID	Preparation of maintenance programme Monitoring of maintenance activities Skill of technology transfer to farmers
	Third	1day	ID	Follow-up programme
Training for farmers	First	1day	RATPA	Awareness programme
	Second	1.5days	ID	Preparation of maintenance programme Organising a patrol Organising a Sramadana Collection of O&M charge
	Third	1day	ID	Follow-up programme

Like the training course for water management, the training course for O&M consists of three sessions; namely, awareness programme, irrigation scheduling knowledge and water distribution skill, and follow-up programme.

(2) First session

Before implementation of rehabilitation and improvement works, the awareness programme on water management is to be carried out. The following issues would be taken into consideration in terms of above:

- water charges,
- participation in maintenance work of irrigation facilities.
- participation in training course undertaken by ID
- establishment of FOs and attendance to FO meeting, and

(3) Second session

After the completion of the rehabilitation and improvement works, the second session of the training is conducted in order to get the knowledge of preparation of maintenance programme, skill for monitoring for maintenance work, and skill how

to organise sramadana and O&M charge collection. The government staff is given for knowledge and skill for maintaining tanks and main irrigation systems and skill of technology transfer to farmers. The training for farmers includes the knowledge and skill necessary for O&M for D and F-canals.

(4) Third session

The O&M activities by farmers and the government staff will be monitored during the joint operation period. Based on the monitoring records, the contents of the follow-up training course will be decided to improve the capabilities of the farmers as well as the government staff.

4.4.3 Training Programme for the Priority Schemes

The proposed number of the training course for each schemes are indicated below

Proposed Training Courses for Water Management

Name of Scheme(s)	Water management		O&M		Remarks
	Government staff	Farmers	Government staff	Farmers	
Nachchaduwa	1	7	1	7	One course for two FOs
Palukadawela	1	4	1	4	One course for two FOs,, and one for traditional village
Periyakulama	1	1	1	1	-
Maha Nanneriya	1	1	1	1	-
Maha Nanneriya Minor Schemes	-	3	-	3	One course for two FOs

TABLES

Table P.3.1 Plan of Operations: Irrigation and Drainage Plan (1/5)

Name of Scheme: Nachchaduwa Major Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks	
		1st	2nd	3rd	4th	5th	6th	7th	8th				
1. Mobilization of PMU										ID, IMD	Staff in ID Staff in IMD Farmers		
2. Awareness programme													
3. Investigation, detailed design & tendering	Farmers participation to formulate the plan can be promoted												
3.1 Guidance of participatory planning to farmers													
3.2 Survey and Investigation in co-operation with farmers													
3.3 Workshop for formation of rehabilitation													
3.4 Detailed design and cost estimate													
3.5 Agreement of final plan with farmers													
3.6 Tendering & Contracting													
3.7 Training of construction management													
3.8 Agreement of farmers' contribution													
4. Implementation of rehabilitation / improvement	Proper water management and O&M can be achieved.									ID	Staff in ID (Contractors) Farmers	- Canal Structures to be rehabilitated (regulators, turnouts, measuring devices, etc.) - Rehabilitation of F-canals are carried out by farmers	
4.1 Rehabilitaion of Tank bund, sluice, and spillway													
4.2 Rehabilitation of main canals and O&M roads													
4.3 Rehabilitation of distributory canals and O&M roads													
4.4 Rehabilitation of Field canals and O&M roads													
4.5 Training for construction management													
5. Turnover process of facilities	Irrigation facilities can be handed over in proper condition									ID, IMD	Staff in ID Staff in IMD (Contractor) Farmers		
5.1 Joint inspection													
5.2 Rectification works, if any													
5.3 Preparation of documents of handover													
5.4 Handover of facilities													
6. Follow-up programme													

Table P.3.1 Plan of Operations: Irrigation and Drainage Plan (2/5)

Name of Scheme: Palukadawela Major Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU		□								ID, IMD	Staff in ID Staff in IMD Farmers	
2. Awareness programme		□										
3. Investigation, detailed design & tendering	Farmers participation to formulate the plan can be promoted	■	■									
3.1 Guidance of participatory planning to farmers												
3.2 Survey and Investigation in co-operation with farmers												
3.3 Workshop for formation of rehabilitation												
3.4 Detailed design and cost estimate												
3.5 Agreement of final plan with farmers												
3.6 Tendering & Contracting												
3.7 Training of construction management												
3.8 Agreement of farmers' contribution												
4. Implementation of rehabilitation / improvement	Proper water management and O&M can be achieved.									ID	Staff in ID (Contractors) Farmers	- Canal Structures to be rehabilitated (regulators, turnouts, measuring devices, etc.) - Rehabilitation of F-canals are carried out by farmers
4.1 Rehabilitaion of Tank bund, sluice, and spillway				■								
4.2 Rehabilitation of main canals and O&M roads				■								
4.3 Rehabilitation of distributory canals and O&M roads					■							
4.4 Rehabilitation of Field canals and O&M roads					■	■						
4.5 Training for construction management				■								
5. Turnover process of facilities	Irrigation facilities can be handed over in proper condition					■				ID, IMD	Staff in ID Staff in IMD (Contractor) Farmers	
5.1 Joint inspection												
5.2 Rectification works, if any												
5.3 Preparation of documents of handover												
5.4 Handover of facilities												
6. Follow-up programme							■					

