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添付資料1．要　請　書

TERMS OF REFERENCE
FOR
THE STUDY
ON
ADDIS ABABA FLOOD CONTROL
AND
ENVIRONMENTAL MANAGEMENT PROJECT

1　Background

The city of Addis Ababa suffered from severe flooding for many years, which has resulted in social disturbances such as loss of human lives, houses/offices, displacement of people living in the river-side areas and damage to various infrastructure such as traffic-related structures in the city. The situation has escalated due to a population increase in the city over the past 15 years. Although the feasibility study for the flood protection and storm sewer system of the city was completed by BECOM in 1982, placing a focus on the formulation of the flood protection plan for riverine areas along the Kechene, Kurtume and Bantyiketu Rivers, the reaches of the Kebena and Little Akaki Rivers recently have many places where people are densely settled along the riverine areas. Thus, it is keenly necessary to prepare the integrated flood control plan with a full coverage of the Addis Ababa city area concerned with flood control and environmental management.

In addition to the aforesaid flooding problems, the river environment has worsened greatly with the rapid population increase along the riverine areas with respect to every tributary draining the city area. In particular, during the dry season when the river streamflow is lower, a foul smell is released from the river channel due to pollution of river water which is the responsibility of nearby households who release domestic waste water into the river channel not to mention the already accumulated garbage found in the river channel.

Taking into account the aforesaid situation in the city of Addis Ababa, the Government of Ethiopia requested the Infrastructure Development Institute of Japan (IDI) to dispatch a preliminary survey mission in order to formulate the terms of reference necessary for the study.

The Government of Ethiopia places vital importance on the urgent implementation of the Study so as to improve the situation of the city.

2. THE PROJECT AREA

The city of Addis Ababa spreads to the upper catchment of the Akaki River, covering an area extending from steep sloping land with a maximum elevation of 2,800 m in the north up to a gentle plateau with an elevation of 2,200 m in the south. The catchment is drained by numerous steep channels which originate from the northern watershed with a peak elevation of about 3200 m. Those small tributaries generally flow down from north to south with a gradual decrease of their gradients. Of these, the main rivers are the Kebena, Kechene, Kurtume and Little Akaki in an order of east to west, which join to form the mainstream of the Akaki River far downstream of the city area.

The study area with a catchment area of about 125 km^2, for which the flood control plan is to be contemplated under the Study, lies in the uppermost part of the Akaki River Basin.

According to the city map in 1986, the catchment is approximately 70 % urbanized and 30 % forested or grassed. The upper catchment area has considerably more open meadows or farm land than is indicated on the 1986 city map which shows forest cover. This seems to reveal recent forest clearance and some soil erosion.

The population of Addis Ababa was 1.2 million in 1982. Thereafter, the population has largely increased, especially due to the migration of rural people to the city during the long-lasting civil war when the city area was the only place in the country that could ensure security. It is generally accepted that at present the city's population is approximately estimated at 3 million, although the results of a recent census are not available. As a result of the population increase, the areas adjacent to the river channel have been densely built up. This situation has led to an increase in the occurrence of flooding in the riverine areas concerning every tributary that passes through the city area. According to the information obtained from the Region 14 Administration Office, around 90 % of the residents living along the riverine areas are settled legally under the formal permission of the regional government, while the rest, around 10 % thereof, is reported to be illegal residents.

In 1986, the Addis Ababa Master Plan was prepared under the assistance of the Italian Government and formally approved in 1994 by the Region 14 Administration Office. The Master Plan sets out the "Green Area" for each of the tributaries draining the city, which delineate the riverine strip area with a width of 50 to 300 m in general and over 500 m in some places. After the approval of the Master Plan by the Regional Government, new residents are prohibited to settle in the riverine areas. The Regional Government recognizes that it is realistically impossible to relocate the people living in the riverine areas to other places in order to realize the Green Area planned in the master plan. The Green Area may also be considered to be the same as a river zone where nobody is allowed to settle. Since the present situation in the riverine areas differs from that at the time of the master plan because of the past rapid popuration increase, however, it is recommended to define the river zone instead of the Grean Area through the future master plan.

The rainfall regime of Addis Ababa is subject to the seasonal movements of the Intertropical Convergence Zone producing two wet seasons. The main wet season generally lasts between the middle of June and the end of September, causing about 70 % or more of the annual average rainfall of 1,400 mm. The Addis Ababa city area is subject to very intense rainfalls of short duration. These conditions coupled with the steep sloping catchment and high runoff rates result in rapid rise of water level and river flows of high velocity causing localized inundation and river bank collapse. The previous rainstorm records which resulted in large-scale flood damages reveal that in general the heaviest rainfall intensity occurs within the first 20 minutes after the start of rainfall.

Due to the aforesaid intense rainfall of short duration as well as the steep sloping catchment, the Addis Ababa city area is susceptible to habitual flooding in the wet season. Actually, flooding in Addis Ababa has occurred for many years, but detailed flood damage surveys were conducted for the two floods, which occurred on 19th August 1978 and 26th August 1994, respectively.

The flood of 19th August 1978 took place between 7:30 p.m. and 10 p.m. It caused the death of 12 people who were caught in their homes by the flood, and carried away when their houses collapsed. The damage was so considerable that the Department of Housing Research and Services undertook a survey to clarify the extent and cost of the damage. However, only the damage to dwellings was covered by the survey. The survey clarified that a total of 1255 houses were affected, of which 562 houses were destroyed. In addition to the damages to dwellings, other flood damage such as interference with traffic and roads were reported as a result of the survey.

To cope with the flood damage in Addis Ababa, a feasibility study on Flood protection and

Storm Sewer System of Addis Ababa was proceeded by BECOM in 1979 with the financial assistance of the French Government. The BECOM study undertook a stream gauging survey, hydrological analysis, flood damage survey, and formulation of flood protection plan and improvement plan of storm sewer system in Addis Ababa. It was clarified through the feasibility study that the 1979 flood would have a flood scale of a 30 year return period and that the total amount of damages caused by the flood be about 2 million Birr at the price level of 1982. The feasibility study recommends the provision of retaining walls and/or dikes along the river banks of the Kechene, Kurutume and Bankiyeketu, and a small flood control dam on each of the upper reaches of the former two rivers and the Little Akaki so as to protect the flood prone areas from flooding. However, the flood protection plan was formulated focusing on the riverine areas along the Kechene, Kurutume, and Bantyiketu Rivers, of which the former two rivers are tributaries of the Bantyiketu. Concerning the Kebena and Little Akaki Rivers, the protective works were not sufficiently planned in the study with exception of a small dam proposed in the upper reaches of the Little Akaki River, as the riverine areas along these two rivers were not so densely populated at the time of the feasibility study. Due to the aforesaid rapid population increase, present land-use along these two rivers has remarkably progressed since the completion of the feasibility study which was about 15 years ago.

Again, a large-scale flood occurred in August 1994. It destroyed or damaged housing, affecting nearly 8000 persons and made some 3000 persons immediately homeless. Initial estimates indicate that at least 462 families require rehousing being spread over the city. These people are presently being housed in community facilities such as community halls or makeshift outdoor-accommodation of plastic sheeting. As far as the present dense housing along every river channel in the city is concerned, it is expected that the same or even larger scale flood damage will take place in the future unless effective flood protection measures are taken to improve the present condition along the riverine areas.

In response to the 1994 flood, the Regional Government established the Addis Ababa Flood Control and Prevention Project Office in September 1994, who is principally responsible for implementation of urgent measures, and investigation and implementation of long-term protection measures to protect Addis Ababa from flooding. However, it appears that the flood protection walls and road bridges currently under construction or being planned take into consideration only the flood water levels corresponding to a flood level of the certain return period, which was formulated through the previous feasibility study. Besides, it is reported that the existing bridges constructed in the past to link the road networks in the city have hampered the smooth streamflow due to the abrupt reduction of the flow area at those locations, causing the river to overflow during times of flood. Also the flood protection walls along the river bank, which were constructed by another

organization in the past for flood protection purposes, cause new problems such as erosion of the opposite river bank. In consideration of these circumstances in the city, it is essential to set up a comprehensive master plan for the whole area of the city of Addis Ababa, since the previous study doesn't cover the whole city area and is not effectively utilized for the river structures and river-related structures currently under construction within the city.

The Study on Addis Ababa Flood Control and Environmental Management Project will aim to formulate a comprehensive master plan for flood protection of Addis Ababa and the environmental management in the riverine areas and upper highlands as well as a feasibility study for the priority flood control project, which is to be selected through the master plan.

