

DEPARTMENT OF WATER RESOURCES, GOVERNMENT OF INDIA

TECHNICAL REPORT

ON

THE REHABILITATION OF TANK IRRIGATION PROJECT

VOLUME - I

1974

JAPAN INTERNATIONAL COOPERATION AGENCY



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FEASIBILITY REPORT
ON
THE REHABILITATION OF TANK IRRIGATION PROJECT

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7. WATER MANAGEMENT

7.1 REGULATING RULES IN THE PAWM PROJECT

The "Pilot Area Water Management (PAWM) Project" functioned in Stage I Section 1 of the Minipe Area from 79/80 Maha to June 1980. Regulating rules on the water distribution were not framed as the PAWM Project was in operation for only the 79/80 Maha season. "Regulation and Procedures in operating Major Irrigation Systems" by Irrigation Department have been largely followed in the PAWM Project.

7.2 IRRIGATION DEPARTMENT REGULATIONS AND PROCEDURES IN OPERATING MAJOR IRRIGATION SYSTEMS

(1) Regulations for Protection of Irrigation Works and Conservation of Water

The role of the Irrigation Department in cultivations under major irrigation works is given in the following "Irrigation Ordinance - 1956 Revision". The REGULATIONS are made under Part VI - Protection of Irrigation Works and Conservation of Water, Section 64 in "A Reprint of the Irrigation Ordinance (Chapter 453) as amended by Act No. 48 of 1968".

Regulation No. 8 - No person other than an Irrigation headman or an officer authorized by the Divisional Irrigation Engineer (succeeded by Range Deputy Director of Irrigation) shall in any way interfere with or alter the level of, any sluice, dam or regulating machinery or device in or upon any ela, channel, or watercourse comprised in any irrigation work.

Regulation No. 9 - 1) No person other than an officer of the Irrigation Department shall distribute or cause the distribution of water from any major irrigation work.

2) No person other than an irrigation headman shall distribute or cause the distribution of water from any minor irrigation work.

Regulation No. 10 - The person in charge of any irrigation work may stop the supply of water from that irrigation work to any lands in which waste of water-
course on account of any neglect or default of the proprietors or cultivators in attending to any work for which they are responsible.

Regulation No. 14 - 1) The Government Agent shall, in consultation with the Divisional Irrigation Engineer (Range DD), fix the dates for the commencement and completion of the supply of water in each season for cultivation of land under any major irrigation work.

2) Where the Government Agent, after consultation with the Divisional Irrigation Engineer (Range DD), is opinion that, by reason of the scarcity of water or for any other cause,

the cultivation, in any season of the entire extent of land which is capable of cultivation under any major irrigation work is not practicable or desirable, he may, after consultation with the Divisional Irrigation Engineer, (Range DD) determine -

- a) the tract or tracts that may be supplied with water in that season; or
- b) the proportion of each proprietor's land that may be supplied with water in that season:

Provided, however, that the Government Agent may determine different proportions in respect of such different classes of proprietors or in respect of lands in such different areas as may be defined by him in writing.

3) The Government Agent shall cause notice -

- a) of the dates of the commencement and completion of the supply of water referred to in paragraph 1) of this regulation, and

b) of any determination made under paragraph 2) of this regulation.

to be given as soon as may be practicable before the date fixed for the commencement of the supply of water in any season. Such notice shall be given by beat of tom-tom or by exhibiting in conspicuous places, written notice in the language or languages prevailing in the area or in such other manner as may be determined by the Government Agent.

4) The Government Agent shall forthwith communicate every date fixed by him under paragraph 1) and every determination made by him under paragraph 2) to the Minister who may, if he considers it necessary so to do, make order varying any such date or determination and cause such order to be transmitted to the Govt. Agent who shall give effect to it.

(2) Notification of Cultivation Meetings

1) In pursuance of the role defined in Regulation No. 14, the Range DD (after preparation of the water balance for the cultivation along with the IE in charge of the project) shall notify the Government Agent at a reasonable period ahead of the cultivation season under a major irrigation

work to hold a Cultivation (Kanna) Meeting in terms of powers vested in the G.A. in Section 19 (1), and the provisions in Section 11 (5) (c) of Irrigation Ordinance referred above, to decide details with respect to the ensuing cultivation season. In this connection the Range DD shall ensure that all close season works are completed and the distribution system up to the Field Canal is in order for the proposed cultivation.

- 2) When notifying the G.A. to hold a Cultivation Meeting, the Range DD shall recommend the number of staggers into which the command area is to be divided to commence cultivation and shall indicate the proposed rotation schedule that would be adopted for the cultivation. Further recommendations shall include but not be limited to the following:
 - Last date to complete maintenance of field canals by farmers in each stagger area.
 - Commencement date for water issue for land preparation in each stagger area.
 - Last date for sowing in each stagger area.
 - Crop to be cultivated with variety of seed to be sown.
 - Last date of water issue for cultivation in each stagger area.
- 3) The recommendations may include an extension of the last date for sowing (about 2 weeks) but in such instance the variety of seed (paddy) to be sown should be of a shorter period of growth than that recommended for the last date of sowing with extension.

- 4) The Range DD shall request the GA that when the latter intimates the date and venue of the Cultivation Meeting he should also inform the name and designation of the Presiding Officer. When the Presiding Officer is the GA the Range DD will represent the department at the meeting. The department will be represented by the IE of the Division in which the Scheme is located when the additional GA presides unless a specific request is made by GA stating reasons requesting Range DDs attendance at the meeting. The senior most TA in charge of the Scheme will represent the department when the Divisional AGA presides at the meeting.

(3) Requisition for Water Issues

- 1) Though a commencement date for water issue is decided at the Cultivation Meeting yet the actual release of water is to be made only on receipt of a written requisition for same from the Colonisation Officer of the Land Commissioner's Department serving under the GA or an Officer authorised by the GA and responsible for the stagger area of the Scheme. Such requisition should be delivered by the CO/AO to the IE/TA/WS as appropriate at least three days before the decided commencement date. Late receipt of such requisition will not be acted upon by the department unless same is endorsed by the officer who had presided at the Cultivation Meeting stating reasons for delay. When the commencement date has been delayed it is to be noted that there would be no change in the Last date for sowing decided at the Cultivation Meeting such to para. (2) 4).
- 2) The requisition from the CO/AO referred in para. (3) 1) shall contain along with the request for

release of water, the quantum of which will be determined by the department, the following minimum information:

- a. Designation of canal(s) ready for release of water.
- b. Extent(s) in acs. under such canal(s) as per BOP.
- c. Estimated extent(s) in acs. of encroached lands benefitted from the canal(s).
- d. Total extent(s) for cultivation which may be either b. or b. and c.

(4) Actions Due before Release of Water

- 1) Upon receipt of requisition from the CO/AO, the WS shall inspect to determine whether required maintenance work in the Field Canals have been completed by the farmers and the accuracy of the extents declared in the requisition and report findings to the TA. If large discrepancies in the extents declared are reported by the WS then the TA himself shall inspect and make his own determination of the extents and report same to the IE. Subject to the approval of the IE, the extents to be issued with water shall be determined by the TA and the quantum of release computed.
- 2) A communication shall be addressed to the GA by the IE with copy to Range DD within three days of commencement date commenting on the maintenance work in the Field Canals by the farmers and the extent to which any lack of maintenance will affect the water issues and on the accuracy of the extents declared in the requisitions including any amendments made to same.

3) After commencement issue of water, release shall be regulated thereafter taking into consideration the rainfall and the crop water requirements for the various stages of growth, namely, initial, development, mid and late stages respectively. The water balance prepared prior to commencement of cultivation shall be compared with actual performance and releases adjusted as found necessary to ensure that the duties by growth stages conform to design. If excessive consumption of water is observed due to causing obstruction or damage to irrigation works or waste of water, or encroaching upon irrigation works - vide Section 93 of Ordinance, the matter shall be promptly reported to the GA for necessary action.

(5) Extension of Last Date of Water Issue

- 1) If the GA deems it absolutely necessary that an extension of water issue for the cultivation is required he shall then request for same from the Range DD giving sufficient time in advance of the date for the procedures in para. (5) 2) to be adopted and furnish the following information with respect to his request: -
 - a. Identify of the area requiring additional water issue.
 - b. Extent and stage of growth.
 - c. Period required beyond last date to mature the crop.
 - d. Reasons for delay in cultivations.
- 2) The Range DD on receipt of the information in para. (5) 1) shall compute the additional volume of water and extended period of issue (base on

declared stage of growth and further period required to mature the crop) required and consider the impact on reservoir operation for the following cultivation due to such additional use of water in present cultivation. He shall further consider the extent to which 'close season' maintenance work will be affected by the extended water issue. After consideration as above the Range DD shall either accede to the request of the GA for the extension or if he considers such extension detrimental report to the DI giving reasons why such extension cannot be granted. The DI, after consultation with S/L. & L.D. as found necessary, shall intimate to the Range DD the decision to be conveyed to the GA on the request for extension of last date of cultivation. The grant of such extension may be subject to penal payment for additional issue of water.

- 3) The extended water issue should not be made until a requisition for same is received from the CO/AO who had submitted the original requisition with references to the correspondence in para. (5) 2). There should be no contravention of the above procedure without the approval of the Snr. D.D. (O & I).
- 4) With respect to Schemes supplemented with Mahaweli Diversion, GA shall request such extension of water issue as in para. (5) 1) from the Mahaweli Authority with advice to Range DD. The Range DD shall furnish the recommendation with respect to such extension as in para. (5) 2) to Snr. DD (O & I) who after consultation with DI will recommend to the Mahaweli Authority the course of action to be pursued. The Mahaweli Authority after due consideration of the recommendations of

the DI will convey to the GA the course of action to be pursued which will be implemented by the Irrigation Department.

7.3 WATER TAXES

The government has decided to levy a portion of the operational and maintenance (O & M) Costs from the cultivators who are benefited from major irrigation projects as from 1984. The quantum of water charge to be levied per ac per annum was worked out based on the "Typical O & M Costs per ac annum for gravity irrigation works (1982 prices)" quoted in Annex 12.

It was proposed to recover the amount in the following manner as the State cannot bear the full costs.