Table P.3.1 Plan of Operations: Irrigation and Drainage Plan (3/5)

Name of Scheme: Periyakulama Medium Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Investigation, detailed design & tendering	Farmers participation to formulate the plan can be promoted									ID	Staff in ID Farmers	
3.1 Guidance of participatory planning to farmers												
3.2 Survey and Investigation in co-operation with farmers												
3.3 Workshop for formation of rehabilitation												
3.4 Detailed design and cost estimate												
3.5 Agreement of final plan with farmers												
3.6 Tendering & Contracting												
3.7 Training of construction management												
3.8 Agreement of farmers' contribution												
4. Implementation of rehabilitation / improvement	Proper water management and O&M can be achieved.									ID	Staff in ID (Contractors) Farmers	- Canal Structures to be rehabilitated (regulators, turnouts, measuring devices, etc.) - Rehabilitation of F-canals are carried out by farmers
4.1 Rehabilitaion of Tank bund, sluice, and spillway												
4.2 Rehabilitation of main canals and O&M road												
4.3 Rehabilitation of D&F canals and O&M roads												
4.4 Improvement of anicut												
4.5 Training for construction management												
5. Turnover process of facilities	Irrigation facilities can be handed over in proper condition									ID	Staff in ID (Contractor) Farmers	
5.1 Joint inspection												
5.2 Rectification works, if any												
5.3 Preparation of documents of handover												
5.4 Handover of facilities												
6. Follow-up programme												

Table P.3.1 Plan of Operations: Irrigation and Drainage Plan (4/5)

Name of Scheme: Mahananneriya Medium Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU										ID	Staff in ID Farmers	
2. Awareness programme												
3. Investigation, detailed design & tendering	Farmers participation to formulate the plan can be promoted											
3.1 Guidance of participatory planning to farmers												
3.2 Survey and Investigation in co-operation with farmers												
3.3 Workshop for formation of rehabilitation												
3.4 Detailed design and cost estimate												
3.5 Agreement of final plan with farmers												
3.6 Tendering & Contracting												
3.7 Training of construction management												
3.8 Agreement of farmers' contribution												
4. Implementation of rehabilitation / improvement	Proper water management and O&M can be achieved.									ID	Staff in ID (Contractors) Farmers	- Canal Structures to be rehabilitated (regulators, turnouts, measuring devices, etc.) - Rehabilitation of F-canals are carried out by farmers
4.1 Rehabilitaion of Tank bund, sluice, and spillway												
4.2 Rehabilitation of main canals and O&M roads												
4.3 Rehabilitation of Field canals and O&M roads												
4.4 Improvement of anicuts												
4.5 Training for construction management												
5. Turnover process of facilities	Irrigation facilities can be handed over in proper condition									ID	Staff in ID (Contractor) Farmers	
5.1 Joint inspection												
5.2 Rectification works, if any												
5.3 Preparation of documents of handover												
5.4 Handover of facilities												
6. Follow-up programme												

Table P.3.1 Plan of Operations: Irrigation and Drainage Plan (5/5)

Name of Scheme: Mahananneriya Minor Schemes (Cascade)

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Investigation, detailed design & tendering	Farmers participation to formulate the plan can be promoted									PED, DAS	Staff in PED Staff in DAS Farmers	
3.1 Guidance of participatory planning to farmers												
3.2 Survey and Investigation in co-operation with farmers												
3.3 Workshop for formation of rehabilitation												
3.4 Detailed design and cost estimate												
3.5 Agreement of final plan with farmers												
3.6 Tendering & Contracting												
3.7 Training of construction management												
3.8 Agreement of farmers' contribution												
4. Implementation of rehabilitation / improvement	Proper water management and O&M can be achieved.									PED	Staff in PED (Contractors) Farmers	- Canal Structures to be rehabilitated (farm turnouts) - Rehabilitation of canals are carried out by farmers
4.1 Rehabilitaion of Tank bund, sluice, and spillway												
4.2 Rehabilitation of irrigation canals												
4.3 Training for construction management												
5. Turnover process of facilities	Irrigation facilities can be handed over in proper condition									PED, DAS	Staff in PED Staff in DAS (Contractor) Farmers	
5.1 Joint inspection												
5.2 Rectification works, if any												
5.3 Preparation of documents of handover												
5.4 Handover of facilities												
6. Follow-up programme												

Table P.3.2 Plan of Operations: Water Management and O&M Plan (1/5)