3. Necessity of the Study

In order to solve the problems and issues related to the flood control and river environment which are explained below, it is essential to formulate an integrated Master Plan on the Addis Ababa Flood Control and Environmental Management Project and to carry out a feasibility study for the priority project as selected through the master plan at the earliest stage.

(1) Occurrence of habitual flood damage

The city of Addis Ababa has suffered from severe flooding for many years. The flooding situation has been aggravated by the rapid population increase. At present, the riverine areas are densely built up for residential purpose, even in low-lying flood-prone areas. For this reason there is a high possibility that even more severe flooding than that of the 1994 flood will occur concerning every tributary basin in the city. This would lead to the creation of a number of displaced people.

(2) Applicability of previous flood control plan

In 1982, a feasibility study was carried out to formulate the flood control plan for Addis Ababa, but it doesn't cover the whole tributaries of the city, placing a focus on flood protection of the central part of the city such as the Kechene, Kurtume and Bantyiketu River Basins since the other tributary basins were not so densely populated. However, the residential area has expanded enormously to the areas along the upper Kebena and Little Akaki Rivers to the east and west, for which no flood control works were contemplated in the previous study with the exception of a flood retention dam on the upstream reach of the Little Akaki River. In addition, a small flood control dam on each of the Kurtume, Kechene and Kebena Rivers, which was proposed in the previous flood control plan, is not an effective measure because of their extremely small

storage capacities attributed to the steep river slopes. Hence, the previous study needs to be updated and revised incorporating the present conditions in Addis Ababa.

(3) Provision of river structures without any flood control plan

The other problems of flood control identifiable in the city are that the flood protection walls and bridges currently under construction are designed without any comprehensive flood control plan. There is a fear that these river and river-related structures will create new issues and problems in relation to flood control in Addis Ababa. In reality, it is reported that the flood protection wall provided along one bank of a tributary caused flooding over the opposite river bank. Thus, the new river and river-related structures should be adequately designed in accordance with the integrated flood control plan to be formulated.

(4) Hydraulic and erosion problems of existing road bridges

At many of the existing road bridge sites in the city, which were constructed 30 years ago or longer, the flow area of the tributary suddenly reduces as they were constructed without sufficient examination of the hydraulic conditions. Due to the insufficient flow areas at those sites, the overflow of river water and rise of the upstream water level takes place during floods, adversely affecting inhabitants living nearby the tributaries, particularly by flooding and hampering road traffic. In addition, there exists other structures such as water supply pipes, which are laid below the average flood water levels.

It was confirmed through site reconnaissance that some bridges have seriously damaged foundations due to erosion of the river bed. Bridge failure in the central part of the city would lead to traffic paralysis in the city, resulting in an adverse effect on economic activities in the city. Hence, it is recommended that the investigation and survey to clarify the present condition of existing bridges and river banks be carried out through the Study in order to set up the urgent rehabilitation plan which comprises of the replacement of existing bridges and protective works for river banks, both of which are subject to severe erosion.

(5) Resettlement of people living in the "Green Area" and Establishing new river zones along tributaries

The Addis Ababa Master Plan sets out the "Green Area" along each of the tributaries draining the city, which delineate the riverine strip area with a width of 50 to 300 m in general and over 500 m in some places. However, the regional government, the Region 14 Administration Office, recognizes that it is realistically impossible to relocate all of the people living in the riverine areas for the realization of the Green Area as

planned in the master plan. From a realistic point of view, it is recommended to establish a new river zone which is to be determined based on the flood water levels of a certain magnitude of flood for every tributary. The river zone will be secured along each tributary as narrowly as possible, providing (a) the project cost is economically feasible as compared to the relocation costs, and (b) there are no adverse environmental effects, by means of contemplating the appropriate flood control measures.

It is necessary to examine the resettlement plan for the people residing in the new river zones, which shall be implemented by the Region 14 Administration Office using their own budgets. The resettlement plan will be formulated taking into account the social aspects concerned with the communities in the river zones such as their organization, family makeup, housing situation and perception to resettlement, and keeping good public relations with the governmental organizations concerned.

(6) Pollution of river water

During the dry season when the river discharge becomes quite small, the river water is much polluted due to inflow of domestic waste water into the tributary from houses in the riverine areas, accumulation of garbage thrown away by the inhabitants, human excretion, etc. Consequently, an extremely foul smell can be noticed in and around the river channel so much so that nobody wants to visit the river channel. Even downstream where the business center is located, the people working in buildings adjacent to the river channel are adversely affected by the foul smell from the river, although this situation is mitigated during the wet season since the polluted river water is diluted by the comparatively abundant runoff.

Unless appropriate measures are taken, the present situation of the river water pollution in set to increase in future. As long as it continues, Addis Ababa cannot qualify to be the capital of the country.

As a short-term measure to improve the river environmental conditions, the simple sewerage system which comprises of the installation of garbage collection boxes/yards and arrangement of garbage collection and vacuum cars along the river banks could be realized taking into account the financial state of the county. On the other hand, a sewerage plan will have to be formulated in association with the Addis Ababa sewerage master plan.

(7) Rezoning of the "Green Area"

Of the Green Area specified in the Addis Ababa master plan, the elevated lands higher than the flood water level will be left to constitute the Green Area as far as the master

plan is valid, even though the river zone for each tributary is to be set up through the Study. It is noted that no development plan for a sewerage system in the Green Area has been proposed in the Addis Ababa sewerage master plan. However, there are a lot of residential places in the Green Areas with a dense housing population. Since almost all the inhabitants are legally settled in these places, these areas should be rezoned to residential areas, or redeveloped as far as practical.

In view of the present status of the Green Area, it is recommended to formulate the overall rezoning plan for the Green Area, which includes the land use plan to secure (i) roads, parks, playgrounds in the vacant areas, of which some places are to be utilized as flood retarding basins during the main wet season and (ii) resettlement area for the people residing in the river zones and (iii) residential areas for which a development plan for infrastructure, such as water supply and sewerage system, will be prepared with reference to other existing master plans.

(8) Issue of organization, institution and laws related to flood control and river management

Since its establishment in 1994, the Addis Ababa Flood Control and Prevention Project Office is responsible for the flood control in Addis Ababa, but the office is not fully organized to control and manage all the rivers in Addis Ababa. It is necessary to examine the organizational strengthening thereof to ensure sustainable flood control and river management in the future. The institution and laws related to flood control and river management is required and should be set up and enforced to successfully keep favorable river circumstance after implementation of the flood control and environmental management project.

4 SCOPE OF WORKS

4.1 Objective of the Study

The objective of the Study will be as follows:

(1) To formulate a comprehensive master plan for flood protection of the city of Addis Ababa through the examination and comparison of all conceivable flood control measures. The master plan will also formulate the resettlement plan for the people residing in the river zone of each tributary to be set up in the master plan, and the urban development plan for the riverine areas which will include a temporary sewerage plan to improve the ever-worsening environmental circumstance as well as land rezoning plan taking into account allocation of infrastructure such as public roads, parks, playgrounds.

(2) To carry out a feasibility study on the priority project, which is to be selected through the aforesaid master plan.

In addition to the above objectives, a transfer of technology to the counterpart personnel of the executing agency shall be another aim of the Study. The main items dealt with in the course of the transfer of knowledge are expected to cover modern engineering technology used on river improvement works in Japan and river management which is practiced in Japan.

4.2 Scope of Works

The Study is scheduled to proceed in the following three (3) stages :

(1) Phase 1 : Field Investigation and Survey

(1.1) Collection of data and information relevant to the Project

(1.2) Review of previous studies and existing plans, which include;
- Feasibility Study on Flood Protection and Storm Sewer System of Addis Ababa, by BECOM
- Addis Ababa Master Plan, by Techeste Ahderom and Paolo Ceccarelli
- Addis Ababa Sewerage Master Plan

(1.3) Aerial photo mapping, river profile and cross sectional survey along major tributaries

(1.4) Installation of water level gauging stations on major tributaries, and current metering at gauging stations

(1.5) Preliminary hydrological investigation and flood damage survey

(1.6) Investigation and survey of existing flood control facilities and related river structures such as road bridges, culverts, water supply pipes, etc.

