

## 付 属 資 料

- 1 . T / R、 S / W、 M / M
- 2 . 主要面談者リスト
- 3 . Questionnaire
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- 5 . ローカルコンサルタントリスト



1. T/R, S/W, M/M

MINISTRY OF IRRIGATION AND POWER

COMPREHENSIVE GROUNDWATER RESOURCES DEVELOPMENT  
STUDY IN HAMBANTOTA AND MONARAGALA DISTRICTS OF SRI  
LANKA

AN APPLICATION FOR THE TECHNICAL COOPERATION  
(DEVELOPMENT STUDY)

August, 1999

WATER RESOURCES BOARD  
2A, GREGORY'S AVENUE  
COLOMBO - 07.

Tel - 697050, 694835, 689772  
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## Standard Model of Terms of Reference

### Application for the Technical Co-operation (Development Study) By the Government of Japan

#### 1. Project digest

##### (1) Project Title

Comprehensive Groundwater Resources Development study in Hambantota and Monaragala districts of Sri Lanka

##### (2) Location

The project is mainly for the development of groundwater resources for improvement of water supply to rural community, agriculture production and industrial development in Sri Lanka. The area of initial implementation of the project in pilot scale is limited to Monaragala and Hambantota districts. The project easily be expanded to include other areas of the country at a later stage.

The project area is shown in Figure 1.

##### (3) Implementing Agency

###### - Name of the Agency - Water Resources Board

Water Resources Board is one of the main institutions that have acquired expertise and the know-how with all scientific and technological facilities for all groundwater research and development activities of Sri Lanka. The functions of the Water Resources Board is not only limited to development of groundwater for domestic purposed but also to identify, investigate and develop groundwater resources in the country for agricultural, industrial purposes as well. The main responsibility of the Institution is to advise on groundwater resources development. In this regard, the Board, for systematic collection and maintenance of scientific data, has set up a comprehensive groundwater data bank.

Data for data bank are being obtained from tube wells drilled for private individuals and the government institutions by the Board.

The other government institution, which deals with the groundwater, is National Water Supply and Drainage Board. The National Water Supply & Drainage Board (NWS&DB) is the principal institution under Ministry of Housing and Urban Development responsible for supply water for human consumption and domestic purposed in the country. This institution deals with major, medium and small water supply and drainage schemes implementing all engineering water supply head works and systems with supply operations. This institution is also responsible to meet the domestic water demands for the rural sector by providing

water from tube wells fitted with hand pumps. Construction of tube wells has been undertaken with mainly from International Agency assistance since 80's. Drilling rigs provided by the Government of Japan to NWS&DB recently are fully engaged under this programme in number of districts of the Island. So far, a large number of tube wells have been constructed for villages and settlements merely by drilling wells up to an average depth of 40 meters to obtain a minimum requirement of 5 litres per minute for hand pump operations. It is understood that plans are underway to drill a large number of wells using these drill rigs in future.

Generally, Provincial Councils do not have their own technical staff for groundwater development work: either Water Resources Board or National Water Supply & Drainage Board undertake investigations and construction work on their request. The Provincial Council and the local authorities do the normal maintenance of the tube well hand pumps.

Annual Budget and staff members of responsible department or section for the past 3 years and future prospects.

Year	1995	1996	1997	1998	1999	2000
Annual Budget (Rs. Million)	60.5	59	57	60	58	60
Number of the Staff	428	397	342	327	320	320

**- Number of the staff of the agency (on a category basis)**

- Executive officers - 3
- Professionals - 24
- Technical officers - 49
- Supporting staff - 235

**- Budget allocated to the agency**  
approximately Rs. 45 million.

**- Organisation chart**  
Organisation chart of the Water Resources Board is given in Annex. 1.

**(4) Justification of the project**

**- Present condition of the sector**

Democratic Socialist Republic of Sri Lanka is located between 5 55' and 9 51' N latitudes and longitudes of 79 42' and 81 52' E. Sri Lanka has a maximum length of 434 Km and maximum width of 224 Km and an area of 65,610 square kilometres. The Island comprises of population of 17 Million people and forecasts to be around 45 Million people by the year 2025. With its strategic location, economic activities, high literacy rates, the Island is expected to accommodate its development process by the turn of the century. It has been forecasted that the country would serve as the financial and training centre of the region in time to come.

With population growing, industrialisation increasing and water supply dwindling, prudent management and proper delivery of water resources will become increasingly important in the next decade. Proliferating health problems related productivity losses, adverse impacts on related industries etc., make prudent water management a vital activity in Sri Lanka. Although no overall and extensive research has been done to search the availability of water resources in the entire Democratic Socialist Republic of Sri Lanka, independent, research and experience have paved the way to expect water from a variety of water bearing bodies. This water is used for both agriculture and domestic purposes and the pattern is more prevalent in the dry zone of Democratic Socialist Republic of Sri Lanka. Without the different methods to extract water and equipment in accordance with it from so far, however, it will be a difficult task to meet the requirement in the years to come.

In the past, water supply schemes in the country were heavily dependent on surface water resources. These sources cannot provide required quantities during dry season due to small base flows. Almost all the rivers have been utilised either for power production & water supply or irrigation. Due to rapid urbanisation taking place in towns, it is no longer possible to abstract surface water. Therefore only feasible option is to explore deep and other groundwater sources in the near future.

The average rainfall volumes in the Island is estimated to be about 132,000 Million Cubic Meters per Annum, for the two monsoons and the other inter monsoon rains. Between 10% to 30% of this rainfall is estimated to go for recharging groundwater storage.