Name of Scheme: Nachchaduwa Major Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Detailed design & tendering												
4. Implementation of rehabilitation / improvement												
5. Turnover process of facilities												
6. Improvement of water management										ID	- ID and external staff	Items to be strengthened
6.1 Training for the government staff	Capacity of the staff for water management is improved.										- Vehicles and equipment	(irrigation requirement, gate operation, and monitoring and evaluation of irrigation water)
1) Awareness for water management											- Training facilities	
2) Irrigation planning and scheduling											- Training equipment	
3) Water distribution and monitoring												
6.2 Training for farmers	Proper water management is done by the farmers (FO).											
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and monitoring												
7. Improvement of O&M										IMD,ID	- IMD, ID and external staff	Items to be strengthened
7.1 Training for the government staff	Capacity of the staff for O&M is improved.										- Vehicles and equipment	(awareness to O&M by farmer themselves, and water distribution)
1) Awareness for O&M											- Training facilities	
2) Planning of O&M												
3) Implementation of O&M												
7.2 Training for farmers	Proper O&M is done by the farmers (FO).										- Training equipment	
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
8. Monitoring & evaluation of O&M activities	Result of irrigation performance can be reflected in the next cultivation season.									IMD,ID	- IMD, ID and external staff	Monitoring will be conducted after cultivation
9. Follow-up programme												
9.1 Water management												
9.2 O&M												

Table P.3.2 Plan of Operations: Water Management and O&M Plan (2/5)

Name of Scheme: Palukadawela Major Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Detailed design & tendering												
4. Implementation of rehabilitation / improvement												
5. Turnover process of facilities												
6. Improvement of water management										ID	- ID and external staff	Items to be strengthened
6.1 Training for the government staff	Capacity of the staff for water management is										- Vehicles and equipment	(irrigation requirement, gate)
1) Awareness for water management											- Training facilities	
2) Irrigation planning and scheduling											- Training equipment	
3) Water distribution and monitoring												
6.2 Training for farmers	Proper water management is done by the farmers (FO).											
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and monitoring												
7. Improvement of O&M										IMD,ID	- IMD, ID and external	Items to be strengthened
7.1 Training for the government staff	Capacity of the staff for O&M is improved.										staff	(awareness to O&M
1) Awareness for O&M											- Vehicles and equipment	by farmer
2) Planning of O&M											- Training facilities	themselves, and
3) Implementation of O&M											- Training equipment	water distribution)
7.2 Training for farmers	Proper O&M is done by the farmers (FO).											
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
8. Monitoring & evaluation of O&M activities	Result of irrigation performance can be reflected in the next cultivation season.									IMD,ID	- IMD, ID and external staff	Monitoring will be conducted after cultivation
9. Follow-up programme												
9.1 Water management												
9.2 O&M												

Table P.3.2 Plan of Operations: Water Management and O&M Plan (3/5)

Name of Scheme: Periyakulama Medium Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Detailed design & tendering												
4. Implementation of rehabilitation / improvement												
5. Turnover process of facilities												
6. Improvement of water management										ID	- ID and external staff - Vehicles and equipment - Training facilities - Training equipment	Items to be strengthened (irrigation requirement, gate operation, and monitoring and evaluation of irrigation water)
6.1 Training for the government staff	Capacity of the staff for water management is											
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and monitoring												
6.2 Training for farmers	Proper water management is done by the farmers (FO).											
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and monitoring												
7. Improvement of O&M										ID	- ID and external staff - Vehicles and equipment - Training facilities - Training equipment	Items to be strengthened (awareness to O&M by farmer themselves, irrigation requirement, gate operation, and monitoring and evaluation of
7.1 Training for the government staff	Capacity of the staff for O&M is improved.											
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
7.2 Training for farmers	Proper O&M is done by the farmers (FO).											
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
8. Monitoring & evaluation of O&M activities	Result of irrigation performance can be reflected in the next cultivation season.									ID	- ID and external staff	Monitoring will be conducted after cultivation
9. Follow-up programme												
9.1 Water management												
9.2 O&M												

Table P.3.2 Plan of Operations: Water Management and O&M Plan (4/5)

Name of Scheme: Mahananneriya Medium Scheme

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Detailed design & tendering												
4. Implementation of rehabilitation / improvement												
5. Turnover process of facilities												
6. Improvement of water management										ID	- ID and external staff - Vehicles and equipment - Training facilities - Training equipment	Items to be strengthened (irrigation requirement, gate operation, and monitoring and evaluation of irrigation water)
6.1 Training for the government staff	Capacity of the staff for water management is											
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and												
6.2 Training for farmers	Proper water management is done by the farmers											
1) Awareness for water management												Items to be strengthened (awareness to O&M by farmer themselves, irrigation requirement, gate operation, and monitoring and evaluation of irrigation water)
2) Irrigation planning and scheduling												
3) Water distribution and												
7. Improvement of O&M										ID	- ID and external staff - Vehicles and equipment - Training facilities - Training equipment	
7.1 Training for the government staff	Capacity of the staff for O&M is improved.											
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
7.2 Training for farmers	Proper O&M is done by the farmers (FO).											Monitoring will be conducted after cultivation
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
8. Monitoring & evaluation of O&M activities	Result of irrigation performance can be reflected in the next cultivation season.									ID	- ID and external staff	
9. Follow-up programme												
9.1 Water management												
9.2 O&M												