(1.7) Reconnaissance and survey of bridges and river banks subject to erosion

(1.8) Investigation and survey of land use survey and survey on organization of existing communities in the riverine areas of each tributary

(1.9) Environmental survey and water quality analysis

(2) Phase 2 : Formulation of Master Plan

(2.1) Hydrological investigation for estimating the probable floods of various return periods in the respective sections of each tributary based on the meteo-hydrological records collected from the concerned organizations and those observed with new stream gauges

(2.2) Hydraulic analyses to clarify the carrying capacity of each tributary, both under the present condition and under the condition that the planned flood control facilities are provided

(2.3) Geotechnical investigation including core boring at existing bridges to be relocated and areas subject to land slide, and soil mechanical investigation

(2.4) Preparation of design and planning criteria to be applied to formulate the master plan on the flood control

(2.5) Formulation of improvement plan of sewer drainage system

(2.6) Examination of flood control measures for each tributary

(2.7) Formulation of integrated master plan on the flood control for the entire study area by means of combining the various flood control measures

(2.8) Establishing new river zones along each tributary based on the flood water level of determined flood protection level on the condition that the flood control plans be realized in accordance with the proposed master plan

(2.9) Preparation of inventory of road bridges and other river-related structures which need to be urgently replaced from a flood-control viewpoint or due to erosion of their foundation, as well as riverine areas subject to collapse, and selection of urgent rehabilitation works for which a basic design is expected to start after completion of the master planning

(2.10) Preparation of an improvement plan of the river environment in the riverine areas, which includes resettlement plan of people in the new river zones set out through the Study, and an installation plan of sewerage system, re-development plan of the "Green Areas" in consideration of their effective land uses for roads, parks, playgrounds, residential areas, etc.

(2.11) Initial environmental examination and preparation of a basin conservation plan including reforestation in the upper reaches of the study area

(2.12) Selection of a priority flood control project taking into account the results of the overall economic evaluation on those projects identified, environmental aspects, and the development policy of the Region 14 Administration Office

(2.13) Preliminary study on organization, laws and institution related to flood control and river management

(3) Phase 3 : Feasibility Study for Priority Flood Control Project

(3.1) Supplemental field investigation and survey

(3.2) Assessment of flood damage values in the project area

(3.3) Formulation of optimal flood control plan

(3.4) Preliminary design of the major structures included in the proposed flood control plan

(3.5) Estimate of construction cost and preparation of implementation program

(3.6) Economic evaluation of the effect of the proposed flood control plan

(3.7) Formulation of future land use plan and sewerage system in the riverine areas

(3.8) Overall project evaluation including environmental effects

4.3 Executing Agency

The executing agency of the study is the Addis Ababa Flood Control and Prevention Project Office under the Region 14 Administration Office. Concerning the study on zoning and urban planning of the riverine areas, the staffs of the Region 14 Administration Office who are specialized in those disciplines will be nominated as the counterpart personnel to participate in the Study.

However, in order to smoothly implement the scope of the works, it is strongly recommended that a single lawfully responsible agency or committee be organized by the governmental organizations concerned such as the Addis Ababa Flood Control and Prevention Project Office, the Works & Urban Development Bureau and the Addis Ababa Water and Sewerage Authority.

5. SCHEDULE AND OUTPUTS OF THE STUDY

5.1 Schedule of the Study

The entire Study, which consists of three phases, namely Phases 1, 2 and 3, shall be completed within a period of 18 months. In Phase 1, the water level gauging stations will be installed on the major tributaries draining the city of Addis Ababa after selection of appropriate sites. The basic investigation and survey will be conducted during Phase 1. On the basis of the basic data and information made available through the field investigation and survey of Phase 1, the regular master plan will be carried out in Phase 2, and subsequently a feasibility study for a priority project selected through the master plan is scheduled to be executed in Phases 3. Phases 1, 2 and 3 shall cover the periods of 5, 6 and 7 months, respectively.

5.2 Output from the Study

The following reports shall be prepared and submitted to the executing agency:

(1) Inception Report within a period of one (1) month after the commencement of the Study, describing approach and method of the Study, implementation schedule, proposed expertise inputs, undertakings by the executing agency, etc.

(2) Progress Report-1 at the end of Phase 1, which describes the results of the field investigation and survey for the master planning as well as the findings obtained through field work

(3) Interim Report within a period of eleven (11) months after the commencement of the Study, which presents the draft master plan on flood control and improvement of river environment.

(4) Progress Report-2 at the end of the field investigation and survey conducted for the feasibility study of the priority project, which describes the results of field investigation and survey work

(5) Draft Final Report within a period of seventeen (17) months after the commencement of the Study, which consists of two parts, namely Part 1 : Master Plan and Part 2 : Feasibility Study, to describe all output of Phases 1, 2 and 3.

(6) Final Report within a period of eighteen (18) months after the commencement of

the Study, which is to be finalized reflecting comments given by the Steering Committee on the Draft Final Report

6. UNDERTAKING OF THE EXECUTIVE AGENCY

(1) To facilitate the smooth conduct of the Study, the Executing Agency shall take necessary measures as follows :

(a) To ensure the safety of the members of the Study Team when and as required in the course of the Study.

(b) To permit the members of the Study Team to enter, leave and sojourn in Ethiopia for the duration of their assignment therein and exempt them from foreign registration requirements and consular fees.

(c) To exempt the members of the Study Team from taxes, duties, fees and any other charges imposed on equipment, machinery and materials brought into Ethiopia for the conduct of the Study.

(d) To exempt the members of the Study Team from income tax and any other charges imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in the course of the Study.

(e) To provide necessary facilities to the Study Team for the remittances as well as the utilization of the funds introduced into Ethiopia in the course of the Study.

(f) To secure permission for entry into private properties or restricted areas for the conduct of the Study within the laws and regulations in force in Ethiopia.

(g) To secure permission for the Study Team to take all data and documents including photographs related to the Study out of Ethiopia, within laws and regulations in force in Ethiopia.

(h) To provide medical services when needed, and the expenses will be

chargeable to the members of the Study Team.

(2) The Addis Ababa Flood Control and Prevention Project Office under the Region 14 Administration Office (Addis Ababa) shall bear claims, if any arises, against the members of the Study Team resulting from, occurring in the course of the Study, otherwise connected to the discharge of their duties in he implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.

(3) The Addis Ababa Flood Control and Prevention Project Office under the Region 14 Administration Office shall, act in relation with other governmental and non-governmental organizations concerned, for smooth implementation of the Study.

(4) The Addis Ababa Flood Control and Prevention Project Office under the Region 14 Administration Office shall, at its own expense, provide the Study Team with the following, in cooperation with other organizations.

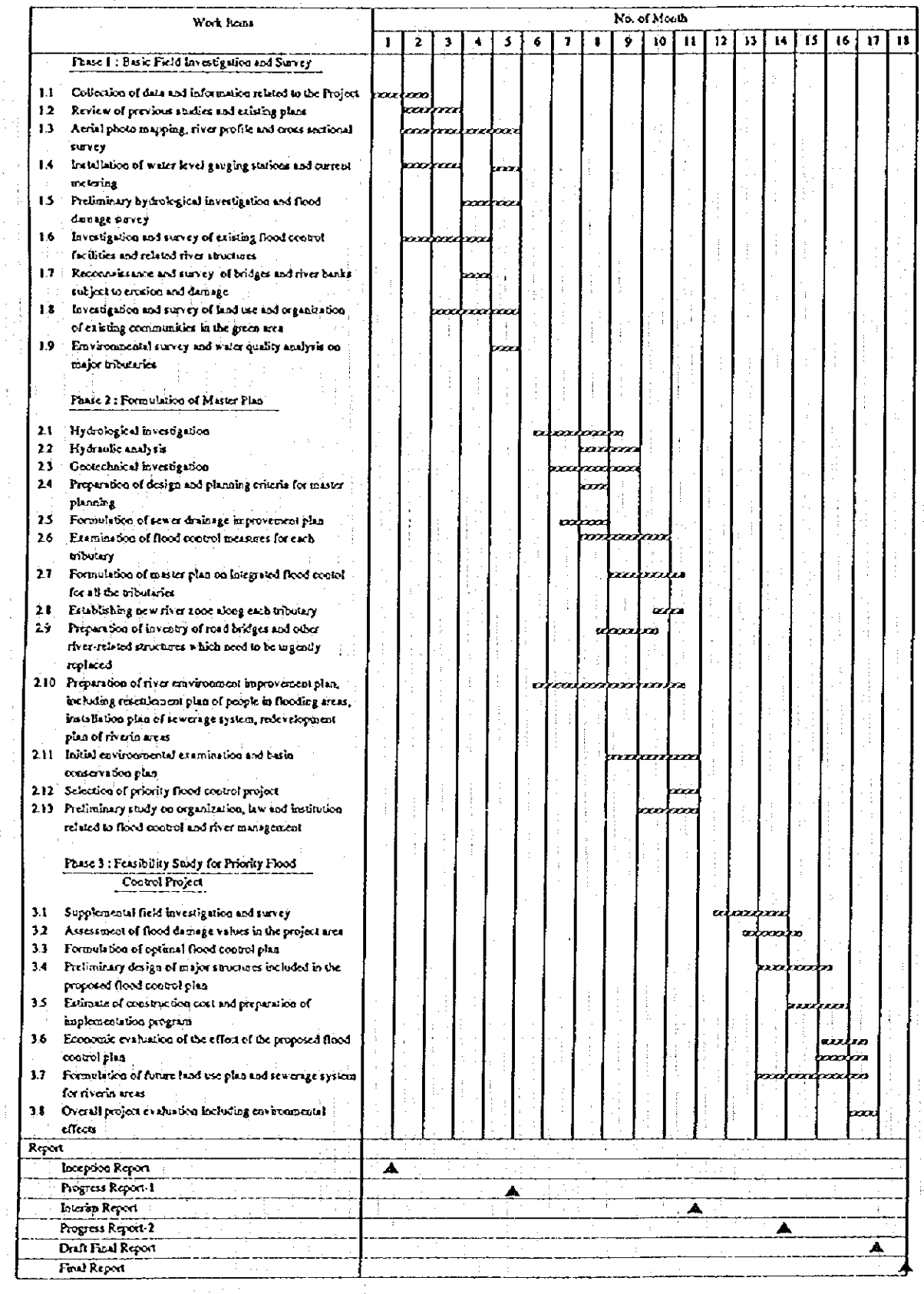
(a) available data and information related to the Study