This is particularly high in the hill country areas and sub-terrain water passages are available to move groundwater to many areas of the Island.

Besides the necessity of increased supply of water, it is considered necessary to introduce effective measures in managing the water resources and supply systems. In view of above, it is urgently required to initiate this development study for the formulation of effective measures such as well-organized groundwater balance to cope with seasonal deficit as well as future shortage of water to sustain the welfare of the people and the development of the country.

#### **- Sectoral development policy of the national/local government**

The government recognizes its responsibility to ensure that the country achieves her development goals with least damages to the environment. As economic plans of the country anticipate achieving accelerated growth of over 6% annually, this growth would intensify the use of natural resources such as groundwater. The proposed project is coherence with government policies as this project is aimed to establish the needed framework to use groundwater in an environmentally sustainable manner.

#### **- Problems to be solved in the sector**

- a. Inadequacy of the existing water supply schemes and sources
- b. Tools, equipment and plants only for shallow wells and deep wells (up to 75 meters).
- c. Shortage of skilled manpower.
- d. Financial constraints.

## - Outline of the project

The project would mainly comprise

a. The policy aims at community based on supporting project one another and stresses the use of appropriate and affordable technology, involvement of beneficiaries (community participation) at all stages of project implementation and also construction, handing over to the beneficiaries the completed projects for operation and maintenance. This project is divided into two stages study and implementation. Implementation is expected to follow immediately after the study. The study stage is considered in this document.

b. This is a project on groundwater resources development study.

Main activities involved are essentially:

### **Data collection:**

- Socio economic background of population and its forecast, industry and mining activities, forestry and agricultural activities etc.
- Urban development policy and programme.
- Existing water resources and water supply schemes.
- Previous study on water resources.
- Physical conditions, Topography, Meteorology, Geology, General Hydrology, Physical characteristics of river and flow conditions.
- Water supply and its facilities.
- Water demand – domestic, industrial, commercial etc.
- Water quality.
- Water management.
- Ecology and environmental aspects – wildlife, vegetation, soil erosion, fish, water pollution etc.

### **Data analysis:**

- Image enhancement processing of satellite images for geological and Hydrogeological interpretation.
- Meteorological and Climatological analysis of available data from Departments of Meteorology, Agriculture and Irrigation.
- A hydrological analysis to incorporate the observation on stream Network, analysis of maps in the office coupled with field investigation on several major streams.

### **Environmental impact assessment:**

- The environmental assessment will be based on the current Environmental requirements and future environmental situation in the country. The concept of “Total Environment” is considered when making overall assessment on the impacts of the present study. It is aimed to address issues such as possible change of the present environmental rules and regulations pertinent to the country’s groundwater resources development, acceptable groundwater

extraction limits relevant to Sri Lanka etc.

#### **Project Identification**

- Present water demand and water use, and the components that ground Water can provide.
- Main targets are as follows :  
Population (growth)  
Industry  
Commercial  
Urban development  
Others, such as recreation, flow etc.
- Assessment of groundwater demand and requirement in the year of 2020 and beyond for Domestic, Industry and Others, such as nature reservation, recreation, management of echo system etc.

#### **Prepare preliminary design and cost estimates:**

- A topographic survey including groundwater level survey to be Carried out under the proposed study
  - Field reconnaissance (Topography and geology, Land use, Existing wells, Water supply facilities).
  - Geological and hydrogeological surveys by using remote sensing.
  - Electromagnetic and resistivity surveys.
  - Geochemical analysis.
  - Water quality analysis.
  - Hydro meteorological observations.
  - Design and installation of the hydrogeological and climatological stations, which will be considered in system, network for upgrading the accuracy and reliability of existing data.
  - Hydro-meteorological observation.
  - Well registration and groundwater leveling.
  - Test well drilling and related investigations.
  - Electrical logging.
  - Pumping tests.
  - Analysis and evaluation of water potential, Hydrological and geological analysis, Natural water balance analysis. Quantitative analysis on water potential.
  - Ecological and environmental survey.
- Draw implementation schedule.
  - Prepare project justification (financial economic analysis)

#### **- Purpose of the project**

To supply adequate, clean and safe water to the people covering whole of Sri Lanka by rehabilitating existing wells and boreholes as well as developing new wells and boreholes.



To improve health and standard of living of the people through assessment and improvement of present sanitation practices.

To eradicate communicable disease (dental diseases from fluoride ions, hardness Disease from hard water).

To be increased productive as well as education, especially for women and children and agricultural and livestock production.

**- Goal (long term objective) of the project**

Enable the efficient and environmentally sustainable development of groundwater resources for domestic, agriculture and industrial purposes, especially in the dry areas.

**- Prospective beneficiaries**

- (1) **Area that will be benefit from the project (specify the total area, if possible) :**  
Estimated total area is about 10,000 Km<sup>2</sup>.
- (2) **Population that will benefit (directly and indirectly).**  
Approximately whole population in the particular two districts and surrounding districts.

**- Project's priority in the development plan of National/Local Government/ Public Investment program**

\* The Project's priority in the National Development Plan/ Public Investment

The Public Investment Programme 1997 - 2001 states as follows:

Since agricultural development depends on effective irrigation systems particularly in dry and intermediary zones, it will continue to play a vital role in the agricultural growth in the country. Of the allocation under Agriculture in the Public Investment Programme during the period 1997 - 2000, 20 percent was for irrigation.