Table P.3.2 Plan of Operations: Water Management and O&M Plan (5/5)

Name of Scheme: Mahananneriya Minor Schemes (Cascade)

Activities	Expected Results	Schedule (Year)								Agencies in Charge	Inputs	Remarks
		1st	2nd	3rd	4th	5th	6th	7th	8th			
1. Mobilization of PMU												
2. Awareness programme												
3. Detailed design & tendering												
4. Implementation of rehabilitation / improvement												
5. Turnover process of facilities												
6. Improvement of water management												
6.1 Training for farmers												
1) Awareness for water management												
2) Irrigation planning and scheduling												
3) Water distribution and monitoring												
7. Improvement of O&M												
7.1 Training for farmers												
1) Awareness for O&M												
2) Planning of O&M												
3) Implementation of O&M												
8. Monitoring & evaluation of O&M activities												
9. Follow-up programme												
9.1 Water management												
9.2 O&M												

Table P 3.3 Rehabilitation and Improvement Plan in Nachchaduwa Major Scheme (1/4)

Classification	Item	Description	Quantities
Tank	Bund	Earth works in tank bund where necessary	1 L.S.
		Strip turfing to newly filled earth	1 L.S.
		Gravelling along tank bund	1 L.S.
		Providing new rip rap	1 L.S.
		Construction of toe filler	280 m
	Sluice	Repair to existing sluice	1 L.S.
		Providing gabion walls in down stream of sluice	1 L.S.
	Spillway	Repair to spillway	1 L.S.
	Others	Improvements to tank bund access road	1 L.S.
		Construction of retaining wall in bund road	1 L.S.
		Improvement to foot bridge	1 L.S.
	Service tanks	Improvement of service tank of 11 nos.	11 nos.
Tank Total			
Feeder canal	Structure	Retaining wall	1 L.S.
		Measuring device & regulator	3 nos.
		Culvert, bridge & crossing	4 nos.
		Other structure	1 L.S.
Feeder canal Total	Earth works	Desilting, etc.	10,500 m
High Level Main	Structure	Masonry wall (canal lining)	3,976 m
		Bathing step	16 nos.
		Bridge	23 nos.
		Water control device	31 nos.
		Other facilities	3 nos.
		Sub-total	
	Earth works	Back fill, desilting, etc.	4,476 m
	Road	Graveling of canal road	15,256 m
	Total		
Low Level Main	Structure	Masonry wall and other lining	3,197 m
		Bathing step	4 nos.
		Bridge	80 nos.
		Water control device	21 nos.
		Crossing culvert	8 nos.
		Other facilities	1 nos.
		Sub-total	
	Earth works	Desilting, etc.	10,500 m
	Road	Graveling of canal road	10,500 m
	Total		
High Level D4-canal	Structure	Concrete lining	519 m
	Earth works	Earth works for canal bund forming	795 m
	Road	Gravelling	795 m
High Level D5-canal	Structure	Concrete lining	83 m
	Earth works	Earth filling	83 m
High Level D7-canal	Structure	Concrete lining	1,481 m
	Earth works	Earth works for canal bund forming	267 m
	Road	Gravelling	376 m
High Level D11-canal	Structure	Concrete lining	90 m
	Earth works	Earth works for canal bund forming	154 m
High Level D12-canal	Structure	Concrete lining	323 m
	Earth works	Earth works for canal bund forming	176 m
High Level D15-canal	Structure	Masonry wall for canal lining	27 m
	Earth works	Turnout	2 nos.
		Earth works for masonry wall	27 m
High Level D17-canal	Structure	Masonry wall for canal lining	21 m
	Earth works	Turnout	2 nos.
		Earth works for masonry wall	21 m
High Level D19-canal	Structure	Masonry wall for canal lining	260 m
		Drop structure	4 nos.
		Turnout structure	3 nos.
		Other facilities	1 L.S.
	Earth works	Earth works for masonry wall	260 m
	Road	Gravelling	825 m
High Level D21-canal	Structure	Masonry wall for canal lining	700 m
		Drop structure	6 nos.
		Turnout structure	5 nos.
		Culvert	1 no.
	Earth works	Earth works for masonry wall	700 m
	Road	Gravelling	700 m
High Level D26-canal	Structure	Masonry wall for canal lining	2,025 m
		Drop structure	17 nos.
		Turnout structure	10 nos.
		Culvert	2 no.
		Other facilities	1 L.S.
	Earth works	Earth works for masonry wall	2,025 m
	Road	Gravelling	2,025 m

Table P 3.3 Rehabilitation and Improvement Plan in Nachchaduwa Major Scheme (2/4)