	<u>AMOUNT BORNE BY THE STATE</u>	<u>RECOVER FROM COLONIST</u>	<u>TOTAL</u>
1984	Rs.100/=	Rs.100/=	Rs.200/=
1985	Rs. 80/=	Rs.120/=	Rs.200/=
1986	Rs. 60/=	Rs.140/=	Rs.200/=
1987	Rs. 40/=	Rs.160/=	Rs.200/=
1988	Rs. 20/=	Rs.180/=	Rs.200/=
1989	-	Rs.200/=	Rs.200/=

7.4 PROGRAMME FOR INTEGRATED MANAGEMENT OF MAJOR IRRIGATION SCHEMES

It is very essential for the increasing agricultural production to promote a good water management as well as to apply the necessary inputs for agricultural production activities.

Good co-ordination among the staffs from the line agencies involved is required to accomplish the various services available to farmers on the above activities. The current water management programme, therefore, is being replaced to establish a harmonisation of the various inputs and services necessary for increasing agricultural productivity with special focus on the use of irrigation water in 1985 by the INMAS Programme mainly promoted under the Irrigation Management Division.

The IMD is to establish the framework for the operation of the INMAS Programme at various levels. So, the main aspects of this Programme are quoted from the "Programme for Integrated Management of Major Irrigation Schemes - INMAS -" in the Information Booklet No. 2 by the IMD as follows:

(1) Objectives of Programme

The programme for Integrated Management of Major Irrigation Schemes (INMAS) seeks to establish a harmonisation of the various inputs and services necessary for increasing agricultural productivity with special focus on the use of irrigation water which has been identified as the most critical and limiting resource in irrigated agriculture. It would identify the components for which various line agencies would be responsible and seeks to co-ordinate these activities through a system of Project Management. The lack of viable farmer institutions has also been a major constraint in involving farmer participation in management decisions affecting them. The programme seeks to rectify this by giving priority to the setting

up of farmer institutions which would provide an effective mechanism for farmer-officer dialogue.

Initial emphasis under the programme would be on the following aspects:

Project Management with a view to:

- Increasing agricultural production per unit of irrigation water.
- Increasing agricultural production per unit of land.
- Adequate and equitable distribution of irrigation water to farmers.
- Arrange for timely supply of agricultural inputs and sale of produce.
- Organise and develop farmer institutions to facilitate their participation in management.
- Recovery of O & M costs from beneficiaries in major irrigation schemes.
- Maintenance of irrigation systems at optimum levels of performance.
- Identify major systems needing urgent rehabilitation.
- Farmer education.

In the long term it would focus on:

- Integrated development of the farm lot to a commercial holding.
- Crop diversification and rotation.
- Social and economic development of the farming community.
- Marketing of agricultural produce and by-products.
- Agro-based industries.
- Processing of agricultural produce to semi-finished or finished products locally.
- Handling over to farmer organisations some of the management and operational functions of these projects.

(2) Organisation and Functions

Division of Irrigation Management:

The Division of Irrigation Management consisting of an inter-disciplinary group with experience in Irrigation, Agriculture, Institutional Development and Management will pay attention mainly to the irrigation systems in the Dry Zone. It will function as the administering authority for the programme and will receive policy guidelines and direction from the Central Co-ordinating Committee on Irrigation Management.

Some of its main functions are:

- Administering and implementing the 'INMAS' programme.
- Recovery of Irrigation Rates (O & M costs) from beneficiaries.
- Administering the O & M collection fund and allocating these funds for maintenance work in irrigation systems.
- Allocation of funds for O & M in Major Irrigation Schemes.
- Identification of systems for improvements and rehabilitation and allocation of funds after discussion with relevant agencies.
- Implementation of programmes for rehabilitation of major schemes.
- Establish farmer institutions whose main focus is irrigation, in Major Irrigation Schemes.
- Monitor the use of irrigation water in Major Schemes with a view to optimising its use.
- Monitoring of agricultural production activities in Major Irrigation Schemes with a view to increasing agricultural productivity.
- Prepare long term plans for diversification and optimum utilization of irrigated land.
- Total integrated development of agricultural land in Major Irrigation Schemes with a view to increasing incomes of farmers.

- Socio-economic Development of the farming community in Major Irrigation Schemes.
- Use of media for Irrigation extension and publicity.

(3) Implementation

i) National Level:

Implementation of the programme involves the co-ordinated contributions of various agencies involved in agricultural production. Several agencies some outside the purview of the Ministry of Lands & Land Development have a vital role to play in implementation. The co-ordination of these services and activities is achieved through the mechanism of the Central Co-ordinating Committee for Irrigation Management which is responsible for direction, co-ordination and implementation of the programme with a view to achieving its objectives. It would review policy and provide continuing guidelines for implementation at National and Local levels while setting priorities and allocating resources. It would monitor progress regularly taking corrective action in instances deemed necessary.

ii) District Level:

At the District level, the instrument of implementation and monitoring is the Sub-Committee of the District Agricultural Committee set up to direct this programme.

This Sub-Committee would:

- Function as the main implementing body for management of the projects coming under the Integrated Management Programme in the District.
- Identify the projects in the District as a separate production unit of the Annual Implementation programme of the Ministry of

Agricultural Development and Research and draw up annual programmes and monitor performance of each project on this basis.

- Programme for holding timely cultivation meetings for Maha and Yala for major schemes in the District especially in the Projects under the programme and draw up a calendar of such meetings.
- Programme, monitor and review the operation and maintenance programmes in respect of the Irrigation net-work as prepared by the Project Committees/Range Deputy Director.
- Programme, monitor and review the programme of Institutional Development and building up of farmer organisations in these projects.
- Programme, monitor and review the collection of Irrigation rates.
- Monitor and review arrangements for prosecution of offenders under the Irrigation Ordinance and Agrarian Services Act.
- Monitor and review administration and organisational aspects of these projects in relation to staffing, services etc.
- Send calendar of meetings, minutes and reports to the Central Co-ordinating Committee on Irrigation Management through the Irrigation Management Division.

iii) Project Level:

Project Committee:

A Project Committee comprising of field staff of all agencies involved in agricultural production and farmer representatives would determine the programmes for implementation in the Project.

The main functions of the Project Committee are:

- Formulation and implementation of a cultivation programme for the season/year.
- Holding of timely Kanna meetings.
- Ensure proper distribution of irrigation water.

- Arrange for timely provision of credit, seed and other inputs.
- Monitor programmes and take corrective action where needed.
- Recovery of O & M costs.
- Arrangements for Operation & Maintenance of all capital assets and approval of items to be handled under the maintenance programme of the Irrigation System.
- Promote formation and participation of Farmer Organisations in project activities.
- Identify training needs of farmers and officers serving in Project and arrange training.
- Report at the required regularity to the D.A.C. Sub-Committee and to the Irrigation Management Division.

The Project Committee would consist of:

- Project Manager (Chairman)
- Representative of Irrigation Department
- Representative of Agriculture Department
- Representative of Agrarian Services Department
- Representative of Agricultural Development Authority
- Representative of Land Commissioners Department
- Representatives of State Banks
- Representatives of Farmer Organisations

The following agencies are broadly identified with the programme and the level of representation would be as follows:

- Agriculture Department:

The Agricultural Instructors working in the Project area. Agricultural Officers if attached to these schemes would also participate.

- Agrarian Services Dept.:
Divisional Officers attached to the A.S.C. serving the Project area.
- Irrigation Department:
Technical Assistants attached to the Project. Irrigation Engineers if attached to these schemes would also participate.
- Land Commissioners Dept.:
Colonisation Officers attached to the Project. District Land Officers if attached to these schemes would also participate.
- Agricultural Deve. Authority:
The Agricultural Manager of the area.
- Other Agencies:
Divisional level staff of other agencies servicing agricultural needs of these schemes may be co-opted into the Committee or be invited to specific meetings if so required.
- Farmer Representatives:
Depending on size of Project, Farmer Representatives from the turn-out groups, Distributory Canal or Sub-Project Committee would represent farmer interests in the Project Committee. In all cases the number of farmer representatives on the Project Committee should be about 15 or 20. As the management capacity of the farmer representatives develop, the Project Manager would take action to have a farmer Secretary to the Committee.

(4) Line Agency Functions in Projects

The following main functions are identified as those performed by the under mentioned agencies in the Projects:

- i) Agriculture Department:
 - Agriculture extension services.
 - Farmer training in agriculture and on-farm water management.
 - Demonstration plots and trials.

ii) Irrigation Department:

- Maintenance of Head Works and the Irrigation System.
- Civil works of Rehabilitation of Irrigation Systems.
- Operation of Irrigation Systems including planning, implementation & monitoring of water distribution.

iii) Department of Agrarian Services:

- Arrange for supply of Agricultural inputs through A.S.C., co-operatives and private sector.
- Farmer training and on-farm water management with assistance of Agriculture Department.
- Crop insurance arrangements with Agricultural Insurance Board.
- Arrange for Agricultural credit.
- Implementation of the Agrarian Services law.
- Take action in cases of animal trespass and damage.
- Assist in establishment of farmer institutions for distribution of water.

iv) Land Commissioners Department:

- Work connected with land disputes in settlements.
- Settler welfare.
- Assist Project Management in organising farmer institutions and Participation.
- Collection of statistics on extents cultivated in settlements.
- Cooperate with Irrigation Department and assist where irrigation problems arise.
- Assist in prevention of Irrigation Offences and in prosecution of offenders.

- v) Agricultural Development Authority:
 - Monitor levels of supply of all agricultural inputs and help in arrangement of supplies where shortages occur.
 - Assist in the sale of produce.
 - Gather statistics as regards the quantities of inputs utilised and produce sold.
- vi) Paddy Marketing Board:
 - Arrange for timely purchase of produce under floor price scheme.
- vii) Agricultural Insurance Board:
 - Provide agricultural insurance and make payments to facilitate recultivation.
- viii) Bank of Ceylon:
 - Provide agricultural credit and cultivation loans to those eligible through the Agrarian Services Centres.
- ix) People Bank:
 - Agricultural credit through its Branches and co-operatives.
- x) Other State Agencies:
 - The Woman's Bureau, Department of Co-operatives, Department of Rural Development, Department of Animal Production and Health, Department for the Development of Marketing, Department of Fisheries and Department of Small Industries would be some of the other agencies with which Project Management and the Programmes would necessitate dealings with. Their participation would be requested if and when necessary.
- xi) Co-operatives and Agrarian Services Committees:
 - Multi-purpose Co-operatives, Agricultural Producers Co-operatives and Agrarian Services Committees serving the Project area are organisations that play a vital role in agricultural activities of the Project. In the drawing up of programmes and connected activities it would be necessary to consult with them. If deemed necessary, representatives may be invited to participate in Project Committee meetings.

xii) Local Authorities and Non-Governmental Organisations:

- It may be necessary to interact with the local authority or Gramodaya Mandalaya of the area and it may be beneficial to have them involved on certain issues. If necessary arrangements may be made to have a representative of the Gramodaya Mandalaya associated with the Project Committee.
- In the organisation of activities involving farmers it may be beneficial to involve any N.G.O.'s that are active and could help in mobilising public support for certain programmes, eg. shramadana in the Project area.