Main policy thrust and strategies towards irrigation development during 1997 to 2000 is on:

- Emphasis on efficiency in system management, rehabilitation, modernisation, and restoration including improved operation and maintenance,
- Participatory system management with beneficiary involvement,
- Integration of water resources for water resources planning,
- Catchment management programmes covering water shed linking upstream

and downstream users,

- Development and management of surface and ground water for irrigation,
- Restructuring of irrigation sub-sector agencies to respond to new economic policies,
- Gradual transfers the management of irrigation schemes to beneficiary organisations,
- Re-orientation of the future role of the State in water management, operation and maintenance and delivery of support services based on the outcome of pilot schemes being implemented.

According to the above-mentioned matters, the proposed project is in line with the government policies.

**(5) Desirable time of the commencement of the project.**

The study should commence in fiscal year 2000 and be completed within a period of 2 years as follows:

- (1) preliminary study using existing data/information, together with getting acquainted with the area.
- (2) Field work for both team (hydrological and hydrogeological)
- (3) Test drilling and further existing dug-shallow well studies.  
Office work

**(6) Expected funding source and /or assistance (including external origin)**  
Grant-aid and technical co-operation of the Japanese government.

**(7) Other relevant projects, if any.**

Rural water supply projects being carried out in six districts.

**Terms of Reference of the Proposed Study**

**(1) Necessity /Justification of the Study**

Current situation of water supply and the adverse effects that might arise from the groundwater schemes which are not properly managed, and of the necessity to explore the different groundwater sources from so far justify the study.

**(2) Necessity / Justification of the Japanese Technical Cooperation.**

WRB is aware that Japanese Technology in remote sensing and groundwater exploration is very

advanced. In addition Japanese Technical Assistance for employing low cost energy saving groundwater extraction systems will make the eventual project sustainable. Grant assistance available under JICA will enable to WRB to start this investigation immediately as mobilization of own resources and exiting technique by WRB in short term is not feasible.

**(3) Objectives of the study**

- . To assess the present water supply and sanitation systems.
- . To assess the information regarding the availability of existing water resources, and the exploration of additional adequate groundwater resources to cope with the seasonal water shortage, paying special attention to availability of groundwater in deeper layers (more than 150 metres).
- . To conduct test drilling in order to establish adequate well fields.
- . To design new water supply projects in specific needs of particular areas based on this study.
- . To design affordable and acceptable sanitation appurtenances for the area.

**(4) Area to be covered by the Study:**

To cover the Hambantota and Monaragala districts initially. It is urgently necessary for formulating of effective measures to cope with the seasonal water shortages and also lack of safe water and good sanitation practices to the people, especially in rural areas, have brought about health problems and contributed to low standard of living. Considerable time is spent on fetching water from distant water sources, and hence the desire for the study to promote new water supply projects and to find a way out of current situation.

**(5) Scope of the Study**

The study shall assess the existing exploitable wells and bore holes, those presently in use for rehabilitation requirement, and identify new groundwater sources with emphasis on new boreholes for the present and future water supply. The study shall, essentially, identify and select feasible projects to be implemented during the implementation phase.

**(6) Study Schedule**

The study is expected to start in the fiscal year 2000/2002. The duration of the study is two calendar years.

**(8) Expected major output of the study**

Expected major out-puts of the study are water supply and groundwater assessment projects for implementation.

Formulation of Groundwater Resources Development Project.

- Groundwater Resources Development potentials.
- Urgent Groundwater Resources Development projects. Special emphasis to be given for the possibility of utilisation of deeper aquifers (more than 150 m deep) and ground-flow water to cater for the demands of identified water supply schemes.

**(8) Request of the study to other donor agencies, if any**

None

**(9) Other relevant information, if any**

None

**3 Facilities and Information for the Study Team, etc.**

**(a) By Sri Lankan Side**

**(1) Assignment of counterpart personal of the implementing agency for the Study**  
(Number, academic background, etc).

Required personal will be assigned to the Study Team by the W.R.B.

**(2) Available data, information, documents, maps etc. related to the Study.**

A preliminary studies pertaining to groundwater.

**(3) Area Information on the security conditions in the Study.**

Security condition is satisfactory.

**(b) Japanese Side**

Multi disciplinary experienced expert team will be required. The Sri Lankan government provide counterpart personnel and engineers who work together with Japanese experts. The overall expertise input for the study will be 120 man months as follows:

- (1) Water Resources Engineer (Team Leader)
- (2) Hydrologist
- (3) Hydrogeologist
- (4) Geologist
- (5) Water Supply Engineer
- (6) Drilling Engineer
- (7) Remote Sensing Engineer
- (8) System Engineer
- (9) Socio Economist
- (10) GIS Expert
- (11) Institutional Expert
- (12) Chemist
- (13) Surveying and Mapping Expert
- (14) Technician to handle scientific equipment

**c) Equipment necessary for the study**

Equipment and instrument necessary for the study, which the Sri Lankan Government

expects the Japanese Government to provide are as follows:

Four wheel drive vehicles	2 Units
Trucks	1 Units
Automatic well water gauge	4 Units
Automatic precipitation and climatological recording equipment	1 Sets
Resistivity meter with a power booster and interpretation software	1 Sets
VLF and EM equipment	1 Sets
Digitizer and a Computer	1 Units
Stereoscopes	1 Units
Personnel Computer with a GIS base, Printer and Plotter	1 Unit
Geo-positioning system	2 Sets
Lamps for Atomic Absorption Spectrophotometer (AAS)	1 Units of each Major element
Argon and NO2 for AAS and chemicals and accessories	
Potable Electrical Conductivity Meters	2 Sets
Potable pH and temperature bridge	2 Sets
Field Kit to analyse major elements in the field	1 Sets
Data logger and accessories	1 Units
Field Kit to analyse major elements in the field	
Mini lab mounted on a vehicle and accessories	1 Unit
Field equipment such as field bags, tents, collapsible beds	2 Units
Brunton compass	2 Units
Geological hammers	2 Units
Surveying equipment and accessories	2 Units
Water well drilling machine (for deep and horizontal test drilling)	2 Units each
Drilling equipment and accessories	2 Units each
Pumping equipment and accessories	2 Units
Copy machine	1 Unit

**Other as recommended by the consultants engaged**

**(3) Information of the security condition**

Project will be carried out in secured area.