(b) Counterpart personnel necessary for the Study

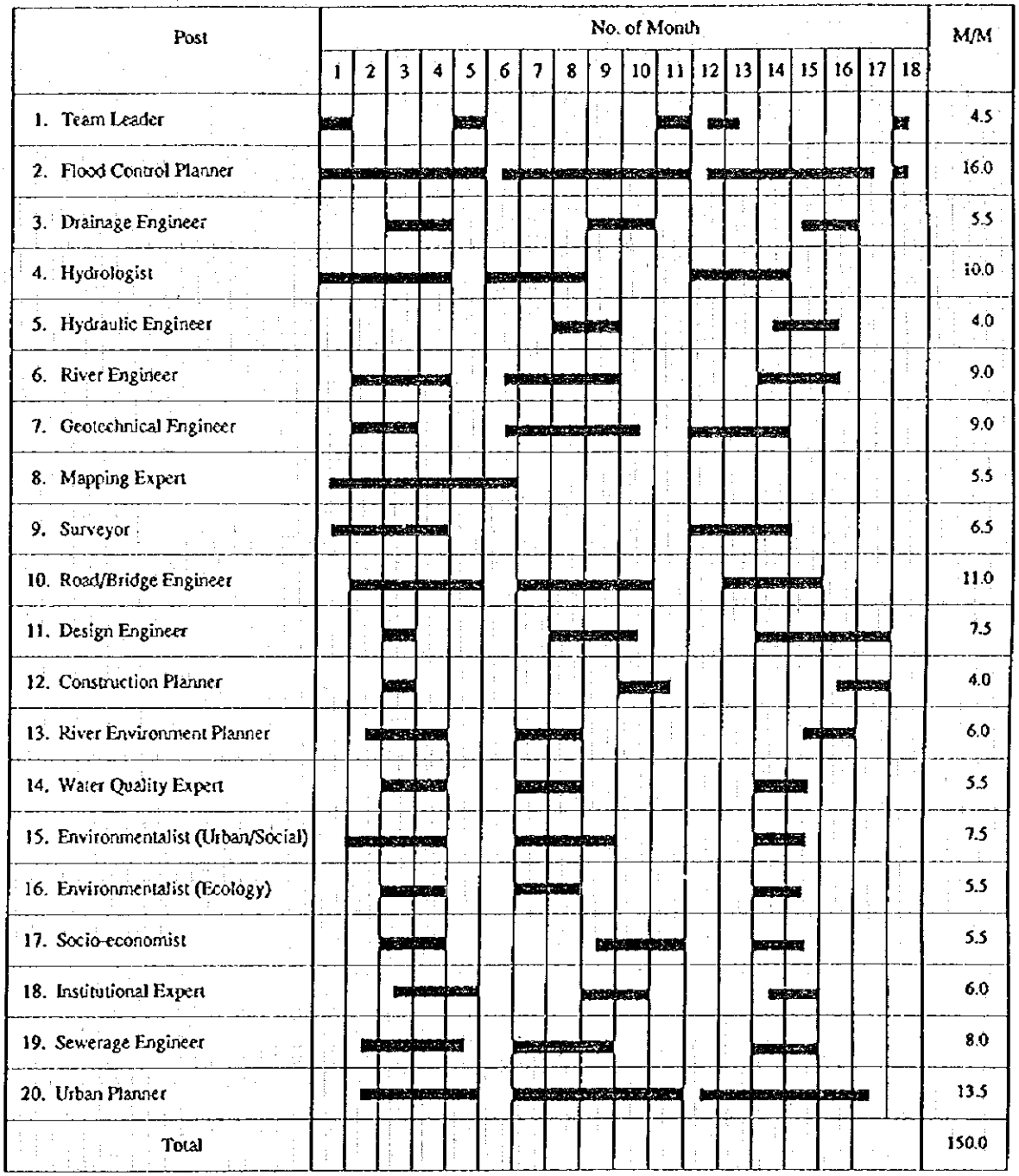
(c) Suitable office with necessary equipment and furniture in Addis Ababa

(d) Credentials or identification cards, if necessary

WORK SCHEDULE



ASSIGNMENT SCHEDULE



添付資料２． Scoop of Work （S/W)

SCOPE OF WORK
FOR
THE STUDY
ON
ADDIS ABABA FLOOD CONTROL PROJECT
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

AGREED UPON BETWEEN
REGION 14 ADMINISTRATION
AND
THE JAPAN INTERNATIONAL COOPERATION AGENCY

Addis Ababa, October 11 , 1996

Mr. Astatke Chaka
Executive Committee Member
Economic Sector
Region 14 Administration

Mr. Masayuki Watanabe
Leader
Preparatory Study Team
Japan International
Cooperation Agency

Mr. Admassu Abebe
Head, Bilateral Cooperation Department
Ministry of Economic Development
and Cooperation

I. INTRODUCTION

In response to the request of the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as "Ethiopia"), the Government of Japan has decided to conduct the Study on Addis Ababa flood control project (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly the Japan International Cooperaton Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical cooperation programmes of the Government of Japan, will undertake the Study, in close cooperation with the authorities concerned of Ethiopia.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

(1) to formulate a master plan of flood control in Addis Ababa with the target year 2020,

(2) to carry out a feasibility study on flood control for the priority project(s) identified in the master plan study.

III. STUDY AREA

The study area shall cover Addis Ababa as shown in the attached Location Map.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following;

(Phase I) Master Plan Study

1. Collection and analysis of the relevant existing data and information, and field survey

(1) Natural condition

a) Climate

b) Topography

c) Hydrology

d) Meteorology

e) Geology and soil
(2) Flood control
a) River channels
b) Dikes
c) Retarding basins
d) Dam reservoirs
e)Flood forecasting and warning system
(3) Drainage and sewerage
a) Drainage facilities
b) Sewerage facilities
c) Sanitation facilities
(4) Road bridges
(5) Land use
(6) Socio-economic situation
(7) Related project
a) Urban plan of Addis Ababa
b) Road improvement plans
c) Environmental improvement plans
d) Others

2. Setting planning framework
a) Population projection
b) Land use plan
c) Economic growth
d) Estimate of design discharge

3. Formulation of a master plan
a) Structural measures
b) Non-structural measures
c) Alternatives
d) Legal basis
e) Cost estimate for construction, operation and maintenance
f) Organization, and management plan
g) Implementation plan
h) Evaluation
i) Initial environmental examination
j) Selection of project(s) for the Feasibility Study

(Phase II) Feasibility Study

Feasibility Study on the priority project based on the results of the Phase I

Study

(1) Additional surveys, data collection and analysis
(2) Preliminary design
(3) Organization, operation and maintenance plan including institutional framework
(4) Cost estimate
  a) Construction
  b) Non-structural measures
  c) Operation and maintenance
(5) Construction plan
(6) Project evaluation
  a) Technical evaluation
  b) Financial evaluation
  c) Economic evaluation
  d) Social evaluation
(7) Environmental impact assessment
(8) Project implementation plan

V. STUDY SCHEDULE

The schedule will be executed in accordance with the attached tentative schedule.