(5) Farmer Organisations

Farmer participation in Project activities constitutes an essential part of the 'INMAS' Programme. Farmer organisations provide the forum for dialogue and interaction among farmers and between farmers and officers working in the Project. Though various types of farmer organisations exist in one state or another in these schemes, this programme seeks to set up these organisations within a identified framework to satisfy the irrigation and allied needs of farmers living in these Projects.

Though size, type and level of representation of these organisations will depend on the Project itself and would need to cater to its specific needs, some conformity and consistency in the organisational and structural arrangements is essential to facilitate management.

In the establishment of farmer organisations under the 'INMAS' Programme, the following guidelines are emphasized:

- Farmer Organisations at all levels should represent a distinct hydrological area.

- Members of these organisations should be bona-fide cultivators within the area it represents.
- The organisation should represent all cultivators within the area.
- Officers would participate at the meetings of these organisations as observers or in an advisory capacity. In the case of the Distributory Canal or Sub Project Committees an officer could function as its Secretary.

To make farmer representation and participation practicable, it is recommended that the 03 tier system of organisation be adopted. This however would be modified depending on the circumstances and size of the Project.

(a) Primary Level of Organisation:

Turn-out Groups:

This constitutes the lowest level of organisation but the most important under the programme. It forms the base on which the higher level organisations are built up and their viability and sustained activity determines the success or otherwise of the programme.

It is recommended that this organisation represent all farmers being served by a Turn-out of F.C. as the case may be. It should not represent more than 15 - 25 farmers under normal circumstances. They would appoint a representative among themselves to be their spokesman in irrigation and agricultural matters in the next level of organisation.

In the selection of the representative it is desirable that he would be appointed by concensus rather than by the electoral process.

Arrangements are being made with the Dept. of Agrarian Services to have the unit area the

organisation represents considered as the area for which a Vel-Vidane or Yaya-Palaka would be appointed under the Agrarian Services law. In view of this the formal ratification of the farmer representative or his election would need to be done in accordance with and as provided for under the Agrarian Services law.

(b) Secondary Level of Organisation:

'D' Canal Committee or Sub-Project Committee:
Depending on size of Project and circumstances, it would be necessary to form these organisations for the next level of representation. They may be formed on the basis of one or more Distributory Canal areas. As it is desirable to limit the number of farmer representatives in the Project Committee to about 15 or 20 for practical reasons, the number of Distributory Canal or Sub-Project Committees would be determined by the number of turn-out groups. In some instances, especially in the smaller projects, it would be possible to have one of the turn-out group representatives to be selected to represent two or three contiguous turn-out areas and he be appointed directly to the Project Committee. This would obviate the necessity of having an intermediate level farmer organisation. In the event it is necessary to have such an organisation and conditions permit representation in the Sub-Project Committee need not be limited to the representative from the turn-out group but one or two other persons from the turn-out group could also represent interests at this level.

(c) Tertiary Level Organisation:

Project Committee:

On this Committee representatives from the Primary or Secondary level organisations, as the case may

be, will be appointed and represent the Head, Middle and Tail sections of the canal system. It is desirable that a greater number of representatives be from the tail sections. The number of farmer representatives on the Project Committee would be about 15 or 20 enable participation to be practical.

(6) Functions of Farmer Organisations:

Some of the main functions and responsibilities of these farmer organisations, especially the turn-out groups would be to;

- Identify the critical areas of the Irrigation System needing attention and indicate priority areas for rehabilitation or repair.
- Maintain and clean field channels with the assistance of farmers.
- Organise shramadana to attend to items of work on the channel network that can be handled by the farmers under supervision of the Irrigation authorities.
- Water distribution and rotational water issues within the field canal.
- Participate in decision making in matters connected with agriculture and irrigation through its representatives.
- Motivate farmers and encourage them to do on-farm water management.
- Inform authorities of offences relating to the irrigation systems and assist in checking of such offences.
- Submit proposals in respect of irrigation or the agricultural programmes through their representatives to the Project Committee for consideration.
- Cooperate with the Project Committee and connected agencies in obtaining of inputs and sale of produces.
- Motivate farmers to pay irrigation rates (O & M costs).

- Inform the necessary authorities and assist them in cases of pest or disease outbreak or damage to crops by animals.
- Handle maintenance work in systems on contract under supervision of Irrigation authorities.

(7) Functions of Farmer Representatives:

- The Farmer Representative or Govi Niyogitha would be the main spokesman for the group he represents at all levels of the organisational hierarchy.
- In addition to the turn-out group, if he is a representative of the Distributory or Sub-Project Committee, he would be spokesman for the entire area he represents and not only the turn-out group.
- At the turn-out or field canal level he will with the agreement and assistance of the group he represents be responsible for water distribution.
- In addition to distribution of water, he would take up with Project Management all issues as regards agriculture that come up in this area and assist the Project Committee in matters coming under its purview.
- Would especially assist the authorities in collection of O & M costs, in instances of animal damage and trespass and irrigation offences.
- Would ensure that cultivation decisions made at the Kanna meetings are carried out and motivate farmers to keep to the calendar of operations.
- Arrange for clearing of field canals by farmers either on 'pangu' basis or shramadana.
- Identify with the farmers the structures and other items in the canal network that need attention on a priority basis and submit the list to the Project Committee.
- Would help the authorities in the gathering of agricultural statistics.
- If appointed under the Agrarian Services Act as Vel-Vidane or Yaya-Palake, he would perform such duties required of him under the Act and be entitled to Salaris.

- If a Vel-Vidane already operates in the area in a scheme and his services are acceptable to the farmers, he could represent the turn-out groups or a distributory canal organisation, as the case may be. His co-operation would be solicited and he should be brought into the programme to prevent separate groups or camps being formed. If his services are unsatisfactory, action could be taken to remove him and the recommended procedure to appoint farmer representatives on the basis outlined earlier followed.

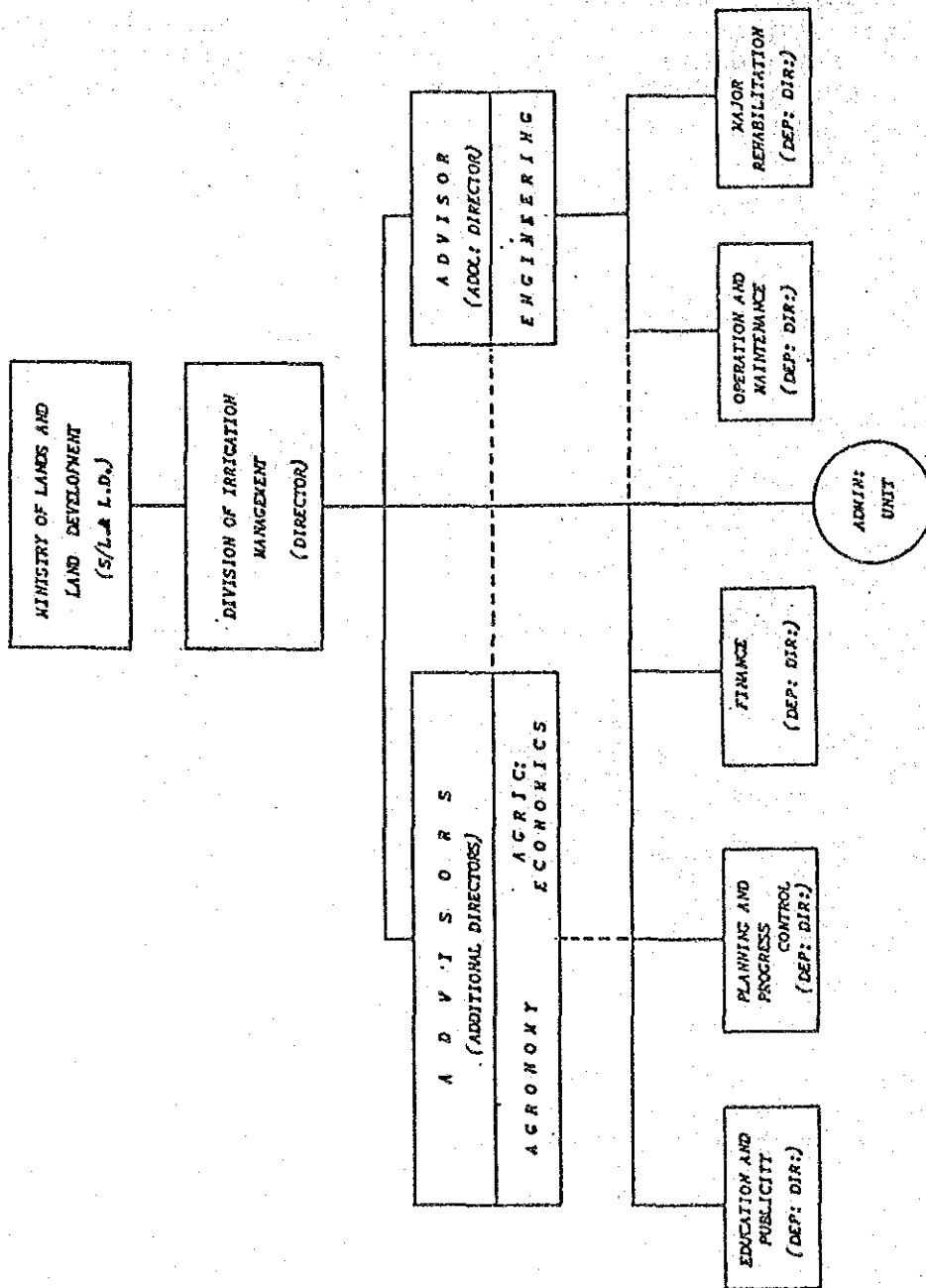


Fig. 7.4.1 ORGANISATION CHART OF THE DIVISION OF IRRIGATION MANAGEMENT

7.5 WATER DISTRIBUTION IN MINIPE AREA

7.5.1 Water Distributor

The turnouts to the D-canals in Minipe area have been operated by the water distributors. Their names and operational spheres are listed in Table 7.5.1.