**4. Global issues (Environment, Women in Development, Poverty, etc)**

- Environmental components of the project have to be assessed prior.
- Women are main beneficiaries
- Some project components may require special consideration for women and children.
- Anticipated impact on women is obvious, and they could reduce the time spent for collecting and transporting of water, which could be utilised for production activities.
- The project will have significant impact on poverty alleviation in the living conditions of the lower income groups in the target area will be

improved.

- No constraints are caused to the low-income people.

## **5 Undertaking of The Government of the Democratic Socialist Republic of Sri Lanka.**

In order to facilitate a smooth and efficient study, the government of the Democratic Socialist Republic of Sri Lanka shall take necessary measures:

- (1) To secure the safety of the study team
  - (2) To permit the members of the study team to enter, leave and stay in the Democratic Socialist Republic of Sri Lanka in connection with their assignment therein, and exempt them from alien registration requirement and consular fees.
  - (4) To exempt the study team taxes, duties and any other charges on equipment, machinery and other materials brought into and out of the Democratic Socialist Republic of Sri Lanka for the conduct of the study.
  - (5) To exempt the study team from income tax and charges of any kind imposed on or disconnection with any emoluments or allowances paid to the members of the study team for their services in connection with the implementation of the study.
  - (6) To provide necessary facilities to the study team for remittance as well as utilisation of the Funds introduced in the Democratic Socialist Republic of Sri Lanka from Japan in connection with the implementation of the study.
  - (7) To secure permission for entry into private properties or restricted areas for the conduct of the study.
  - (8) To secure permission for the study to take all data documents and necessary materials related to the study out of the Democratic Socialist Republic of Sri Lanka to Japan.
  - (9) To provide medical services as needed. Its expenses will be chargeable to members of the study team.
- 6. The Government of the Democratic Socialist Republic of Sri Lanka shall bear claims, if any arises against member(s) of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the study except when such claims arise from gross negligence or wilful misconduct on the part of the member of the Study Team.**
- 7. The Water Resources Board shall act as counterpart agency to the Japanese Study Team and also as co-ordinating body in relation with other government and non-governmental organisation concerned for the smooth implementation of the study. The Government of the Democratic Socialist Republic of Sri Lanka assured that the matters referred in this form will be ensured for a smooth conduct of the Development Study by the Japanese Study Team.**

The Government of (the recipient country) assures that the matters referred to in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.