Classification	Item	Description	Quantities
High Level D27-canal	Structure	Masonry wall for canal lining	1,961 m
		Drop structure	8 nos.
		Turnout (including pipe outlet & regulator)	13 nos.
		Culvert	1 no.
	Earth works	Earth works for masonry wall	1,961 m
	Road	Gravelling	1,961 m
High Level D35-canal	Structure	Masonry wall for canal lining	2,698 m
		Drop structure	16 nos.
		Turnout	4 nos.
		Culvert, crossing & bridge	6 no.
	Other facilities		1 L.S.
	Earth works	Earth works for masonry wall	2,698 m
	Road	Gravelling & filling pot	2,422 m
High Level D36-canal	Structure	Masonry wall for canal lining	1,661 m
		Drop structure	5 nos.
		Turnout & pipe outlet	14 nos.
		Culvert, crossing & bridge	2 no.
	Other facilities		1 L.S.
	Earth works	Earth works for masonry wall	1,661 m
	Road	Gravelling & filling pot	1,661 m
High Level D36A-canal	Structure	Masonry wall for canal lining	631 m
		Drop structure	3 nos.
		Turnout & pipe outlet	7 nos.
		Culvert, crossing & bridge	1 no.
	Other facilities		1 L.S.
	Earth works	Earth works for masonry wall	631 m
	Road	Gravelling & filling pot	631 m
High Level D-canal Total			
Low Level D1-canal	Structure	Rectangular canal section	820 m
		Turnout & pipe outlet	7 nos.
	Earth works	Earth works for rectangular canal section	820 m
		Gravelling	810 m
Low Level D1A-canal	Structure	Rectangular canal section	537 m
		Drop structure	1 nos.
		Turnout & pipe outlet	1 nos.
		Culvert & crossing	2 nos.
	Earth works	Earth works for rectangular canal section	537 m
	Road	Gravelling	537 m
Low Level D2canal	Structure	Trapezoidal canal section	465 m
		Turnout, pipe outlet & regulator	5 nos.
		Culvert & crossing (tractor crossing)	1 nos.
	Earth works	Earth works for trapezoidal canal section	0 m
	Road	Gravelling	475 m
Low Level D3A-canal	Structure	Trapezoidal canal section	13 m
		Turnout & pipe outlet	1 nos.
		Earth works for trapezoidal canal section	0 m
	Road	Gravelling	15 m
Low Level D4-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	1,235 m
		Drop structure	1 nos.
		Turnout, pipe outlet & regulator	9 nos.
		Culvert & crossing	1 nos.
	Earth works	Earth works for trapezoidal canal section	170 m
	Road	Gravelling	1,245 m
Low Level D5-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	18 m
		Turnout, pipe outlet & regulator	2 nos.
	Earth works	Earth works for trapezoidal canal section	0 m
Low Level D6-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	1,325 m
		Drop structure	6 nos.
		Turnout, pipe outlet & regulator	7 nos.
		Culvert, crossing & bridge	2 nos.
	Earth works	Earth works for trapezoidal canal section	0 m
	Road	Gravelling	1,350 m
Low Level D7-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	170 m
		Turnout, pipe outlet & regulator	3 nos.
		Culvert, crossing & bridge	1 nos.
		Earth works for trapezoidal canal section	0 m
	Road	Gravelling	0 m
Low Level D8-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	340 m
		Turnout, pipe outlet & regulator	7 nos.
		Culvert, crossing & bridge	1 nos.
	Earth works	Earth works for trapezoidal canal section	0 m
	Road	Gravelling	350 m

Table P 3.3 Rehabilitation and Improvement Plan in Nachchaduwa Major Scheme (3/4)