Table 7.5.1 NAME AND OPERATIONAL SPHERE OF WATER DISTRIBUTORS

<u>Name of Water Distributor</u>	<u>D/Channels Nos</u>	<u>Unit</u>
<u>Stage - I</u>		
01. T.G.Sugathapala	D/1 - 12	Minipe
02. E.M.Ekanayaka	D/13 - 19	Amabagahapalesse
03. D.M.Jayathilleka	D/20 - 24	Handaganawa
04. A.K.B. Samarakoon	D/25 - 28	Handaganawa
05. S.S.Hewavasam	D339 - 43	Morayaya
06. W.W. Weerasekara	D/29 - D/33A	Morayaya
07. R.M.G. Kumarasinghe	D/33 - D/38	Morayaya
08. W.W.Gunasekara	D/44 - D/49	Morayaya
<u>Stage - II</u>		
01. L.H. Abeywardhana	D/1 - D/3 & D/5	Ulpothagama
02. W.G.Jinadasa	D/4	Ulpothagama
03. R.M.D.Samaraweera	D/6 - D/8	Ulpothagama
04. H.M.Wijeratna	D/9 - D/13	Ulpothagama
05. E.M. Premaratna	D/14 - D/24	Ulpothagama
06. P.K.Appusingho	D/25 - D/27	Kolongoda
07. S.B.Dissanayaka	D31 - D/34	Kolongoda
08. H.G.Ariyadasa	D/28 - D/30	Kolongoda
<u>Stage - III</u>		
01. P.K.Punyasara	D/35 - D/43	Heengange
02. I.B.Dissanayaka	D/44 - D/51	Heengange
03. A.G.Siriwardhana	Radagalpotha	Heengange
04. H.B.Tillekaratna	kahawatenna	Heengange
05. P.G.Rambanda	D/51-D/57, Dewagiriya	Hettipola
06. W.Weerasinghe	Maraka, Bogahawewa, Balugammana, Radunna	Maraka.
<u>Stage IV</u>		
01. H.M.Dinigiri Banda	Karugahawewa	Handungamuwa
02. A.N.Kuda Banda	Handungamuwa	Handungamuwa

7.5.2 Inner Rotation

Intermittent irrigation method has been taken in Minipe area. The durations of turnouts opening to the D-canals in 1984 Yala were indicated in Table 7.5.2.

The rotational issues of irrigation water to D-cannals in 1985 Yala were executed by the manners listed in Table 7.5.3. Some of inner rotational issue method under the D-cannals in 1985 Yala are listed in Table 7.5.4.

Table 7.5.2a INTERNAL ROTATION IN 1984 YALA

Stage I Section I

D-Canal No.	Duration of Issuing to D-Canal in hours	No. of Days the Canal should be closed after issues
D/1B	24	3
D/3	6	3
D/3A	12	3
D/3B	36	3
D/4	6	3
D/5	6	3
D/6A	6	3
D/6B	18	3
D/6C	6	3
D/7A	12	3
D/7B	12	3
D/8A	12	3
D/8B	12	3
D/9	12	3
D/10A	12	3
D/10B	6	3
D/10C	6	3
D/11	12	3
D/12	48	3
D/13	24	3
D/14	12	3
D/15	12	3
D/16	48	3
D/17	48	3
D/18	12	3
D/19A	24	3
D/19B	18	3

Table 7.5.2b INTERNAL ROTATION IN 1984 YALA

Stage I Section 1

D-Canal No.	Duration of Issuing to D-Canal in hours	No. of Days the Canal should be closed after issues
D/20	36	3
D/21	72	3
D/22	6	3
D/23A	24	3
D/23B	12	3
D/24A	36	3
D/24B	6	3
D/24D	6	3
D/25	36	3
D/26	72	3
D/27	48	3
D/27B	12	3
D/28	12	3

Table 7.5.2c INTERNAL ROTATION IN 1984 YALA

Stage I Section 2

D-Canal No.	Duration of Issuing to D-Canal in hours	No. of Days the Canal Should be closed after issues
D/29	8	3
D/30	6	3
D/31	24	3
D/32	24	3
D/32A	6	3
D/32B	6	3
D/33	12	3
D/33A	6	3
D/34	48	3
D/34A	6	3
D/34B	6	3
D/35	48	3
D/36	6	3
D/37	6	3
D/38	6	3
D/39	24	3
D/40	12	3
D/41	24	3
D/42	12	3
D/43	48	3
D/44	12	3
D/45	24	3
D/46	12	3
D/47	48	3
D/48	24	3
D/49	12	3

Table 7.5.2d INTERNAL ROTATION IN 1984 YALA

Stage II Section 1

<u>D-Canal No.</u>	<u>Duration of Issuing to D-Canal in hours</u>	<u>No. of Days the Canal should be closed after issues</u>
D/1	48	3
D/2	6	3
D/3	12	3
D/4	96	3
D/5	24	3
D/6	12	3
D/7	36	3
D/8	24	3
D/9	18	3
D/10	12	3
D/11	48	3
D/12	24	3
D/13	24	3
D/14	12	3
D/15	12	3
D/16	12	3
D/17	48	3
D/18	24	3
D/19	24	3
D/20	6	3
D/21	12	3
D/22	12	3
D/23	6	3
D/24	24	3

Table 7.5.2e INTERNAL ROTATION IN 1984 YALA

Stage II Section 2

<u>D-Canal No.</u>	<u>Duration of Issuing to D-Canal in hours</u>	<u>No. of Days the Canal should be closed after issues</u>
D/25	96	3
D/26	6	3
D/27	12	3
D/27A	48	3
D/28	12	3
D/28A	6	3
D/29	12	3
D/30	72	3
D/31	24	3
D/32	36	3
D/33	6	3
D/34	24	3

Table 7.5.3 DURATION OF TURNOUT CLOSURE TO D-CANALS
IN MINIPE AREA IN 1985 YALA

STAGE I : SECTION 1		
<u>From 8:00am Mon.</u> <u>To 8:00am Thu.</u>	<u>From 8:00am Mon.</u> <u>To 12:00am Wed.</u>	<u>From 8:00am Mon.</u> <u>To 8:00am Wed.</u>
D/2, D/4	D/1	D/12
D/5, D/7	D/3	D/16
D/9, D/10	D/6	D/17
D/11, D/14	D/8	D/21
D/15, D/18	D/13	D/25
D/20, D/22	D/19	D/26
D/23, D/28	D/23	D/27
	D/24	
STAGE I : SECTION 2		
<u>From 8:00am Mon.</u> <u>To 8:00am Thu.</u>	<u>From 8:00am Mon.</u> <u>To 12:00am Wed.</u>	<u>From 8:00am Mon.</u> <u>To 8:00am Wed.</u>
D/29	D/35	D/31
D/30	D/40	D/32
D/33	D/41	D/34
D/36	D/43	D/39
D/37	D/44	D/45
D/38	D/49	D/47
D/42		
D/46		
D/48		
STAGE II : SECTION 1		
<u>From 8:00am Tue.</u> <u>To 8:00am Fri.</u>	<u>From 8:00am Tue.</u> <u>To 12:00am Thu.</u>	<u>From 8:00am Tue.</u> <u>To 8:00am Thu.</u>
D/2, D/3	D/1	D/4
D/6, D/9	D/5	
D/10, D/13	D/7	
D/14, D/15	D/8	
D/16, D/19	D/11	
D/20, D/21	D/12	
D/22, D/23	D/17	
	D/18	
	D/24	
STAGE II : SECTION 2		
<u>From 8:00am Tue.</u> <u>To 8:00am Fri.</u>	<u>From 8:00am Tue.</u> <u>To 12:00am Thu.</u>	<u>From 8:00am Tue.</u> <u>To 8:00am Thu.</u>
D/26	D/27	D/25
D/28	D/31	D/30
D/29	D/34	D/32
D/33		
STAGE III		
<u>From 8:00am Thu.</u> <u>To 8:00am Sat.</u>	<u>From 8:00am Thu.</u> <u>To 12:00am Fri.</u>	<u>From 8:00am Thu.</u> <u>To 8:00am Fri.</u>
D/38, D/39	D/35	D/43
D/40, D/44	D/41	D/47
D/45, D/45A	D/42	D/51
D/46, D/49	D/52	D/57
D/50, D/54	D/53	
D/55, D/56		

Table 7.5.4 INNER ROTATION UNDER THE D-CANALS IN 1985 YALA

Canal Number	Lot Number	Duration
STAGE I : SECTION 1		
D/16	16,17,21,22,23,24,25	From 8:00am Wed. To 12:00am Thu.
	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,18,19,20,26	From 12:00am Thu. To 6:00pm Fri.
		From 6:00pm Fri. to 8:00am Mon. - No rotation.
D/17	13,14,15,16,17,18,19,20 21,22	From 8:00am Wed. To 12:00am Thu.
	1,2,3,4,5,6,7,8,9,10,11, 12	From 12:00am Thu. To 6:00pm Fri.
		From 6:00pm Fri. to 8:00am Mon. - No rotation.
D/25	No rotation at head gate	No rotation
	1,2,3,4,5,6,7,8,9,10,11, 12,13,14	No rotation
	15,16,17,18,19,20,21,22	24 hours every other day commencing at 6:00am
	23,24,25,26	- do -
STAGE II : SECTION 2		
D/28	1125 - 1132	From 8:00am Fri. To 6:00am Sat.
	1133 - 1139	From 6:00am Sat. To 6:00am Sun.
		From 6:00am Sun. to 8:00am Tue. - No rotation
D/30	1243 - 1283	From 8:00am Thu. To 6:00am Fri.
	1284 - 1328	From 6:00am Fri. To 6:00am Sat.
	1206 - 1242	From 6:00am Sat. To 6:00am Sun.
		From 6:00am Sun. to 8:00am Tue. - No rotation.
D/25	929 - 958	From 8:00am Thu. To 7:00am Fri.
	892 - 929	From 7:00am Fri. To 7:00am Sat.
	870 - 890	From 7:00am Sat. To 7:00am Sun.
	903 - 882	To 7:00am Sun.
		From 7:00am Sun. to 8:00am Thu. - No rotation.