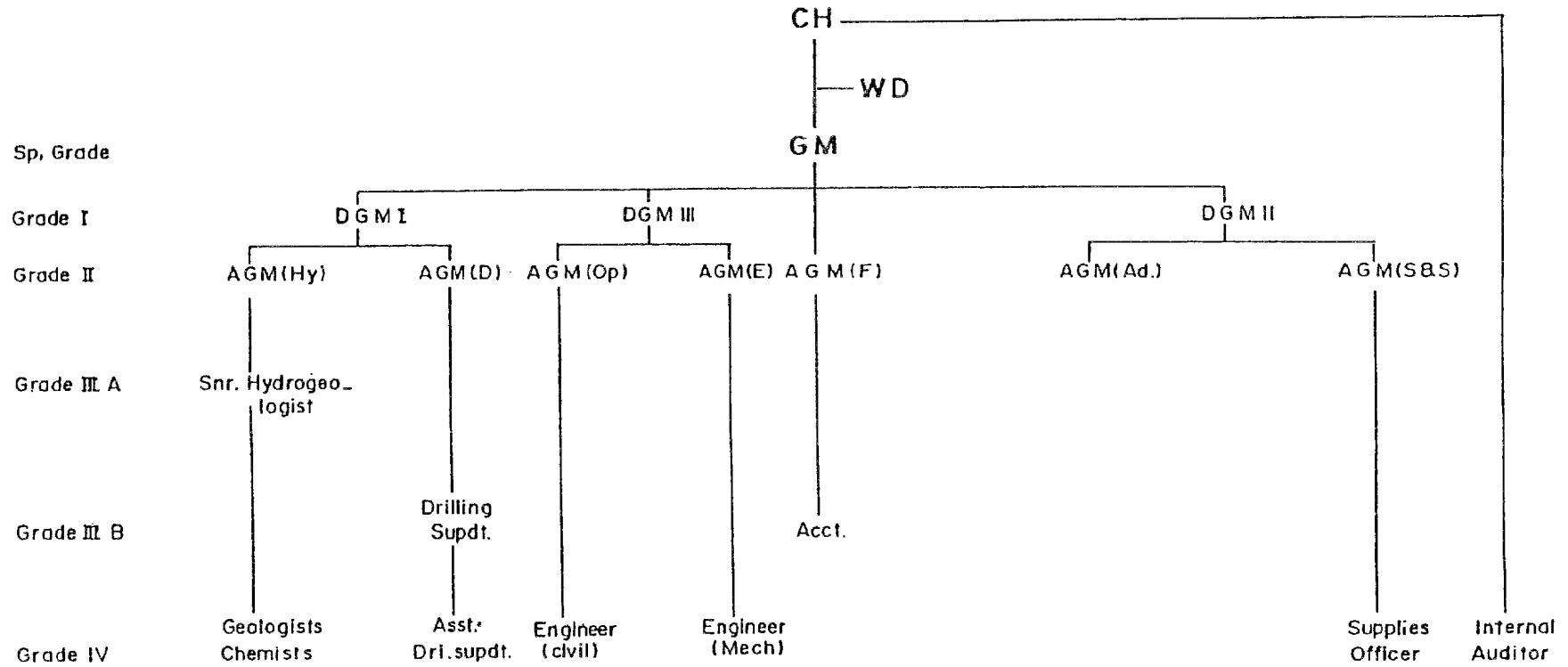
Signed:   
R.N. Karunaratne

Title: General Manager  
Water Resources Board

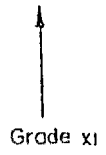
On behalf of the Government of: Sri Lanka.

Date: 23rd of August 1999

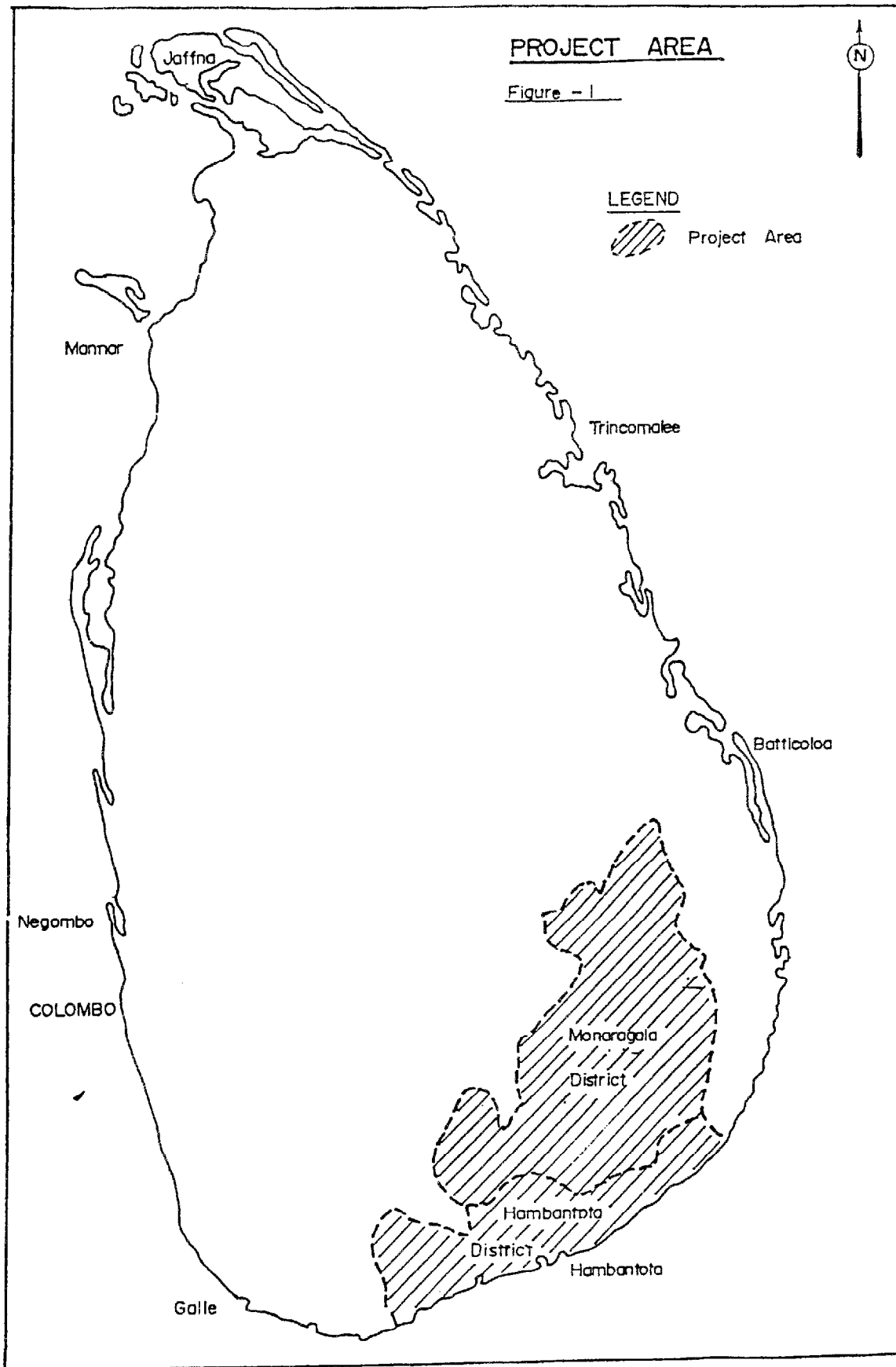
Organization Chart of the Staff Grade - W.R.B



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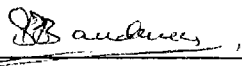




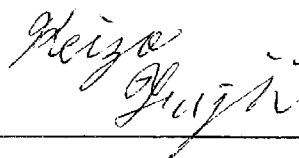
*Scope of Work*  
*For*  
*The Study on Comprehensive Groundwater Resources Development*  
*for Hambantota and Monaragala Districts*  
*in the Democratic Socialist Republic of Sri Lanka*