VI. REPORTS

JICA will prepare and submit the following reports in English to the Government of Ethiopia.

1. Inception Report
   Thirty (30) copies at the commencement of the Study in Ethiopia.

2. Progress Report (1)
   Thirty (30) copies within seven (7) months after the commencement of the study in Ethiopia.

3. Interim Report (Draft Master Plan Report)
   Thirty (30) copies within nine (9) months after the commencement of the Study.

4. Progress Report (2)
   Thirty (30) copies within fourteen (14) months after the commencement of

the Study.

5. Draft Final Report
Thirty (30) copies within nineteen (19) months after the commencement of the Study.

6. Final Report
Fifty (50) copies within one (1) month after the receipt of the written comments on the Draft Final Report from the Government of Ethiopia, while these comments are expected to be delivered to JICA within one (1) month after the submission of the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMET OF ETHIOPIA

1. To facilitate the smooth conduct of the Study, the Government of Ethiopia shall take necessary measures in accordance with the relevant laws and regulations in force in Ethiopia:

(1) to secure the safety of the Study Team;

(2) to permit the members of the Study Team to enter, leave and stay in Ethiopia for duration of their assignment therein, and exempt them from foreign registration requirements and consular fees;

(3) to exempt the members of the Study Team from taxes, duties and other charges on equipments, machinery, and other materials brought into and out of Ethiopia for the conduct of the Study;

(4) to exempt the members of the Study Team from income taxes and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study;

(5) to provide necessary facilities to the Study Team for remittance as well as utilizations of the funds introduced into Ethiopia from Japan in connection with the implementation of the Study;

(6) to secure permission to enter into wherever possible for the purpose of implementing the Study;

(7) to secure permission which is considered and issued by the relevant

authorities for Japanese Study Team to take out all data and documents including maps and photographs related to the Study out of Ethiopia to Japan; and

(8) to provide medical services as needed and its expense will be chargeable on the members of the Japanese Study Team.

2. The Government of Ethiopia shall bear claims, if any arises against members of the 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 arises from gross negligence or willful misconduct on the part of the members of the Study Team.

3. Region 14 Administration (hereinafter referred as to "AA") shall act as a counterpart agency to the Japanese Study Team and also coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. AA shall, at its own expense, provide the Study Team with the followings, in cooperation with other organizations concerned:
(1) available data and information related to the Study,
(2) counterpart personnel,
(3) suitable office space with necessary equipment and clerical services in Addis Ababa,
(4) Credentials or identification cards, and
(5) appropriate number of vehicles with driver(s) during the Study in Ethiopia.

VIII. UNDERTAKING OF JICA

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

(1) to dispatch, at its own expence, the Study Team to Ethiopia, and

(2) to pursue technology transfer to the Ethiopian counterpart personnel in the course of the Study.

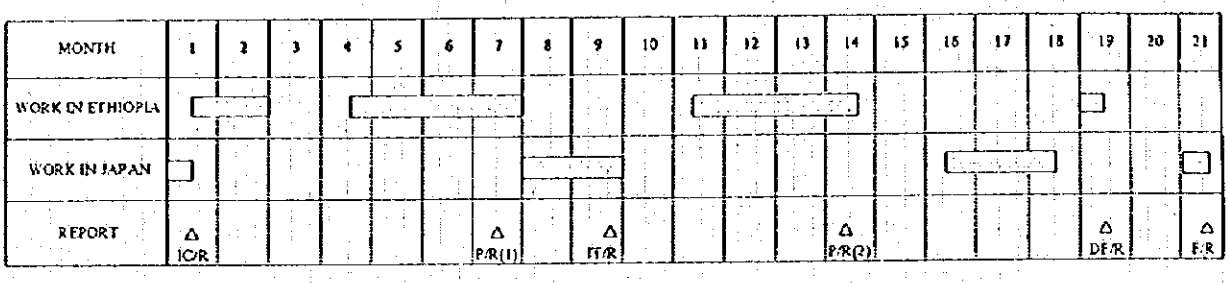
IX. OTHERS

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

Location Map of Study Area
Study Area : 310 km²
ADDIS ABEBA
Kechene R.
Kurtume R.
Little Akaki R.
Akaki R. (W)
SCALE

ANNEX

TENTATIVE SCHEDULE



REMARKS:
- IC/R : Inception Report
- P/R : Progress Report
- IT/R : Interim Report
- DF/R : Draft Final Report
- F/R : Final Report

添付資料3．質　問　書

QUESTIONNAIRE FOR THE STUDY ON ADDIS ABABA FLOOD CONTROL PROJECT IN ETHIOPIA

The Preparatory Study Team shall be furnished with following information on the Addis Ababa Flood Control Project (hereinafter refer to Project), in order to clarify the contents of the Project, (to decide whether JICA can extend the technical cooperation in the Project,) and to decide the scope of the cooperation.

I. Please supply the answers in writing to the following items. And, please explain them in detail.

(BACKGROUND)

1. The relationships between the National Development Plan and the Project. (including the priority of the Project in the National Development Plan)

2. The relationships between the national policy and the Project. (including the priority of the Project in the national policy)

3. The relationships between the regional/provincial development plan and the Project.

4. The relationships between the city plan and the Project.

(THE PROJECT)

1. Outline of the Project
   - (1) Objectives an target
   - (2) Project components
   - (3) Difficulty and/or deficiency in flood disaster prevention
   - (4) Relocation plan for the residents in riparian areas
     - a. Target area and population
     - b. Housing and resettlement area
     - c. Budget
     - d. Schedule
     - e. Measures for livelihood

(5) Project area

(6) Target year

(7) Population

(8) Citizen's opinion and response to the Project

(9) Prospective funding source

2. Organization or agency

(1) a) Organization or agency which shall be directly responsible for the Study of the Project.

b) Organization Chart

c) Counterpart personnel

(2) Organization or agency which shall be responsible for the implementation (construction,operation and maintenance) of the Project.

(3) Organization which is responsible for the urban development plan.

(4) Organization which is responsible for the road bridges.

(5) Organization which is responsible for the relocation of the residents in riperian areas.

(6) Other organizations which are related to the Project.

3. Present condition of flood control system in the Project area

(1) Outline of river and basin

a. River-bed material

b. Devastated area

c. Flood disaster-prone area

d. Cause of flood

(2) Outline of flood control system in the Project area

(3) Present problems

(4) System for funding and budgeting

a. Construction

b. Operation and maintenance

(5) Budget

a. Construction

b. Operation and maintenance

4. Flood control plans, so far prepared and problems, if any
(e.g. "Feasibility Study, Flood Protection and Storm Sewer System of Addis Ababa, November 1982", "Flood Protection of Addis Ababa, Review of Flooding and Proposals for Remedial Works, December 1994", "Conditional Survey and Fundamental Information on Flood Affected Area in Addis Ababa, November 1995",)
   (1) Outline
   (2) Present condition
   (3) Causes which hinder implementation, if the plan was not completed.
5. Drainage improvement plan
   (1) Outline
   (2) Present condition
   (3) Causes which hinder implementation, if the plan was not completed.
6. Land use and city plan
   (1) Outline
   (2) Present condition of the implementation
   (3) Causes which hinder implementation, if the plan was not completed.
7. Road improvement plan
   (1) Outline
   (2) Present condition
   (3) Causes which hinder implementation, if the plan was not completed.
8. Water supply in the Project area
9. Power supply in the Project area
10. Foreign assistance for flood control
11. Environmental consideration and present status
   (1) Historic sites and scenic spots to be conserved.
   (2) Valuable fauna and flora, and habitats to be protected and conserved.

(3) Experiences of air/water pollution, including some troubles by poisonning/polluting of agricultural chemicals, insecicide, herbicide, fungicide,etc.

(4) Peoples' education/enlightenment for environmental protection.