7. WATER MANAGEMENT

7.1 NAGADEEPA MAHAWEWA WATER MANAGEMENT PROJECT

The current water management programme in Nagadeepa Scheme has been replaced by the INMAS Programme from May 1985. The outline of the Programme is quoted from the "NAGADEEPA MAHAWEWA WATER MANAGEMENT PROJECT, A Project of the Irrigation Management Division of the Ministry of Lands & Land Development, (in collaboration with the Nation Builders' Association)" as follows:

(1) Activities under the Project

It is proposed that the I.D. will undertake a 3 year program for the improvement of the canal system on the basis of special allocation depending on the availability of funds. The items for inclusion in the program as well as the priorities for execution will be decided by the Sub-Project Water Management Committees and the Project Water Management Committee.

The I.D. will also progressively improve the arrangements for water control and measurement, within the Project area. Those programmes will run parallel to and blend with the other main activities of the water management Project which are as follows:

- (a) Strengthening of the "committee system" of management in the Scheme.
- (b) Educational Courses.
- (c) Motivational seminars and work-camps.
- (d) Cultural activities.
- (e) Experimental water management Blocks & Demonstration Plots.

(f) School water conservation committees.

(2) Participation of the Nation Builders Association (BNA)

The NBA is non-profit making non-governmental organisation (incorporated by an Act of Parliament) which participates in the integrated development of the rural sector). It is particularly active in promoting schemes for the protection of the land and water resources of the Island through the direct participation of people. It is a non-political body assisted largely by professional persons of varied disciplines. The activities of the NBA are closely linked to many Government Departments servicing the agricultural sector at the grass-roots level.

Under the present water management Project, there is a strong social-change component and an attempt is being made to mobilize the local people (not merely the farmers) to create a social transformation within the project area. Such a transformation is considered essential in order to introduce and sustain a new and effective water management process which would involve the active participation of the farmers on a continuing basis.

The NBA has a cadre of trained youth for community development who would act as catalysts in the proposed change programme. It would also motivate and train several selected youths within the project area to function as "community organisers". The other activities that would be undertaken by the NBA are listed under Item 3 of the Table given in para (3) ii).

(3) Staffing of Project & Methodology

i) The Director, Irrigation Management Division, or his nominee will function as Project Director for this Project. The Project Manager, Nagadeepa

will function as Chairman of the "Project Water Management Committee". Except for the recruitment of 12 youths from the area to serve as Community Organisers, and an office assistant for the Project Manager, there will be no recruitment of additional staff for the water management project activities.

- ii) There will be 3 basic components in the Project and these items together with the Agency responsible for each component area as follows:

Item No.	Description	Related Activities	Officer/Agency responsible
1.	Technical aspect of water management	(i) Water control & measurement. (ii) Rehabilitation & maintenance of canal system (iii) Operation of Experimental water management blocks	Irrigation Engineer
2.	Management process & Agricultural inputs	(i) Building up appropriate management structures for decision-making with effective farmer involvement. (ii) Training programmes for field officers. (iii) Operation of demonstration plots.	Project Manager
3.	Social change programme	(i) Training of farmers. (ii) Educational & motivational programmes & introduction of cultural practices. (iii) Mobilizing local resources of Priests, teachers, students, etc. for the program. (iv) Directing the community organisers (see para (4)) (v) Assist the formation of farmer organisations. (vi) Socio-economic surveys.	Nation Builders Association (NBA)

(4) Community Organisers

In order to carry out the multitude of activities in the social change programme described under Item (3) in the Table above, it is suggested that the NBA should recruit about 12 educated youths from the project area itself or from neighbouring area. They will be called "Community Organisers". Their main task would be to serve as change-agents in the social transformation proposed under the Project. The NBA would undertake the motivation and training of these youths.

(5) Committee System of Management

It is proposed to commence operation of this Project through the existing "water management Committees". There are 2 Sub-Project Committees and one Project Committee for the Scheme. In addition, there will be a "Steering Committee" to direct all operations under the Project. The composition of these Committees are subject to change, if found necessary, during the operation of the Project.

(a) Sub-project Water Management Committee

These Committees are presently composed primarily of the farmer representatives elected under the Agrarian Services Act. The other members of this Committee are the officers of the Departments of Irrigation, Agriculture, Agrarian Services and of the Land Commissioner's Department. In addition, representatives of the NBA, and the Community Organisers of the area, will be co-opted as members of this Committee. The Chairman of this Committee is one of the farmer representatives, elected to the post. The Secretary of the Committee will be the T.A. of the I.D. One of the Community Organisers or an NBA representative will function as the Asst. Secretary.

These sub-project committees will meet monthly at a fixed place within the area and at a fixed time on a fixed day during each month. Copies of minutes of every meeting will be sent to the Project Manager, and to the Project Director.

The function of this Committee is to resolve any water distribution or related issues within its area of operation. It will decide on patterns of internal rotation of water, priorities for rehabilitation of canals and any other matters within their capacity to solve. It will review programmes for the maintenance of the canal system and also promote farmers to clean their field canals as well as to participate in other shramadana activities to encourage collective action. These committees will also discuss related matters like credit, fertilizer, farm-power etc. It will be the duty of this Committee to bring to the notice of the Project Committee any matters which cannot be resolved at the sub-project level.

(b) Project Water Management Committee

This Committee is also composed primarily of farmer representatives elected from among the farmer representatives in the 2 sub-project committees. The Chairman of each sub-project committee and several other elected farmer representatives will serve as members of the Project Water Management Committee.

In addition, the Secretary (T.A.) of each Sub-project Committee, the A.I. (Agr. Dept.), the D.O. (Agrarian Services Dept.) the Colonisation Officers (L.C.D.) and the I.E. will be members of the Project Committee. A representative of the

NBA will also be co-opted to this Committee. The Project Manager, Nagadeepa, will function as Chairman of this Committee. The I.E. or his nominee will function as Secretary.

This Committee will meet bi-monthly at the Water Management Project Secretariat (at Tissapura). The meetings will be at a fixed time on a fixed date every alternate month. Additional meetings will be held whenever required. Copies of minutes of every meeting will be sent to the Project Director.

The main purpose of this Committee is to take macro-decisions regarding water management in the Project, to decide on rotational patterns of water issue and to oversee the operation of the 2 Sub-project Committees. This Committee will also resolve any issues that had been brought up at the Sub-project Committees but which could not be resolved at that level. It will also take action to see that any problems outside its capacity to resolve would be referred to the Project Director or to the appropriate authority for solution.

(c) Steering Committee

The Project Director, (or his representative) will chair this Committee. In addition to the Project Director (or his representative), it will also comprise the Project Manager, the Irrigation Engineer, and a representative of the NBA. The Project Director may co-opt to the Committee any other members as may be necessary.

This Committee will meet whenever required. Records of meeting will be kept by the Project Manager who will also function as Secretary of this Committee.

ANNEX 8 LIVESTOCK

8.1 An Income and Expenditure Analysis for One Female and Two Male Dual-Purpose Crossbred Cattle	VIII - 1
8.2 An Income and Expenditure Analysis for Two Female and One Male Dual-Purpose Crossbred Cattle	VIII - 4

8 LIVESTOCK

8.1 AN INCOME AND EXPENDITURE ANALYSIS FOR ONE FEMALE
AND TWO MALE DUAL-PURPOSE CROSSBRED CATTLE

(1) Projections for 1 Female and 2 Male Dual-Purpose
Crossbred Cattle

	YEARS		
	1	2	3
<u>Herd Composition at end of year (Nos)</u>			
Breeding Females	1	1	1
Adult Males	2	2	2
Calves less than 1 year	1	1	1
Calves 1-2 years	-	1	1
Surplus animals 2-3 years	-	-	1
<u>Purchases (Nos)</u>			
Cows	1	-	-
Bulls	2	-	-
<u>Sales (Nos)</u>			
Surplus Animals	-	-	1
Milk (litres)	450	540	720
<u>Value of Production</u>			
milk <u>1/</u>	1,688	2,025	2,700
Surplus Animals <u>2/</u>	-	-	2,000
Manure <u>3/</u>	300	300	300
<u>Assumptions :</u>			
Calving Rate %	80	80	80
Calf mortality %	15	15	15
Milk Yield (litres/day/cow)	2.5	3	3

1/ Rs. 3.75 per litre at 4% butter fat

2/ Rs. 2000 per animal

3/ Rs. 200 per tractor load

(2) INVESTMENT COST REQUIREMENTS

(Rupees)

Item	Years		
	1	2	3
Building (Shed)	1,000	-	-
Stock <u>1/</u>	6,000	-	-
Insurance <u>2/</u>	240	-	-
Pre-operational Expenses <u>3/</u>	1,431	-	-
TOTAL	8,671	-	-

1/ Rs. 2,000 per animal2/ 4% of sum insured/year3/ Cost of feeding for 6 months

for female - 2 kg. rice bran/day at Rs. 1.50/kg.

7 kg. urea treated straw/day at Rs.0.25 per kg.
and 100 g/day mineral mixture at Rs.4/- per kg.for males - 4 kg. urea treated straw at Rs.0.25 /kg and
(per animal) ad lib quantities of untreated straw and 100 g
of mineral mixture/day.(3) CASH OPERATING EXPENSES

(Rupees)

Item	Years		
	1	2	3
Feed <u>1/</u>	2,884	2,884	2,884
Drugs & Vet Service	150	150	150
Repairs and Maintenance of Sheds <u>2/</u>	-	50	50
Insurance	-	240	240
Miscellaneous	225	225	225
TOTAL	3,259	3,549	3,549

1/ Daily ration for Female - 7kg. treated straw at Rs.0.25/kg.
2kg. rice bran at Rs. 1.50/kg.
100 g. mineral mixture at Rs. 4/kg.for Males - 4 kg. treated straw at Rs. 0.25/kg.
(per animal) 100 g. mineral mixture at Rs.4/kg.2/ 5% of cost3/ 4% of value of animals4/ Includes ropes etc.