*Agreed upon between*  
*Ministry of Irrigation & Water Resources Management,*  
*Ministry of Finance & Planning*  
*and*  
*The Japan International Cooperation Agency*

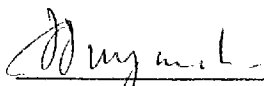
*Colombo, December 18, 2000*



**Mr. S.B. Bandusena**  
Secretary,  
Ministry of Irrigation and  
Water Resources Management

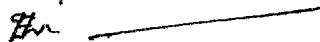


**Mr. Keizo FUJII**  
Team Leader,  
The Preparatory Study Team,  
Japan International Cooperation  
Agency (JICA)



**Mr. J. H. J. Jayamaha**  
Director,  
Department of External Resources,  
Ministry of Finance & Planning

Witnessed by:



**Mr. M. L. A. M. Hizbullah**  
Chairman,  
National Water Supply &  
Drainage Board

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## **I. INTRODUCTION**

In response to the official request of the Government of the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Government of Sri Lanka"), the Government of Japan decided to conduct the Study on Groundwater Development in the Study on the Comprehensive Groundwater Resources Development for Hambantota and Monaragala Districts in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Sri Lanka.

The present document sets forth the Scope of Work for the Study.

## **II. OBJECTIVES OF THE STUDY**

The objectives of the Study are:

1. to evaluate potential of water resources, focusing on groundwater;
2. to formulate groundwater development plan; and
3. to pursue technology transfer to counterpart personnel in the course of the Study.

## **III. STUDY AREA**

The Study will cover the Hambantota and Monaragala districts, except for some part of eastern region where the safe implementation of the Study may be at stake. Those area are shown in the attached sheet of Annex-I.

## **IV. SCOPE OF THE STUDY**

Phase I: Basic Study

- 1) The collection and review of existing data
- 2) Field reconnaissance
- 3) Serial observation of groundwater level in the existing wells / Topographic survey
- 4) Socio-economic survey (the condition of water use, socio-economic aspect, people's awareness, existing well inventory, and analysis on water tariff)
- 5) Preliminary water demand projection
- 6) Preliminary analysis on the planning framework
- 7) Initial Environmental Evaluation (IEE)

Phase II: Study on Groundwater Potential

- 1) Geophysical exploration
- 2) Test boring, well logging, and pumping
- 3) Water quality analysis
- 4) Measurement of groundwater level in the observation wells / Topographic survey

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- 5) Approximate water balance analysis
- 6) Production of hydrogeological map
- 7) Preliminary evaluation of groundwater potential
- 8) Supplementary investigation / measurement

Phase III: Evaluation of Groundwater Potential and Formulation of Groundwater Development Plan

- 1) Projection of water demand
- 2) Setting of planning framework
- 3) Evaluation of groundwater potential
- 4) Plan of the groundwater monitoring
- 5) Environmental Impact Assessment (EIA)
- 6) Formulation of groundwater development plan

**V. SCHEDULE OF THE STUDY**

The Study will be carried out in accordance with the tentative schedule as attached in Annex-II.

**VI. REPORTS**

JICA shall prepare and submit the following reports in English to the Government of Sri Lanka.

1. Inception Report:  
Twenty (20) copies at the commencement of the first work period in Sri Lanka.
2. Interim Report:  
Forty (40) copies at the end of Phase II in Sri Lanka.
3. Draft Final Report:  
Forty (40) copies at the end of the third work period in Sri Lanka. The Government of Sri Lanka shall submit its comments within one (1) month after the receipt of the Draft Final Report.
5. Final Report:  
Seventy (70) copies within one (1) month after the receipt of the comments on the Draft Final Report.

**VII. UNDERTAKINGS OF THE GOVERNMENT OF SRI LANKA**

1. To facilitate the smooth conduct of the Study, the Government of Sri Lanka will take the following necessary measures:
  - a. To secure the safety of the Japanese study team (hereinafter referred to as "the Team")

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- b. To permit the members of the Team to enter, leave and sojourn in Sri Lanka for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees
  - c. To exempt the members of the Team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into Sri Lanka for the conduct of the Study
  - d. To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study
  - e. To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Sri Lanka from Japan in connection with the implementation of the Study
  - f. To secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study
  - g. To secure permission for the Team to take all data and documents (including photographs and maps) related to the Study out of Sri Lanka to Japan
  - h. To provide medical services as needed, expenses for which will be chargeable to the members of the Team.
2. The Government of Sri Lanka shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Team.
3. The Water Resources Board (hereinafter referred to as WRB) shall act as a counterpart agency and the National Water Supply & Drainage Board as a collaborate agency to the Japanese Study Team. And WRB shall also act as a coordinating body in relation with other governmental and non-governmental organizations for the smooth implementation of the Study. WRB, at its own expense, provides the Team with the followings, in cooperation with other organizations concerned:
- a. available data and information related to the Study
  - b. counterpart personnel
  - c. suitable office space with necessary equipment for the Study
  - d. credentials or identification cards

#### VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:



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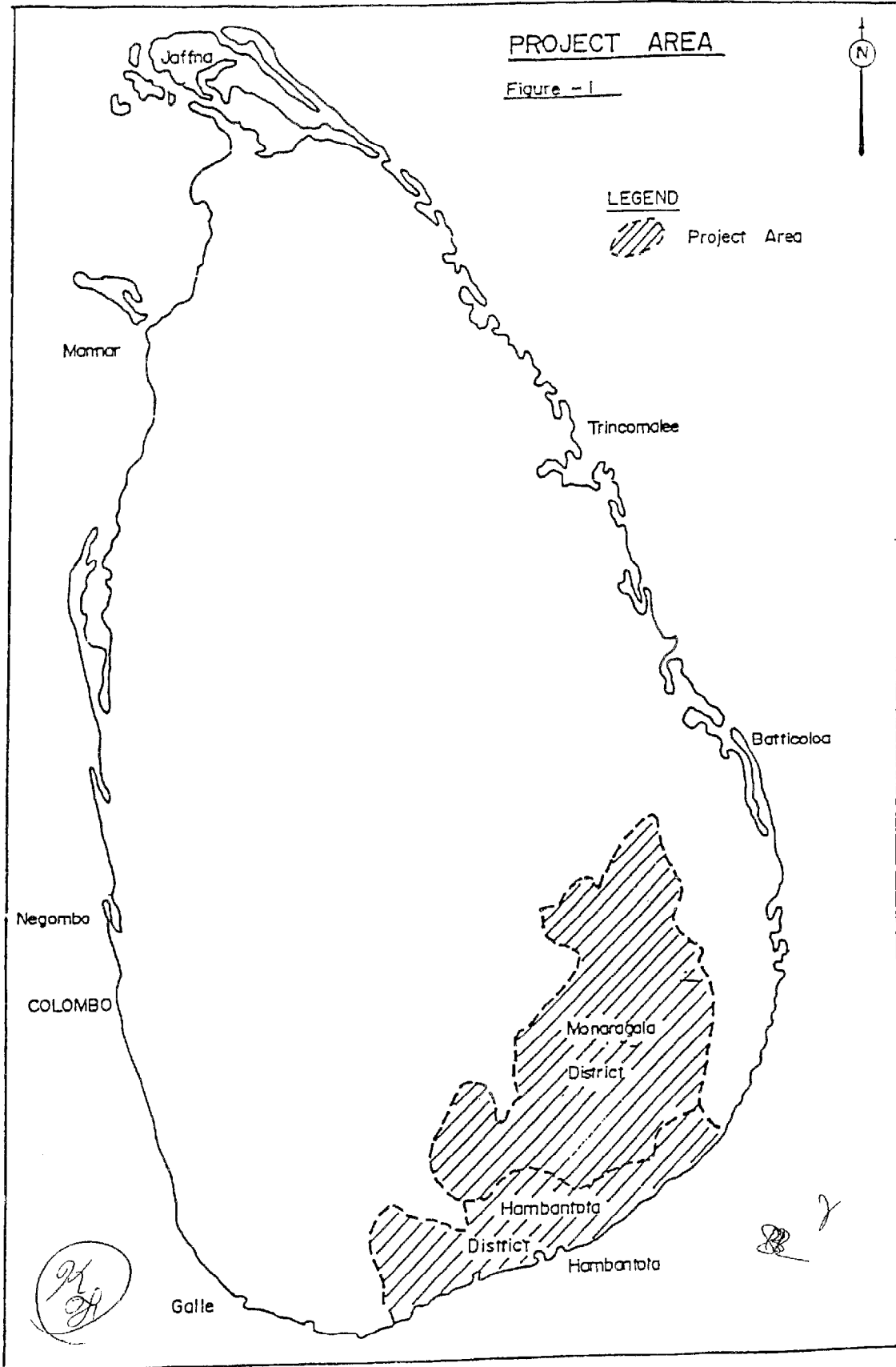
1. to dispatch, at its own expense, study teams to Sri Lanka
2. to pursue technology transfer to the Government of Sri Lanka counterpart personnel in the course of the Study.

**IX. CONSULTATION**

JICA and WRB shall consult with each other in respect of any matter that may arise from or in connection with the Study.

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### Tentative Schedule

No. of Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
S/W	■																			
Study					■															
Report				▲ IC/R																▲ F/R

IC/R : Inception Report  
F/R : Final Report

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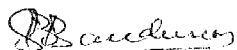
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*Minutes of Meetings  
on  
Scope of Work  
for  
The Study on Comprehensive Groundwater Resources Development  
for Hambantota and Monaragala Districts  
in the Democratic Socialist Republic of Sri Lanka*

*between  
Ministry of Irrigation & Water Resources Management,  
Ministry of Finance & Planning  
and  
The Japan International Cooperation Agency*

*Colombo, 18th December  
2000*



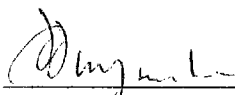
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**Mr. S.B. Bandusena**  
Secretary,  
Ministry of Irrigation &  
Water Resources Management



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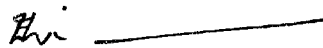
**Mr. Keizo FUJII**  
Team Leader,  
The Preparatory Study Team,  
Japan International Cooperation  
Agency (JICA)



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**Mr. J. H. J. Jayamaha**  
Director,  
Department of External Resources,  
Ministry of Finance & Planning

Witnessed by:



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**Mr. M. L. A. M. Hizbullah**  
Chairman,  
National Water Supply &  
Drainage Board

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## **I. Introduction**

In response to the official request of the Government of the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Government of Sri Lanka"), the Preparatory Study Team (hereinafter referred to as "the Team") ,headed by Mr. Keizo Fujii, of the Japan International Cooperation Agency (hereinafter referred to as "JICA") is visiting Sri Lanka from December 12 to December 30, 2000 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Study on the Comprehensive Groundwater Resources Development for Hambantota and Monaragala Districts in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Study").

The Team carried out field surveys of the study area and held a series of discussions with the authorities concerned of the Water Resources Board (hereinafter referred to as "the WRB") and other organizations.