(5) Present condition of sanitation

a) Sewerage

b) Night-soil

c) Solid waste

(6) Legal process of the environmental impact assessment for implementation of the Project

12. Community in riparian areas

(1) Hierarchy / structure of community

(2) Income source and industry

(3) Family size

(4) Economic situation

(5) Education level and literacy

(6) Income level

(7) Problems in communituy management e.g. security level

(8) Leadership in community management

(9) Cooperation mechanism in case of emergency

(10) Information transmittal

II. Please prepare the following data.

(BACKGROUND)

1. Yearbook of Ethiopia (Annual Report)

2. Statistics of Ethiopia

3. Annual Report of Region 14 Administration (latest)

4. Annual Report of Addis Ababa Flood Control and Prevention Project Office

(THE PROJECT)

1. Topographic maps at scales of 1:50,000, 1:10,000 1:2,000
2. Land use map
3. Geological map
4. River map
   (1) Plane map
   (2) Longitudinal profile
   (3) Cross sectional profile (including critical points such as bridges)
5. Flood damage data
   (1) Occurrence date
   (2) Period and duration
   (3) Frequency of flood
   (4) Flood disaster-prone area
6. Location maps of enbankment, road and bridges
7. Meteorological data
   (1) Rainfall (annually, monthly, daily; gauging stations, period of observation)
   (2) Temperature
   (3) Humidity
   (4) Solar radiation
   (5) Wind velocity
   (6) Wind direction
   (7) Evaporation
   (8) Evapotranspiration
   (9) Location of meteorological stations
8. Hydrological, geological and hydrogeological data
   (1) Hydraulic data (water level & discharge of rivers; gauging stations, period of observation)

(2) Groundwater

(3) Water and wastewater quality

(4) Geological data

9. Information on the survey cost, and organizations capable of :

(1) Hydraulic measurement

(2) Geographical test

(3) Topographical map survey

(4) Environmental Impact Assessment

(5) Community survey.

10. Law, act and regulations regarding to water, wastewater and environmental protection

(1) Water related laws

(2) Land law

(3) Water quality standard/guideline

(4) Wastewater quality standard/guideline

(5) Design standard

III. RECONNAISSAINCE/VISIT

Please show us following facilities:

1. Flood disaster-prone areas.
2. Flood control facilities (existing and proposed).
3. Drainage facilities.
4. Trouble spots in terms of flood prevention and drainage.
5. The most polluted area by wastewater.
6. Sewerage treatment plant .
7. Workshop for construction and O/M
8. Water treatment plant

添付資料４．エティオピア側からの回答書

የክልል 14 መስተዳድር ምክር ቤት
COUNCIL OF REGION 14 ADMINISTRATION

ቀን DATE 15/10/96

ቁጥር No. ክ14/አ.ጉ54/13/20

Mr. Masayuki Watanabe
Leader
Preparatory Study Team
Japan International
Cooperation Agency

In order to clarify the contents of the Addis Ababa Flood control Project and decide the scope of work you have been prepared questionnaires in different matters.

So we therefore gave the answers attached with this letter. We hope that the answers will satisfy any information you want.

Thank you for your cooperation.

Sincerely Yours,

ASTAYEKE CHAKA
Member of Economic Sector

ADDIS ABABA FLOOD CONTROL & PROTECTION

ANSWERS FOR QUESTIONNAIRES

OCT. 1996

BACK GROUNDS

1. The relationships between the National Development plan and the A.A Flood Control and Prevention Project: The National Development plan incorporates disaster prevention and preparedness activities. So the project is in accordance with the National Development plan and the Project.
2. The relationship between the national policy: and the project: The national disaster and prevention policy recognizes flood as a disaster. This shows their compatibility.
3. The relationship between the regional / provincial development plan and the project: Although the regional development plan is under preparation the fact that special project office is set up shows the regions attention to words flood control
4. The relationships between the city plan and the project: The city master plan and this project are harmonious in attaining the over all city master plans goals.

THE PROJECT

1. Outline of the Project

(1) Objectives and Target:-

The geographic location of Addis Ababa is at high altitude of more than 2200m. The upper catchment is drained by numerous steep channels which originate from the northern watershed with a peak elevation of about 3200m. small tributaries generally flow down to the city area from north to south. The steep sloping river beds as well as heavy rainfall of short duration in the main wet season usually lasting between the middle of June and the end of September, the city has sustained severe flooding for many years

This situation has worsened recently due to a rapid population increase accelerated by the migration of rural people to the city during the civil war. It is reported that the 1978 and 1994 floods caused especially large- scale flood damage, bringing about loss of human lives and destruction of a lot of houses in the riverine areas , and other damages to infrastructures.

In response to the 1994 flood, the Regional government (Region 14 Administration) established the Addis Ababa Flood Control and Prevention Project Office in September 1994. It is responsible for implementation of urgent flood measures , investigation and implementation of long-term protection measures, measures to protect Addis Ababa from flooding and resettle people who are in danger due to flood. The office needs a comprehensive plan to improve the aforesaid situation of the city to be formulated by master plan at its earliest and that priority projects implemented.

In general its objectives and its targets are stated as follows

- Capacity building.
- Short and medium term intervention to give optimum solution to already affected and endangered inhabitants and structures.
- Long term intervention on the causes.
- All of the actions to be planned harmoniously so that one can be complementary to the other.

(2) Project components:-

- Assessment and identification of flood related facts.
- Proposal on technics and methods for tackling flood problems

- Preparation of a comprehensive flood control master plan
- Setting order of priorities.
- Project preparation for short and medium term actions.

(3) Difficulty and / or Deficiency in flood disaster prevention

Difficulty and / or deficiency in flood disaster prevention is that as it is already known that there are 28 woredas in Addis Ababa city and out of this 28 woredas 23 woredas are affected by the flood problem and out of 289 kebeles the 108 kebeles were affected by the flood damage in August 19, 1978 also the same problem happens in august 26,1994.

with the population of the reverine areas increasing over the past 15 years, the project has got a very wide scope of work but a little budget for the implementation of flood controlling system. the scarcity of budgeting and lack of master plan of flood are the major causes for the difficulty and /or deficiency in flood disaster prevention.

(4)Relocation Plan for the residents in riparian areas.

a) Target area and Population :-

The floods of August 1994 destroyed or damaged housing affecting nearly 8000 persons and making some 3000 immediately homeless. Initial estimates indicate that at least 462 families require rehousing being spread across five zones and eighteen different weredas of the city.

These people are presently being housed in community facilities such as kebele halls or makeshift accommodation of plastic sheeting in the open areas. Some of the damaged houses have been repaired and some of the destroyed houses are being rebuilt in their original locations. However, many of those affected lack the resources to repair or rebuild their houses.

Until now preparations are made to resettle some of them in woreda 23 kebele 13 but the construction is not started yet. There are also other areas ether already affected or endangered by the flood. Identification of same is to be outcome of the project.

b) Housing and Resettlement Area :-

As the intensity of the problem and specific project are not studied, only principles can be talked about. Relocation to be taken only in cases where there are no alternative solution. In such cases areas for relocation purpose will be as close as possible to their original residences.

c) Budget :-

Total cost for the above mentioned project is 15-18 million Ethiopian Birr, but for the 1996-1997 budget year the Region 14 Administration allocated 3.4 million Ethiopian Birr. Efforts will be done to mobilize internal and external resources ; Government owned urban land and part of evacuated houses will be rented to flood driven relocation purposes.

d) Schedule:-

To be decided by the study.

e) Measures for livelihood : -

As our principles is to keep victims not far from their origin, no measure for livelihood is foreseen. But if things go wrong income generation, provision of service ... will be considered.

(5) Project Area :-See attached map

(6) Target Year :- 2020.

(7) Population :- Total number of population victimed will be about 6 million .

(8) Citizen's Opinion and Response to the Project :-
There are demands for sustainable flood protection and victim rehabilitation actions expressed through different meanses and medias.

(9) Prospective funding source :-
Mobilization of local and external resource.

2. Organization or Agency :-

(1) (a) Organization or agency which shall be directly responsible for the study of the project is the Steering Committee of the Addis Ababa Flood Control and Prevention Project .

(b) Organization Chart :- It is attached.

(c) Counterpart Personnel :-

- Steering Committee
- A A Flood Control & Prevention Project Office (Specially For Field Works)
- Urban Development & Works Bureau
- Addis Ababa Water Supply & Sewerage Authority
- Plan and economy dev Bureau
- Finance Bureau
- Health Bureau
- Labour and Social Affairs Bureau
- Environmental protection Office

(2) Organization or agency which is responsible for the implementation (Construction, Operation and Maintenance) of the Project : - The Addis Ababa Flood Control and Prevention Project office is responsible for construction. For the O.M better be decided by the Project Office.

(3) Organization which is responsible for the urban development plan is Urban Development and works Bureau.

(4) Organization which is responsible for the road bridges is also Urban Development and Works Bureau.

(5) Organization or Agency which is responsible for the relocation of the residents in riparian areas is Addis Ababa Flood Control and Prevention Project Office in corporation with Region 14 Administration Urban Development and Works Bureau.