(4) INCOME PROJECTIONS

(Rupees)

Item	Years		
	1	2	3
Sale of Milk <u>1/</u>	1,688	2,025	2,700
Contribution from draught <u>2/</u>	2,000	2,000	2,000
Manure <u>3/</u>	300	300	300
Sale of Surplus animals <u>4/</u>	-	-	2,000
Total	3,988	4,325	7,000

1/ Rs. 3.75 at 4% Butter fat

2/ Saving of hire charges for farm power for 2 Ac lowland and 1/2 acre highland

3/ Rs. 200/ Tractor load

4/ Rs. 2,000 / animal

(5) GROSS INCOME FROM OPERATIONS

(Rupees)

Item	Years		
	1	2	3
Income from Operation	3,988	4,325	7,000
Operating Expenses	3,259	3,549	3,549
GROSS INCOME	729	776	3,451

8.2 AN INCOME AND EXPENDITURE ANALYSIS FOR TWO FEMALE
AND ONE MALE DUAL-PURPOSE CROSSBRED CATTLE

(1) Projections for 2 Female and 1 Male Buffalo Operation

	YEARS		
	1	2	3
<u>Herd Composition at end of year (Nos)</u>			
Breeding Females	2	2	2
Adult Males	1	1	1
Calves less than 1 yr.	1	1	1
Calves 1-2 yrs.	-	1	1
Surplus animals 2-3 years	-	-	1
<u>Purchases (Nos)</u>			
Cows	2	-	-
Males	1	-	-
<u>Sale (Nos)</u>			
Surplus Animals	-	-	1
Milk (Litres)	420	540	540
<u>Value of Production (Rs)</u>			
Milk <u>1/</u>	2415	3105	3105
Surplus animals <u>2/</u>	-	-	1750
Manure <u>3/</u>	300	300	300
<u>Assumptions:</u>			
Calving Rate (%)	60	60	60
Calf Mortality (%)	17	17	17
Milk Yield (litres/day/cow)	1.75	2.25	2.25

1/ Rs. 5.75 per litre of milk at 7% butter fat

2/ Rs. 1,750 for a 2-3 yr. old animal

3/ Rs. 200 per tractor load

(2)

INVESTMENT COST REQUIREMENTS

(Rupees)

Item	Project Years		
	1	2	3
Building (Shed)	1000	-	-
Stock <u>1/</u>	9000	-	-
Utensils	250	-	-
Insurance <u>2/</u>	360	-	-
Pre-operational Expenditure <u>3/</u>	1152	-	-
TOTAL	11762		

1/ Rs. 3,000 per animal2/ 4% of sum insured

3/ Cost of feed for 120 days. Daily ration for a female buffalo comprising 2 kg. rice bran at Rs.1.50/kg., 2 kg. urea treated straw at Rs.0.25/kg., 5 kg. ordinary straw (free) and 100 g. mineral mixture at Rs. 4/kg.

For male buffalo 2 kg. urea treated straw and ad lib untreated straw and 100 g. mineral mixture (No cost for untreated straw).

(3) CASH OPERATING EXPENSES

2 Female and 1 Male Dual Purpose Buffalo Operation

Item	Years		
	1	2	3
Feed <u>1/</u>	2,847	2,847	2,847
Drugs and Veterinary Service	150	150	150
Repairs and maintenance of Sheds <u>2/</u>	-	50	50
Miscellaneous <u>3/</u>	225	225	225
Insurance <u>4/</u>	-	360	360
TOTAL	3,222	3,632	3,632

1/ Daily ration comprises :-

(a) for females - 2 kg. treated straw at Rs. 0.25/kg.
(per animal) 2 kg. rice bran at Rs. 1.50/kg.
5 kg. untreated straw (no cost for untreated) and 100 g. mineral mixture at Rs. 4/- kg.

(b) for male - 2 kg. treated straw and ad lib amounts of untreated straw and 100 g. mineral mixture at Rs. 4.00 per kg.

2/ 5% of building cost

3/ Includes ropes etc.

4/ 4% of value of animals

(4) INCOME PROJECTIONS

(RUPEES)

Item	Years		
	1	2	3
Sale of Milk <u>1/</u>	2,415	3,105	3,105
Contributions from draught <u>2/</u>	2,000	2,000	2,000
Manure <u>3/</u>	300	300	300
Sale of Surplus animals <u>4/</u>	-	-	1,750
TOTAL	4,715	5,405	7,155

1/ Rs. 5.75 per litre of milk at 7% butter fat

2/ Saving of hire charges for farm power. 2 Ac. lowland and about 1-2 Ac. highland

3/ Rs.200/tractor load

4/ Rs.1,750

(5) GROSS INCOME FROM OPERATIONS

(Rupees)

Item	Years		
	1	2	3
Income from Operations	4,715	5,405	7,155
Operating Expenses	3,222	3,632	3,632
Gross Income	1,493	1,773	3,523

ANNEX 9 ROAD SYSTEM

9	ROAD SYSTEM (MINIPE SCHEME)	IX	-	1
9.1	Present Condition	IX	-	1
9.1.1	Road Network	IX	-	1
9.1.2	Traffic Survey	IX	-	1
9.2	Planning	IX	-	10
9.2.1	Proposed Road Network	IX	-	10
9.2.2	Future Proposal of New Bridge across the Mahaweli River	IX	-	10
9	ROAD SYSTEM (NAGADEEPA SCHEME)	IX	-	16
9.1	Planning	XI	-	16

9. ROAD SYSTEM

9.1 PRESENT CONDITION

9.1.1 Road Network

Motorable road network is shown in the Main Report. Bus route network is shown in Fig. 9.1.1. Those information was given from the Hasalaka, Mahiyangana and Matale Depot of the Ceylon Transportation Board. Number of C.T.B. busses operating per day is shown in Table 9.1.1 and 9.1.2, and number of passengers for the Hasalaka Depot is given in Table 9.1.3.

Transportation by the private busses is increasing, however, enough information was not available because the registration is not necessary for the bussiness.

9.1.2 Traffic Survey

Traffic survey was carried out to evaluate the traffic condition in the Minipe Scheme. Enumeration was made at four location, i.e. Handaganawa in Stage I, Weragama T junction, Hasalaka junction and Hettipola T junction. Measurement was carried out on 25th July, 1985. The result is shown in Table 9.1.4.

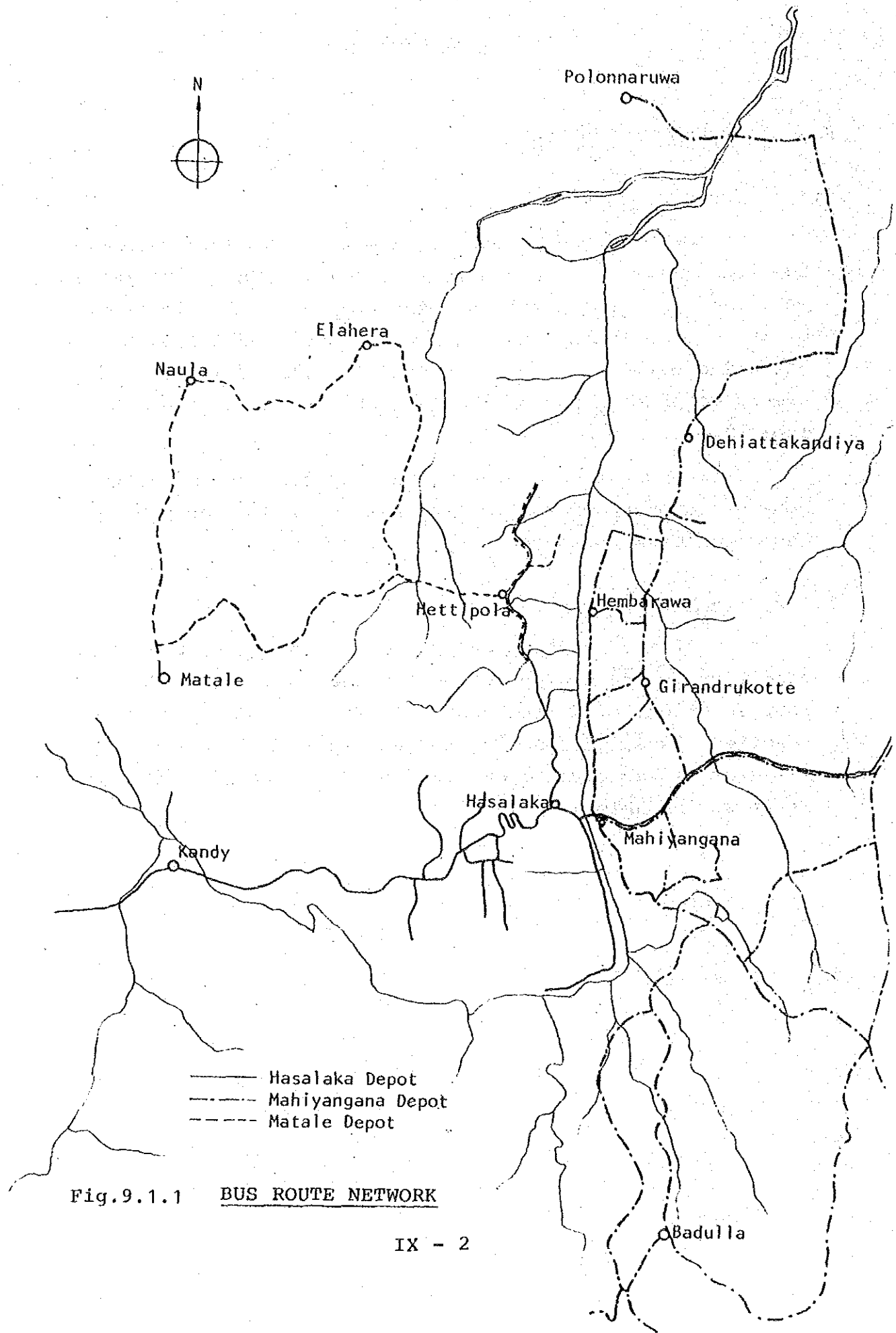


Fig.9.1.1 BUS ROUTE NETWORK

Table 9.1.1 NUMBER OF BUSSES OPERATING PER DAY

Ticket Price	Route (Hasalaka Depot)	Nos.	Distance KM
29.00	Hasalaka - Colombo	01	195.0
12.50	Hasalaka - Kandy	12	72.1
6.00	Hasalaka - Randenigala	18	31.4
6.50	Hasalaka - Hettipola	09	27.4
8.75	Hasalaka - Handungamuwa (Mendakanda)	05	48.0
6.00	Hasalaka - Kalugala	02	36.5
6.25	Hasalaka - Madugalla	01	36.2
9.00	Hasalaka - Loolwatta	01	45.0
6.25	Hasalaka - Mahaweli	01	36.2
8.25	Hasalaka - Dewahandiya	01	44.2
22.00	Hasalaka - Ampara	04	128.50
11.80	Hasalaka - Wekanda	01	60.0
16.00	Randenigala - Kandy	06	105.1
	Route (Matale Depot)		
	Heen Ganga - Matale	01	117.5
	Hadungamuwa - Matale	02	109.5
	Maraka - Matale	02	103.8
	Hadungamuwa - Laggala	01	27.4