And both sides agreed upon Scope of Work for the Study which was signed on December 18, 2000.

The list of attendants is shown in Appendix.

The Minutes of Meetings has been prepared for the better understanding of the S/W, summarizing main points of the discussions made in the course of the preparation of the S/W.

## **2. Objectives of the study**

Both sides confirmed that the groundwater development plan would be considered to include a domestic, irrigation, industrial use and so on.

## **3. Study Title**

Both sides agreed that the title of the Study would be "The Study on Comprehensive Groundwater Resources Development for Hambantota and Monaragala Districts in the Democratic Socialist Republic of Sri Lanka" as described in the S/W.

## **4. Study Area**

Both sides agreed that the Study Area would be the Hambantota and Monaragala districts except for some insecure areas as described in the S/W.

And both sides also agreed that the detailed study area would be confirmed at the later stage based on the condition at that time.

## **5. Scope of the Study**

Japanese side explained that they would drill some observation wells (approximately 10 and some more points) in the Study and they would consider changing their wells to production wells in the future.

Sri Lankan side understood these and requested that the observation wells should be drilled in deeper layers (more than 150 meters) because the data of shallow wells (under than 75 meters) was existing.

Japanese side recognized the situation and promised to convey the request to JICA Headquarters for positive consideration.

Both sides confirmed that the Study would be implemented in the Master Plan



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level and the Feasible Study of this study would not be implemented.

And if this study is completed successfully, JICA will recommend Sri Lanka side for the implementation of the feasibility study.

#### **6. Undertakings of the Government of Sri Lanka (Secure Safety and necessity equipment)**

Both sides confirmed the following matters:

- (1) Sri Lankan side will secure the full support and participation of organizations concerned in the course of the Study.
- (2) Sri Lankan side will take necessary measures to secure the safety of the JICA plenary study team, especially during field surveys and inform the JICA plenary study team about security conditions.
- (3) Sri Lankan side will assign the appropriate number of counterpart personnel to the JICA Study Team. The number and fields of counterpart personnel will be finalized between Sri Lankan side and the JICA Study Team throughout discussions at the commencement of the Study.
- (4) Sri Lankan side will prepare a suitable office space and necessary office equipment for the Study but no vehicles and no drilling equipment for the Study because of the budgetary constraints. Japanese side recognized their situation and promised to convey the situation to the JICA Headquarters for consideration.

#### **7. Undertakings of JICA**

Sri Lankan side requested that JICA would provide necessary equipment for the Study, especially equipment for drilling deep well, geophysical equipment and computer for GIS including software.

Japanese side understood the requests and promised to convey the requests to the JICA Headquarters for positive consideration.

#### **8. Steering Committee**

Japanese side suggested Sri Lankan side to organize a steering committee which shall coordinate the Study and make comment to and evaluate the report of the Study for smooth implementation of the Study. Sri Lankan side accepted the suggestion and promised to set up the committee. The members of the committee may consist of the representatives of the following entities:

- Ministry of Irrigation and Water Resources Management
- Ministry of Urban Development Construction & Public Utilities
- Ministry of Finance & Planning
- Water Resources Board
- Department of Irrigation

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- Water Resources Secretariat
- National Water Supply & Drainage Board
- Uva Province ~~of Hambantota~~, Chief Secretary
- Southern Province ~~of Monaragala~~, Chief Secretary
- District Secretary of Hambantota
- District Secretary of Monaragala

#### 9. Seminar

Japanese side explained that a seminar as a means of reporting the findings and the recommendations made by the Study to the Sri Lanka side and other related organization could be held in the course of the Study. The Sri Lanka side took an interest in those programs and requested to hold those programs. Japanese side promised to convey this request to the JICA Headquarters for positive consideration.

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## APPENDIX

### LIST OF ATTENDANTS

(Sri Lanakan side)

Ministry of Irrigation and Water Resources Management

Mr. S. B. Bandusena	Secretary
Mr. L. T. Wijesuriya	Additional Secretary
Mr. Ranjith Ratnayake	Director, Water Resources Department

Ministry of Urban Development Construction & Public Utilities

Mr. A. S. Gunasekera	Secretary
Mr. W. Jirasingha	Additional Secretary (Technical)

Department of External Resources, Ministry of Finance & Planning

Mr. J. H. J. Jayamaha	Director (Japan Division)
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Department of National Planning, Ministry of Finance & Planning

Mrs. S. M. Karunaratne	Director (Human Settlement & Environment)
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Water Resources Board

Mr. K. Yoganathan	Chairman
Mr. R. N. Karunaratne	General Manager
Mr. H. M. U. Bandara	Assistant General Manager
Mr. K. A. W. Kodituwakku	Dputy General Manager
Mr. R. S. Wijesekara	Senior Hydrogeologist
Mr. G. R. R. Karunaratne	Senior Hydrogeologist

National Water Supply & Drainage Board

Mr. M. L. A. M. Hizbullah	Chairman
Mr. D. N. J. Ferdinando	Assistant General Manager (Japanese Project)
Mr. G. K. Simal	Assistant General Manager (Ground Water)
Mr. E. M. Wiwabsen	Manager
Mr. Hirokatsu ASAKAWA	JICA Expert, Japanese Projects Unit



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(Japanese side)

Preparatory Study Team

Mr. Keizo FUJII	Leader
Mr. Taketo KUROKI	Member
Mr. Shigemi KIMURA	Member
Mr. Osamu NISHII	Member
Mr. Hiroshi YOSHIDA	Member

JICA Sri Lanka Office

Mr. Hiroyuki TANAKA	Staff
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