(6) Other Organization which are related to the Project are

- Foreign Relations & Development Cooperation Bureau (Reg 14)
- A.A Water Supply and Sewerage Authority
- Ministry of Water Resource
- National Urban Planning Institute
- Ministry of Economic Development & Cooperation

3. Present Condition of Flood Control System in the Project Area

(1) Outline of River Basin

I) Little Akaki River

a) River Bed Material :- Gravel, Soil, Rock in different sections

b) Devastated Area :- The Little Akaki drains the western side of the catchment and like the Kechene has a comparatively long narrow catchment with an area of 16.5 Km2 of which 40 % is upland catchment flowing in a North / South direction. it receives a significant inflow from the Buhe river

which accounts for approximately 20 % of the catchment area and a major tributary further upstream, the Fereja joints some 600m upstream of the Akaki Bridge. The head of the river receives a significant contribution to flow at the confluence of tributaries in the area downstream of Arbennoch Street.
the river generally has a gentler average gradient than the other rivers (excepting the Bantiyketu) and has long reaches of meandering channel. This is particularly the case in the Kera area upstream and was noted again upstream of the Mekanissa Bridge and the Akaki Bridge at the confluence with the Fereja Tributary. Similar long wider reaches of flood plain are reported up to the Kolfe Bridge south west of the dill oil Factory.

In the lower reaches and between the flatter areas the river flows in narrow channels with volcanic rock beds and varying thickness (2- 4) of silty clayey banks.

c) Flood Disaster Prone area:-
220000 m2 approximately

d) Cause of flood :
Terrain Condition
Unplanned settlement and increase in urbanization

- Deforestation
- Formally and Informally green areas are violated
No- drainage facility and lack of proper drainage
Intense rainfalls on small steeply sloping catchment. these conditions produce rapid rises in river levels accompanied by very high potentially destructive flow velocities in the rivers.

II) *Kechene River : -*

a) River Bed Material : - volcanic rock origin, Basalt parent rock overlain by varying thickness of silty clay.
b) Devastated area :- The Kechene flows generally from north to south and on a course to the east of the central area half way between and parallel with Intoto Avenue and Churchill Avenue eventually joining with the Kurtume in the central area at Filwiha Bridge on Yohannis Street. It has an elongate catchment (width to length ratio of 4.5) and an area about 12.5 km2 of which about 40 % is estimated to be in rural upland areas. Along the upper reaches it flows in a deep valley with steep bed slopes of .03 to .04. There are reduced gradients (0.015-0.02) on some reaches particularly just upstream of the Afincho Ber Bridge and again for a distance of 650m upstream of the Iri bekentu Bridge (Wingate Street) . The gradient slackens considerably at the confluence with the Kurtume. The bed and banks are generally of volcanic bed rock but in flatter areas alluvial material predominates with gravel beds and banks which are subject to erosion.
c) Flood disaster Prone area :- 150000m2
d) Cause of Flood :-
The same as Little Akaki River

III) Kebena River :-
a) River Bed Material :- Mostly bedrock
b) Devastated area :- The kebena river to the east has the largest catchment of the rivers draining the area 60 km2 upstream of its confluence with the Bantyiketu with an estimated area and in common with most of the rivers in the area it flows from north to south . The discharge is increased significantly by the major tributaries of the Abo and Ginfle. The upper reaches of the main river are deeply incised with beds of hard volcanic basalt overlain by varying depths of superficial deposits of clayey silty "red soil" or black cotton soils.
Downstream of the incoming Abo tributary the slope flattens and the channel widens into low flood plains particularly between the Tesfa Asged Bridge and the Urael Bridge. The river flattens and widens again at the confluence with the Bantiyketu River in the south east of the city 600m upstream o f Bole bridge.

c) flood disaster prone area :- 250000 m2
d) Cause of floods :- The same as Little Akaki river

Iv) Kurtume River :-

a) River Bed material :- The same as the Kechene River

b) Devastated Area :- The Kurtume drains a small area approximately 9 km2 of the city and with exception of the Bantiyketu it probably has the highest proportion of built up area having almost no tributaries from the upland areas. The length of the main channel is only some 2.5 Km , about 70 % of the catchment area is drained by tributaries which come together in the Aba Koran area near the Ethiopian Tannery. the gradient , not surprisingly slackens appreciably in this area again downstream of the Colson Street bridge and at the confluence with the Kechene . This river , although incised , is generally smaller and less deeply cut than the Kechene.

c) Flood disaster prone area :- 150000 m2

d) Cause of flood:- The same as Little Akaki river.

V) Bantiyketu River :-

a) River bed material :- Gravelly material

b) Devastated Area :- The Bantiyketu is unique in it characteristics in comparison with other rivers which drain the city. It is formed by the of the Ketchene and Kurtume and flows in a south-easterly direction for some 5 km where it joins the Kebena just north of Bole Bridge before flowing southwards and out of the main city area.

Its uniqueness is due to its origins , being in the combination of two comparatively major rivers . The longitudinal slope is 0.0009 being less than the other rivers by a factor of 3 , and its banks are generally low with a wide and shallow cross - section . The banks are soft alluvial material.

c) flood disaster prone area :- 100000 m2

d) Cause of flood :- The same as Little Akaki river

(2) Outline of Flood Control Measures,

- River Widening
- Construction of Retaining Wall
- Establishment of Drainage Works
- Changing course of river/ river diversion
- Food proof housing (individual initiatives)

(3) Present Problems :-

- Absence of general intervention framework
- Lack of resources (financial, material, institutional, technical, ...)
- Lack of public awareness.

(4) System for funding and budgeting :-

(a) Construction :- Government Budget & NGO'S grants

(b) Operation and Maintenance :- Government Budget

(5) Budget :-

a) Construction:- Data is not available but only for 1996 - 97 budget year the region 14 allocated 3.4 million birr.

b) Operation & Maintenance:- No data is available

4. Flood control Plans :- No plan yet but there were studies by BCEOM " Feasibility Study, Flood protection and Storm sewer System of Addis Ababa, November 1982,"
"Flood Protection of Addis Ababa, review of Flooding and Proposals for Remedial works, December 1994,"
" Conditional Survey and Fundamental Information on Flood affected Area in Addis Ababa, November 1995,"
5. Drainage Improvement plans:- Not planned yet but Sewerage master plan is Available.
6. Land use and City Plan :- A.A master plan legally endorsed in 1994 is available.
7. Road Improvement plan :- Road network plan (part of the city) master plan is available and Ring Road plan of undergoing project is available.
8. Water supply for the project area :- Generated from two dams and numerous wells. Satisfies only under 60% or the demand. Projects are underway.Emergency water supply project and water III projects are under study & construction.
9. Power supply for the project area :- Hydroelectric based power practically satisfies demand.
10. Foreign assistance for flood control :- No foreign assistance until now.
11. Environmental considerations and present status :-
    1) Historic sites and scenic spots to be conserved are specified on the master plan
    2) Valuable fauna and flora , and habitats to be protected and conserved : until now no data, but it will be studied in the near future. A map of green area (part of the city master plan) is available
    3) Experiences of air/ water pollution , including some troubles by poisoning / polluting of agricultural chemical , insecticide ,herbicide, fungicide, etc.
       Please refer to an over view of problems the case of A.A planning & Economic Development Bureau 1994 and response to special questionnaires.
    4) People's education / enlightenment for environmental protection is rudimentary.
    5) Present condition of sanitation
        a) Sewerage;- 1.6 million m3 / year by sewerage line , about 210000 m3 by truck
        b) Night Soil :- No exact figure
        c) solid - Waste :- About 50% is collected and disposed by municipal service.
12. Community in riparian areas :-
    1) Hierarchy / Structure of Community :-
       Region, Zone , Wereda, Kebele, Administration
    2) Income source and Industry :- seeks survey.
    3) Family size :-
       Average family size is 5.1
    4) Economic Situation :- seeks survey
    5) education level and literacy- seeks survey
    6) Income level- seeks survey
    7) Problems in community management :- Insignificant.
    8) Leadership in community management :- Kebeles Administration
    9) Cooperation mechanism in case of emergency :-
       From National to Wereda level disaster prevention & preparedness committees and administrations
    10) Information Transmittal :-
       Media and Administrative Channel function effectively.