Table 9.1.2 NUMBER OF BUSES OPERATING PER DAY

Ticket Price	Route (Mahiyangana Depot)	Nos.
5.00	Mahiyangana - Senehigama	4
5.00	Mahiyangana - Gamunupola	2
4.50	Mahiyangana - Kehalpotta	4
27.00	Mahiyangana - Polonnaruwa	10
5.20	Mahiyangana - Girandrukotte	4
12.40	Mahiyangana - Dehiattakandiyu	3
6.40	Mahiyangana - Ratkindu	4
12.75	Mahiyangana - Kandy	28
26.00	Bibile - Mahiyangana - Colombo	2
44.75	Mahiyangana - Gale	2
48.25	Mahiyangana - Panadura	2
8.50	Mahiyangana - Bible	10
	Ampara - Mahiyangana - Kandy	6
	Mahiyangana - Padiyatalawa	2
	Mahiyangana - Lihiniyagama	8
	Mahiyangana - Henanigala	2
	Mahiyangana - Duraparasa	10

Table 9.1.3 No. of Passengers Travelled

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1981	175493	159924	243126	243473	216645	208873	212924	217059	237707	209880	178016	191026	2494146
1982	184214	154380	218189	225271	190921	209253	176354	177641	240752	160167	152038	171479	2260659
1983	162716	137692	181895	202782	194790	197058	170001	153056	199299	172828	144112	154356	2052585
1984	157104	117625	147521	174546	149174	146056	138865	164473	177181	142451	111875	122929	1776800
1985	120022	103154	136729	178121	168522	155802							

* Private bus service started in 1982

Sgd.

W. M. Rumatunga,
C. R. T. B. Depot,
Hasalaka

Table 9.1.4a TRAFFIC SURVEY RESULT

Location .. Hasalaka							
Route	Time	Bigbus	Minibus	Truok	Car	Motorbike	Bicycle
Kandy	6 - 7	3	8	10	4	0	11
	7 - 8	3	6	12	8	6	24
	8 - 9	7	9	11	9	5	20
	9 - 10	15	9	11	11	9	41
	10 - 11	9	10	14	9	9	28
	11 - 12	6	16	20	8	3	19
	12 - 13	7	13	13	7	8	24
	13 - 14	8	11	7	10	10	26
	14 - 15	7	5	9	14	5	17
	15 - 16	7	17	19	9	5	17
	16 - 17	10	6	11	8	7	22
	17 - 18	5	7	14	3	2	17
	18 - 19	3	11	16	21	11	17
	Total	90	128	167	121	80	283
Hettipola	6 - 7	3	10	11	3	2	21
	7 - 8	0	6	10	4	6	77
	8 - 9	2	7	1	6	4	79
	9 - 10	4	3	2	4	6	55
	10 - 11	4	5	5	1	3	54
	11 - 12	2	2	9	5	6	34
	12 - 13	4	1	0	2	2	28
	13 - 14	2	3	4	2	7	26
	14 - 15	3	0	2	3	4	35
	15 - 16	3	2	2	4	10	38
	16 - 17	2	5	2	7	8	43
	17 - 18	4	5	6	4	9	55
	18 - 19	2	2	4	3	9	39
	Total	35	51	58	48	76	583
Mahiyangana	6 - 7	4	8	11	3	2	26
	7 - 8	8	13	22	10	12	74
	8 - 9	9	17	12	9	7	86
	9 - 10	19	12	13	13	13	87
	10 - 11	13	16	18	7	11	88
	11 - 12	8	15	23	10	10	51
	12 - 13	11	14	13	8	10	48
	13 - 14	10	14	9	9	13	46
	14 - 15	10	6	11	15	9	46
	15 - 16	10	19	20	11	12	44
	16 - 17	12	12	13	10	12	61
	17 - 18	9	8	18	7	11	66
	18 - 19	5	13	16	24	19	51
	Total	128	167	199	136	141	774

Table 9.1.4b TRAFFIC SURVEY RESULT

Location .. Hasalaka

Route	Time	Bigbus	Minibus	Truck	Car	Motorbike	Bicycle
Hund Road	6 - 7	0	0	0	1	0	0
	7 - 8	0	1	0	0	0	1
	8 - 9	0	1	0	2	2	2
	9 - 10	0	0	0	0	0	21
	10 - 11	0	0	1	3	1	0
	11 - 12	0	1	2	1	1	4
	12 - 13	0	0	0	1	0	6
	13 - 14	0	0	0	1	0	8
	14 - 15	0	1	0	0	0	2
	15 - 16	0	0	1	4	1	15
	16 - 17	0	1	0	3	1	4
	17 - 18	0	0	2	0	0	12
	18 - 19	0	0	2	2	1	1
Total		0	5	8	18	7	76

Location .. Handakanawa, Minipe

Route	Time	Bigbus	Minibus	Truck	Car	Motorbike	Bicycle
	6 - 7	2	2	6	1	4	16
	7 - 8	3	3	6	2	5	15
	8 - 9	2	2	4	3	4	17
	9 - 10	2	5	8	7	2	16
	10 - 11	4	3	10	5	2	6
	11 - 12	4	3	6	6	0	11
	12 - 13	0	5	5	1	3	4
	13 - 14	4	1	3	7	4	12
	14 - 15	4	3	6	3	1	8
	15 - 16	1	7	8	2	0	14
	16 - 17	1	2	2	4	1	15
	17 - 18	1	4	8	3	2	13
	18 - 19	1	4	2	1	7	10
Total		29	44	74	45	35	157

Table 9.1.4c

TRAFFIC SURVEY RESULT

Location .. Weragama

Route	Time	Bigbus	Minibus	Truck	Car	Motorbike	Bicycle
Kandy	6 - 7	5	6	12	5	3	38
	7 - 8	6	11	19	10	12	88
	8 - 9	8	16	21	10	7	73
	9 - 10	8	18	15	6	8	57
	10 - 11	6	18	17	7	4	56
	11 - 12	4	19	15	6	12	57
	12 - 13	5	18	23	5	9	33
	13 - 14	5	12	12	5	18	40
	14 - 15	6	20	26	11	8	67
	15 - 16	5	17	20	11	14	59
	16 - 17	6	13	16	5	8	72
	17 - 18	4	14	20	9	7	82
	18 - 19	5	12	20	8	9	71
	Total	73	194	236	98	119	793
Mahiyangana	6 - 7	6	12	12	5	6	61
	7 - 8	10	14	20	10	13	123
	8 - 9	8	23	22	17	14	101
	9 - 10	10	18	23	17	12	97
	10 - 11	6	29	22	17	9	73
	11 - 12	8	24	17	14	15	99
	12 - 13	6	22	21	7	15	68
	13 - 14	6	20	21	10	11	64
	14 - 15	9	34	38	11	18	86
	15 - 16	8	21	27	16	13	47
	16 - 17	8	17	20	8	17	66
	17 - 18	6	20	36	18	19	106
	18 - 19	5	18	24	10	19	70
	Total	96	272	303	160	181	1,061
Randenigala	6 - 7	1	6	4	2	3	35
	7 - 8	4	7	9	4	9	97
	8 - 9	2	9	17	9	13	80
	9 - 10	4	8	14	9	4	48
	10 - 11	0	11	17	10	9	47
	11 - 12	4	9	16	8	9	42
	12 - 13	1	10	14	2	8	47
	13 - 14	1	10	9	7	7	34
	14 - 15	3	14	12	2	12	45
	15 - 16	3	10	11	5	9	34
	16 - 17	2	6	10	3	13	56
	17 - 18	2	6	18	9	16	52
	18 - 19	0	6	6	2	10	47
	Total	27	112	157	72	122	664

Table 9.1.4d TRAFFIC SURVEY RESULT

Location .. Hettipola

Route	Time	Bigbus	Minibus	Truck	Car	Motorbike	Bicycle
Stage 4	6 - 7	2	1	0	0	2	14
	7 - 8	1		3	0	2	28
	8 - 9	2	1	2	3	0	29
	9 - 10	1	2	3	1	1	25
	10 - 11	1	2	4	2	2	22
	11 - 12	1	1	0	3	0	21
	12 - 13	1	0	4	1	4	13
	13 - 14	2	1	2	0	3	12
	14 - 15	2	1	0	3	2	17
	15 - 16	1	0	2	1	5	20
	16 - 17	1	1	1	1	3	16
	17 - 18	1	1	3	3	2	30
	18 - 19	0	2	1	1	0	20
	Total	16	1	25	19	26	267
Matale	6 - 7	2	3	0	0	1	32
	7 - 8	3	3	3	0	3	53
	8 - 9	4	3	4	2	3	56
	9 - 10	2	4	2	3	1	51
	10 - 11	2	6	3	3	4	52
	11 - 12	5	2	1	4	1	42
	12 - 13	1	2	6	1	2	38
	13 - 14	7	3	3	0	4	32
	14 - 15	5	4	1	2	4	34
	15 - 16	2	2	4	6	7	30
	16 - 17	5	4	2	1	4	36
	17 - 18	2	3	4	2	3	61
	18 - 19	2	3	6	3	2	48
	Total	42	42	39	27	39	565
Hasalaks	6 - 7	0	2	0	0	1	24
	7 - 8	2	2	0	0	1	35
	8 - 9	2	2	2	1	3	37
	9 - 10	1	2	1	4	0	38
	10 - 11	1	4	1	3	2	36
	11 - 12	4	1	1	3	1	29
	12 - 13	0	2	4	0	2	23
	13 - 14	5	2	3	0	1	22
	14 - 15	3	3	1	1	2	19
	15 - 16	1	2	2	5	2	14
	16 - 17	4	3	1	0	3	34
	17 - 18	1	2	1	1	0	41
	18 - 19	2	1	5	2	2	38
	Total	26	28	22	20	20	390

9.2 PLANNING

9.2.1 Proposed Road Network

The present road network makes poor communication among villagers due to lack of bridges crossing the streams and drainage canals. The new main road running the flood plain along the Mahaweli River is proposed as Road I grade. The existing unpaved main road, in Stage III and IV, is proposed to be paved as Road I. The proposed new road accompanies planned roads as Road II connecting with the existing village roads and O/M roads of canals. The proposed road network is shown in Fig. 9.2.1.