Classification	Item	Description	Quantities
Low Level D9-canal	Structure	Trapezoidal canal section (masonry wall + plaster)	2,000 m
		Drop structure	3 nos.
	Earth works	Turnout, pipe outlet & regulator	14 nos.
		Culvert, crossing & bridge	1 no.
Low Level D10-canal	Structure	Desilting the canal bed	3,000 m
		Trapezoidal canal section (masonry wall + plaster)	190 m
	Earth works	Turnout, pipe outlet & regulator	2 nos.
		Culvert, crossing & bridge	1 no.
Low Level D11-canal	Structure	Desilting the canal bed	0 m
		Gravelling	355 m
	Earth works	Trapezoidal canal section (masonry wall + plaster)	726 m
		Turnout, pipe outlet & regulator	4 nos.
Low Level Nelubewa center	Structure	Drop structure	5 nos.
		Desilting the canal bed	0 m
	Earth works	Gravelling	748 m
		Trapezoidal canal section (masonry wall + plaster)	578 m
Low Level D-canal Total	Structure	Turnout, pipe outlet & regulator	9 nos.
		Culvert, crossing & bridge	2 nos.
	Earth works	Desilting the canal bed	0 m
		Gravelling	588 m
High Level Sena Samagi FO-1	Structure	Canal lining (masonry or concrete)	335 m
		Regulator	1 no.
	Earth works	Culvert	1 no.
		Earth works for canal bund filling	61 m
High Level Mahasen FO-2	Structure	Earth excavation for drainage canal	75 m
		Earth filling & gravelling	4,000 m
	Earth works	Total of FO-1	
		Canal lining (masonry or concrete)	1,488 m
High Level Parakrama FO-3	Structure	Water tank	2 nos.
		Regulator	2 nos.
	Earth works	Spill canal improvement	1 no.
		Culvert	2 nos.
High Level Samagi FO-4	Structure	Earth works for canal bund filling	152 m
		Earth woks for gravelling & others	1 L.S.
	Earth works	Total of FO-2	
		Canal lining (masonry or concrete)	3,848 m
High Level Ranketa FO-5	Structure	Regulator & turnout	5 nos.
		Culvert	24 nos.
	Earth works	Construction of threshing yard	3 nos.
		Improvement of anicut	1 no.
High Level 26/27 D-canal FO-6	Structure	Earth works for canal bund filling	207 m
		Earth filling & gravelling	4,000 m
	Earth works	Total of FO-3	
		Canal lining (masonry or concrete)	1,610 m
High Level Ruwanmweli FO-7	Structure	Turnout	4 nos.
		Culvert	1 no.
	Earth works	Earth work for canal desilting	3 nos.
		Total of FO-4	
High Level Tissa FO-8	Structure	Canal lining (masonry or concrete)	6,089 m
		Sluice gate	1 nos.
	Earth works	Culvert	2 no.
		Earth work for drainage canal	500 m
High Level D & F-canal Total	Structure	Earth work for canal bund filling	10 m
		Earth filling & gravelling	5,476 m
	Earth works	Total of FO-5	
		Canal lining (masonry or concrete)	2,389 m
High Level D & F-canal Total	Structure	Turnout	13 nos.
		Culvert	3 no.
	Earth works	Earth work for canal bund filling	1 no.
		Earth filling & gravelling	6,468 m
High Level Tissa FO-8	Structure	Total of FO-6	
		Canal lining (masonry or concrete)	1,470 m
	Earth works	Regulator & turnout	3 nos.
		Culvert	1 no.
High Level D & F-canal Total	Structure	Improvement of spill tail canal	1,500 m
		Eart work for drainage canal excavation	500 m
	Earth works	Earth filling & gravelling	5,950 m
		Total of FO-7	
High Level D & F-canal Total	Structure	Canal lining (concrete)	550 m
		Total of FO-8	
	Earth works	High Level D & F-canal Total	

Table P 3.3 Rehabilitation and Improvement Plan in Nachchaduwa Major Scheme (4/4)

Classification	Item	Description	Quantities
Low Level	Structure	Canal lining (masonry)	5,400 m
Al-Aksa		Turnout	16 nos.
FO-9	Total of FO-9		
	Structure	Canal lining (masonry or concrete)	3,105 m
Low Level		Regulator & turnout	5 nos.
Ekasth		Causeway	1 no.
FO-10	Earth works	Eart work for canal bund filling	3,947 m
	Road	Earth filling & gravelling	2,840 m
	Total of FO-10		
	Structure	Canal lining (masonry or concrete)	1,631 m
Low Level		Turnout	12 nos.
Isuru		Culvert	1 no.
FO-11		Tractor entrance	1 no.
	Earth works	Eart work for canal bed desilting	200 m
	Road	Earth filling & gravelling	3,236 m
	Total of FO-11		
	Structure	Canal lining (masonry or concrete)	3,060 m
Low Level		Turnout & sluice gate	5 nos.
Rana Mayura		Culvert	3 nos.
FO-12		Others	1 L.S.
	Earth works	Eart work for canal bed desilting	122 m
		Eart work for canal bund filling	550 m
	Road	Earth filling & gravelling	4,720 m
	Total of FO-12		
	Structure	Canal lining (masonry or concrete)	4,900 m
Low Level		Culvert	4 nos.
Gemunu	Earth works	Eart work for canal bund filling	5,200 m
FO-13	Road	Earth filling & gravelling	6,200 m
	Total of FO-13		
	Structure	Canal lining (masonry or concrete)	2,500 m
Low Level		Culvert	8 nos.
Wiyaya	Earth works	Eart work for canal bund filling	4,150 m
FO-14		Earth work fir drainage excavation	4,000
	Road	Earth filling & gravelling	2,100 m
	Total of FO-14		
Low Level D & F-canal Total			

Table P 3.4 Rehabilitation and Improvement Plan in Palukadawela Major Scheme (1/2)

Classification	Item	Description	Quantities
Tank	Bund	Earth works in forming bund at low sections	1 L.S.
		Improvement to rip rap protection	1 L.S.
		Improvement to bathing spots	1 L.S.
		Construction of new bathing spots	1 L.S.
		Gravelling tank bund road	1 L.S.
		Provision of toe filter	1 L.S.
	Sluice	Improvement to down stream structure of LB & RB sluices	1 L.S.
		Improvement to upstream wall of RB sluice & fixing gate posts	1 L.S.
		Provision of trash rack	1 L.S.
		Provision of hand rails to head sluice	1 L.S.
	Spillway	Providing reinforced concrete skin cover	1 L.S.
		Construction of bridge over spill way	1 L.S.
	Others	Construction of new bridges	2 nos.
		Construction of new causeway	4 nos.
		Construction of retaining wall	60 m
Tank Total			
Feeder Canal	Structure	Regulator	1 no.
		Measuring device	1 no.
	Earth works Road	Earth filling & desilting	472 m
		Ravelling	472 m
Feeder Canal Total			
Anicut		Improvement to Dangahakotuwa amuna	1 L.S.
		Improvement to Alakola amuna	1 L.S.
		Improvement to Kota Ela	1 L.S.
		Improvement to Weeradadana amuna (No.1)	1 L.S.
		Improvement to Weli amuna	1 L.S.
		Improvement to Malgaha Kotuwa	1 L.S.
		Improvement to Weehena amuna	1 L.S.
		Improvement to Thalakola amuna	1 L.S.
		Improvement to Thibbatuhena amuna	1 L.S.
		Improvement to Weeradadana amuna (No.2)	1 L.S.
		Improvement to Kotuwela amuna	1 L.S.
		Improvement to Halmilla Kotuwa amuna	1 L.S.
		Improvement to Pahgaha Kotuwa amuna	1 L.S.
		Improvement to Karuwala Gaha Kotuwa amuna	1 L.S.
		Improvement to Puranwela amuna	1 L.S.
		Improvement to Nawa amuna	1 L.S.
		Construction of new anicut between Thalakola & Thibbatuhena amuna	1 L.S.
Anicut Total			
RB Main Canal	Structure	Retaining wall (masonry)	16 nos.
		Turnout, regulator & mesuring devices	31 nos.
		Bridge, culvert & crossing	28 nos.
		Spill causeway	10 nos.
		Bathing spots	9 nos.
		Improvement of tunnel section	260 m
		Others	1 L.S.
		Earth works	Earth filling, desilting & gravelling road
	RB Main Canal Total		
Tract 1 D6-canal	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	948 m
Tract 1 D10-canal	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	1,950 m
Tract 2 D10-canal	Structure	Retaining wall for canal lining (masonry)	2 no.
		Turnout & regulator	12 nos.
		Drop structure	5 nos.
		Culvert	2 no.
		Others	1 L.S.
	Earth works		0 m

Table P 3.4 Rehabilitation and Improvement Plan in Palukadawela Major Scheme (2/2)

Classification	Item	Description	Quantities
Tract 2 D10/4-canal	Structure	Retaining wall for canal lining (masonry)	2 no.
		Turnout & pipe outlet	8 nos.
		Drop structure	12 nos.
		Pipe culvert	7 no.
		Others	1 L.S.
	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	1,920 m
Tract 4 D10canal	Structure		
	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	720 m
Tract 5 D1-canal	Structure	Pipe outlet	5 nos.
		Pipe culvert	2 no.
		Others	1 L.S.
	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	1,712 m
Tract 5 D2-canal	Structure	Pipe outlet	12 nos.
		Culvert	1 no.
		Causeway	1 no.
	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	2,038 m
Tract 6 D1-canal	Structure	Retaining wall for canal lining (masonry)	1 no.
		Pipe outlet	14 nos.
		Drop structure	12 nos.
		Culvert	2 nos.
		Bathing spots	1 no.
	Earth works	Earth works for canal bund forming, turfing & gravelling for bund road	1,920 m
D-Canal Total			
Tract 1 F-canal	Structure	Turnout	23 nos.
	Earth works		
Tract 2 F-canal	Structure	Canal linig (masonry or concrete)	82 m
		Farm turnout	31 nos.
		Culvert	1 no.
		Drain canal anicut	1 no.
		Others	1 L.S.
	Earth works	Earth works for canal bund forming	150 m
		Desilting from tank bed	1 L.S.
	Road	Eath filling & gravelling	10,020 m
Tract 3 F-canal	Structure	Canal linig (masonry or concrete)	400 m
		Farm turnout	5 nos.
		Culvert	1 no.
		Bathing step	3 nos.
	Earth works	Earth filling for canal & road	1 L.S.
Tract 4 F-canal	Structure		
	Earth works		
Tract 5 F-canal	Structure	Canal linig (masonry or concrete)	304 m
		Sluice	1 L.S.
		Farm turnout	4 nos.
		Culvert	12 nos.
		Bathing step	3 nos.
		Others	1 L.S.
	Earth works	Earth works for canal bund forming	206 m
	Road	Eath filling & gravelling	9,582 m
Tract 6 F-canal	Structure	Tank rip rap protection	1 L.S.
		Bathing step	1 no.
		Farm turnout	4 nos.
	Earth works	Eart work for canal bed desilting	1 L.S.
	Road	Eath filling & gravelling	375 m
Puranagama F-canal	Structure	Canal linig (masonry or concrete)	462 m
		Causeway	3 nos.
	Earth works	Eart work for canal bund filling	200 m
	Road	Eath works for drainage canal excavation	200 m
F-Canal Total			