9.2.2 Future Proposal of New Bridge across the Mahaweli River

The New Bridge crossing the Mahaweli River will affect not only to the Minipe Scheme but also to the wider zones.

Location for the new bridge was selected at Hembarawa because the existing road of the opposite bank side is very close to the river. Enough space is available for the construction.

Foundation condition is expected to be rock covered by riverbed sand deposit about 2 - 3 m from the outcrop. The geological survey was not carried out in this survey. The riverbed is covered by clean sand. Width of riverbed was measured as 223 m by the Mission.

Bridge size is selected considering the future transportation condition for the area.

Type	: Prestressed Concrete Bridge - Post Tension
Width	: 9 m
Span	: 30 m
Number of Span	: 8 Nos.

Proposed bridge is shown in Fig. 9.2.2.

HASALAKA TANK

SECTION - 2

MAHIYANGANA

- ==== Main road paved
- ===== Village road paved
- Village road unpaved
- O/M road of canal
- ==== Road I
- ||||| Road I Rehabilitation
- ||||| Road II Rehabilitation

SECTION - I

ELA
YODA
MINIPE

Fig.9.2.1a ROAD NETWORK
IN MINIPE STAGE I

MINIPE

SCALE - 1 : 63,360



SECTION - 2

- ==== Main road paved
- ===== Village road paved
- Village road unpaved
- O/M road of canal
- ////// Road I
- ===== Road II
- +++++ Road II Rehabilitation
- +++++ Road III Rehabilitation

SECTION - 1

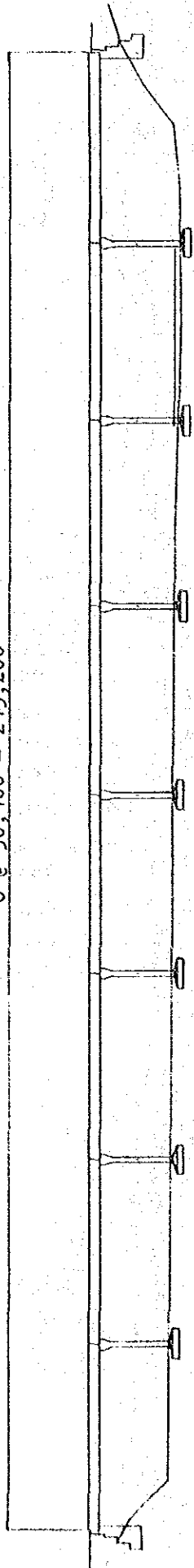
Fig.9.2.1b

ROAD NETWORK IN
MINIPE STAGE II

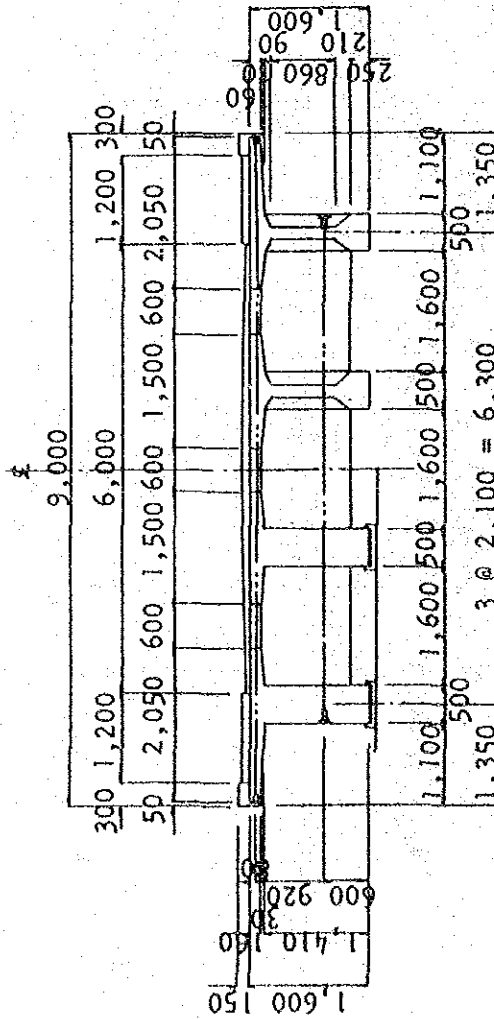
SCALE - 1:83,360



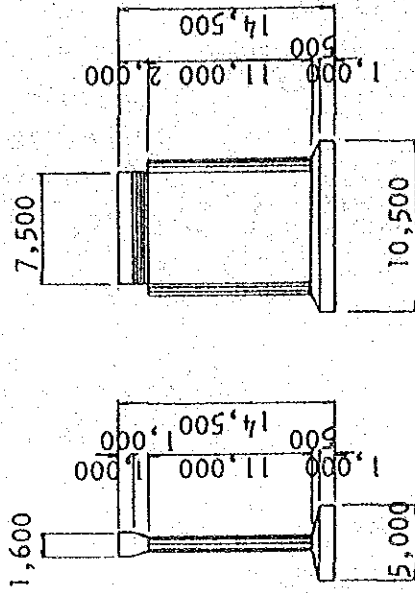
8 @ 30,400 = 243,200



PROFILE



SECTION



SECTION OF PIERS

Fig. 9.2.2.a PROPOSED NEW BRIDGE CROSSING THE MAHAWELI RIVER

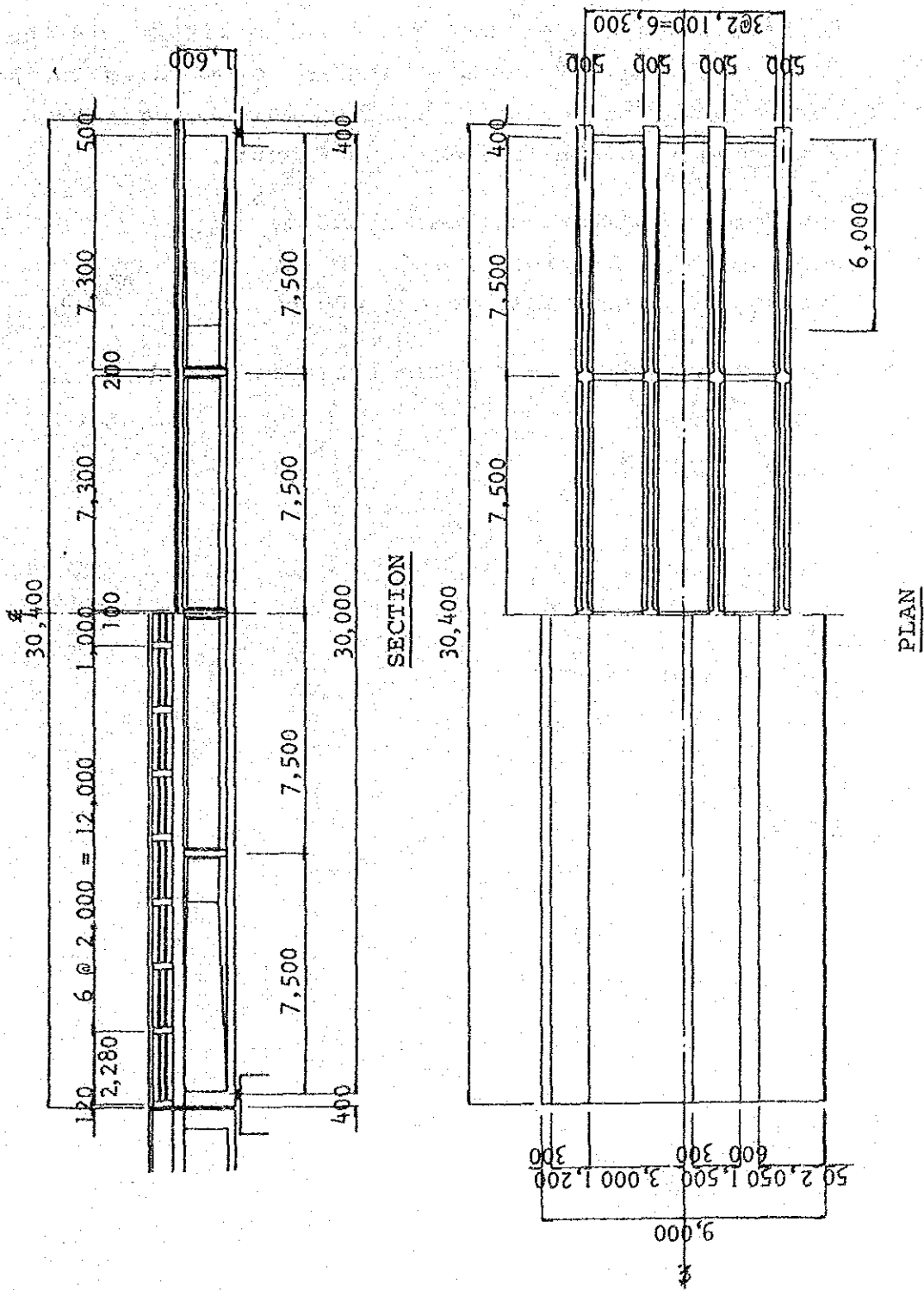


Fig.9.2.2b PROPOSED NEW BRIDGE CROSSING THE MAHAWELI RIVER