Table P 3.5 Rehabilitation and Improvement Plan in Periyakulama Medium Scheme

Item to be rehabilitated		Description	Quantities
Tank	Bund	Earth and gravel filling & slope protection	1 L.S.
	Sluice	Reconstruction	3 nos.
	Spillway	Spill tail canal improvement	1 L.S.
	Others		1 L.S.
	Total		
Main Canal (Low level, center)	Structure	Turnout & Regulator	19 nos.
		Culvert	5 nos.
		Rubble masonry wall	330 m
		Sub-total	
	Earth works	Earth works & turfing	920 m
		Sub-total	
	Maintenance road	Earth filling & graveling	330 m
Total			
D-Canal 1 (Low level, center)	Structure	Turnout	20 nos.
		Culvert	4 nos.
		Sub-total	
	Earth works	Earth works	2,000 m
		Sub-total	
Total			
D-Canal 2 (Low level, center)	Structure	Turnout	12 nos.
		Culvert	2 nos.
		Sub-total	
	Earth works	Earth works	350 m
		Sub-total	
Total			
D-Canal 3 (Low level, center)	Structure	Turnout	7 nos.
		Culvert	2 nos.
		Sub-total	
	Earth works	Earth works	1,200 m
		Sub-total	
Total			
F-canal (High level, RB)	Structure	Turnout	10 nos.
		Culvert	3 nos.
		Sub-total	
	Earth works	Earth works	1,150 m
		Sub-total	
Total			
F-canal (High level, LB)	Structure	Turnout	6 nos.
		Culvert	3 nos.
		Sub-total	
	Earth works	Earth works (field canal improvement)	1,400 m
		Earth excavation (proposed drainage canal)	600 m
		Sub-total	
Total			
Total			

Table P 3.6 Rehabilitation and Improvement Plan in Mahananneriya Medium Scheme

Item to be rehabilitated		Description	Quantities
Tank	Bund	Earth works in forming bund at low sections	1 L.S.
		Gravelling tank bund road	1 L.S.
		Improvement of rip rap protection	1 L.S.
		Improvement of concrete slap protection	1 L.S.
		Provision of toe-filter	1 L.S.
	Sluice	Improvement to tower and approach of sluice & fixing gauge	1 L.S.
		Improvement of down stream transition structure	1 L.S.
		Provision of measuring device	1 L.S.
	Spillway	Provision of upstream cut-off wall	1 L.S.
		Improvement of downstream water cushion	1 L.S.
		Improvement of abutments	1 L.S.
	Others	Improvement of anicut	7 nos.
	Total		
Main Canal (RB)	Structure	Rubble masonry wall for canal lining	88 m
		Turnout & regulator	29 nos.
		Culvert	12 nos.
		Drainage inlet structure	6 nos.
		Drop structure	7 nos.
		Canal spill structure	6 nos.
		Others	1 no.
		Sub-total	
	Earth works	Desilting, Earth work in forming canal bund & turfing	3,550 m
		Sub-total	
F-Canal	Structure		
	Earth works		
Road	Earth filling & graveling		2,310 m
	Culvert		2 nos.
	Sub-total		
Total			

Table P 3.7 Rehabilitation and Improvement Plan in Mahananneriya Minor Schemes

Name	Place to be repaired	Description	Quantities	
Kall	Tank	Bund	Widen bund & slope	1 L.S.
		Spill	Construction of spill	1 L.S.
		Sluice	Reconstruction	1 no.
		Sub-total		
	Canal system	F-canal	Rubble masonry wall	1,000 m
Structure		Farm turnout	20 nos.	
Sub-total				
Feeder canal	Earth Excavation		1,500 m	
	Sub-total			
Total				
Arti	Tank	Bund	Widen bund & slope	1 L.S.
		Sluice	Reconstruction	2 nos.
		Bathing step	New construction	2 nos.
		Spill	Rehabilitation	1 L.S.
	Sub-total			
Canal system	Structure	Farm turnout	10 nos.	
	Causeway	New construction	2 nos.	
	Sub-total			
Total				
Mai	Tank	Bund	Earth filling & turfin	1 L.S.
		Sluice	Reconstruction	1 no.
		Spill tail canal	Earth excavation	3,000 m
		Sub-total		
	Canal system	Canal	Earth filling & turfin	1,500 m
Sub-total				
Road		Agricultural Road	Earth & gravel filling	2,000 m
Sub-total				
Total				
Tam	Tank	Desilting		1 L.S.
		Bund	Widen bund & slope	1 L.S.
		Spill	Rehabilitation	1 L.S.
		Sluice	Reconstruction	2 nos.
	Sub-total			
Canal system	Structure	Farm turnout, 20 nos	20 nos.	
	Sub-total			
Total				
Ihar	Tank	Bund	Earth filling & turfin	1 L.S.
		Bathing step		3 nos.
		Desilting		1 L.S.
		Sluice	Reconstruction	1 no.
	Spill	Rehabilitation	1 L.S.	
Sub-total				
Canal system	Canal	Earth filling	800 m	
	Canal	Rehabilitation of pipe	30 m	
	Sub-total			
Total				
Total				
Rs./ha				