The Region 14 is undertaking the following items

- Two Four Wheel Drive Vehicles with drivers.
- 1 set of Computer (Windows)
- 1 Printer
- Photo copy machine is accessible
- 1 Set of Telephone
- Office With the necessary Furniture
- Fax is Accessible

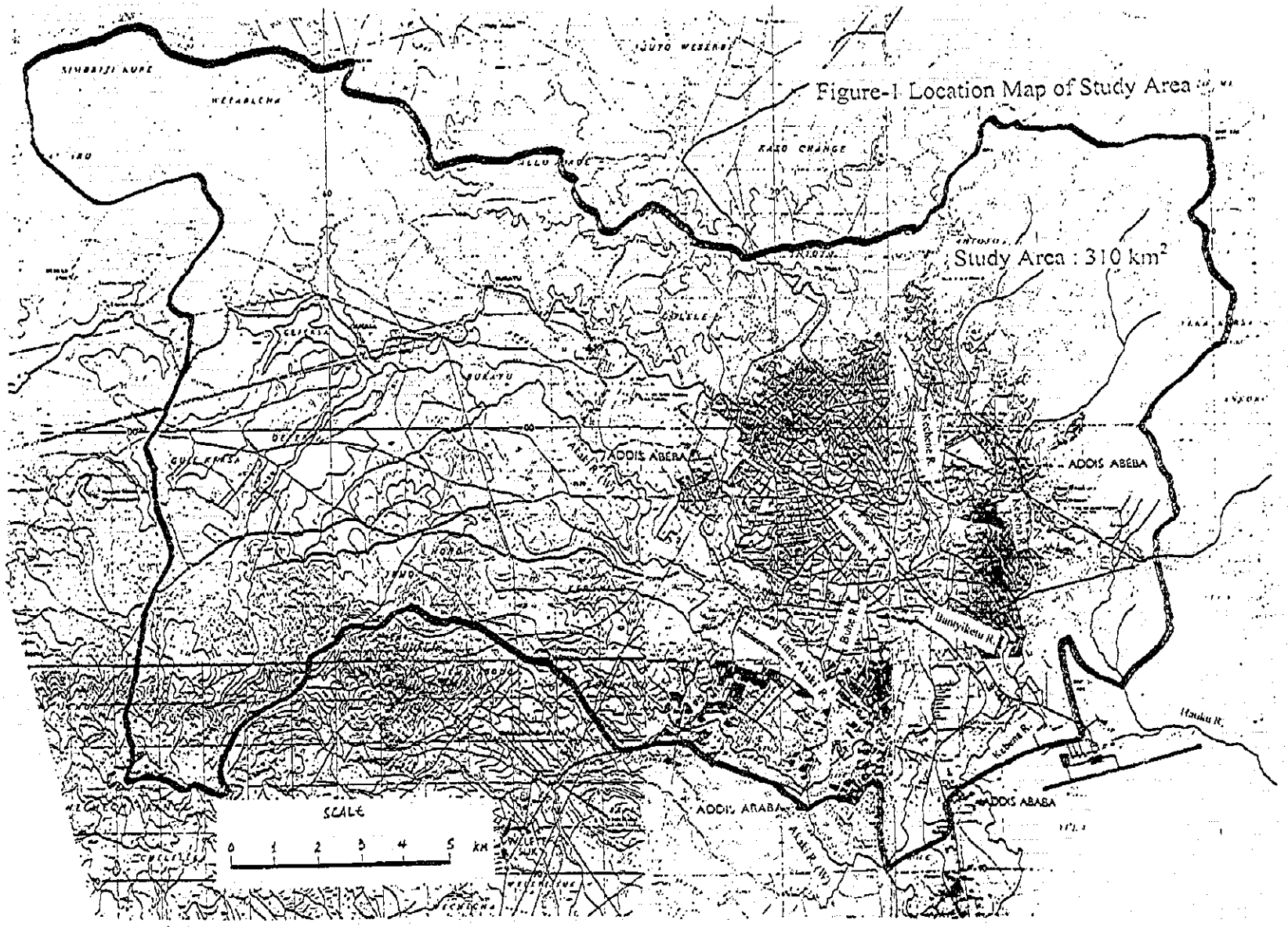
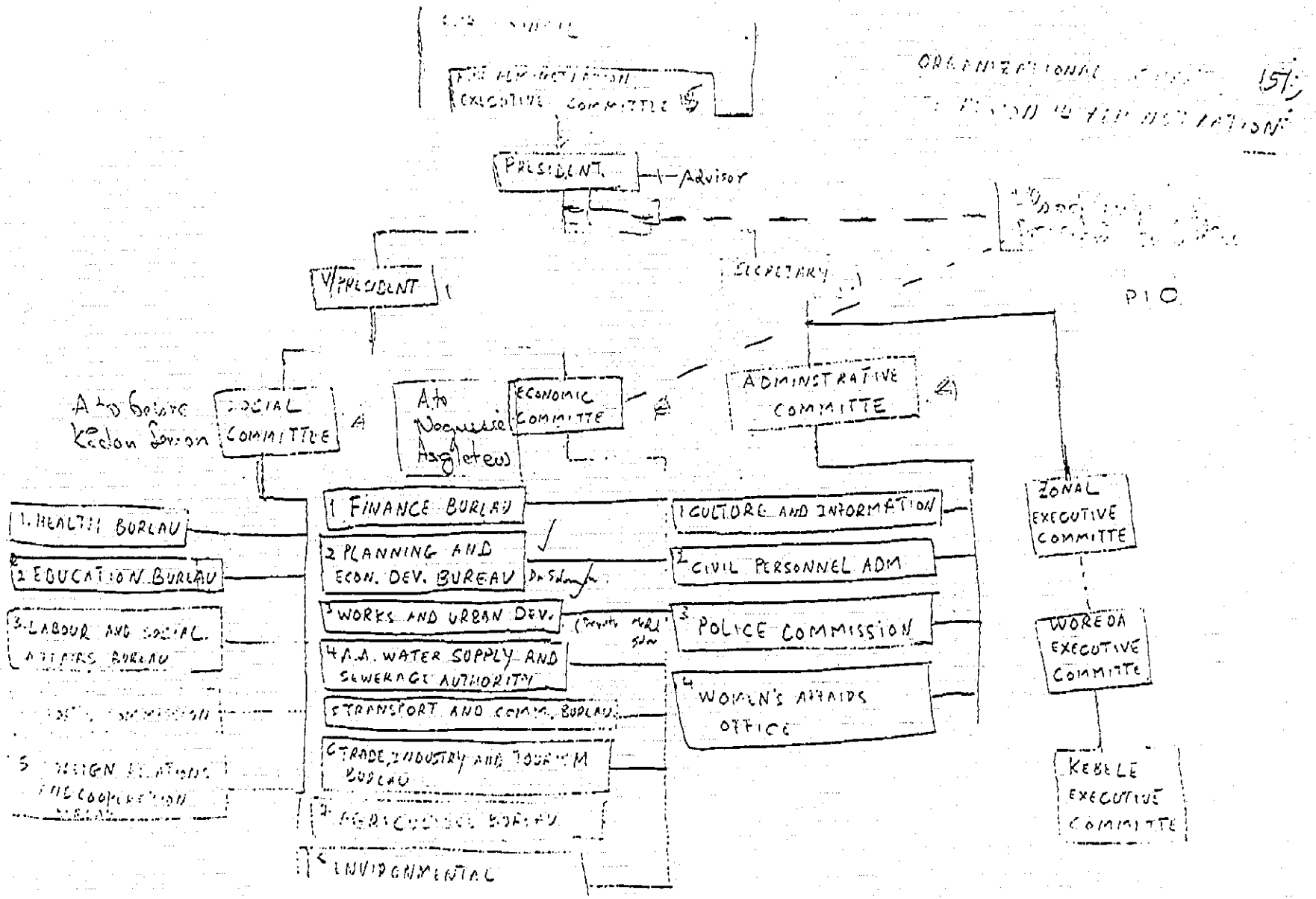


Figure-1 Location Map of Study Area


EXECUTIVE COMMITTEE
PRESIDENT
Advisor
V/PRESIDENT
SECRETARY
PIO
SOCIAL COMMITTEE
ECONOMIC COMMITTEE
ADMINISTRATIVE COMMITTEE
1. HEALTH BUREAU
2 EDUCATION BUREAU
3-LABOUR AND SOCIAL AFFAIRS BUREAU
1 FINANCE BUREAU
2 PLANNING AND ECON. DEV. BUREAU
3 WORKS AND URBAN DEV.
4 A.A. WATER SUPPLY AND SEWERAGE AUTHORITY
TRANSPORT AND COMM. BUREAU
TRADE, INDUSTRY AND TOURISM BUREAU
1 CULTURE AND INFORMATION
2 CIVIL PERSONNEL ADM
3 POLICE COMMISSION
4 WOMEN'S AFFAIRS OFFICE
ZONAL EXECUTIVE COMMITTE
WOREDA EXECUTIVE COMMITTE
KEBELE EXECUTIVE COMMITTE

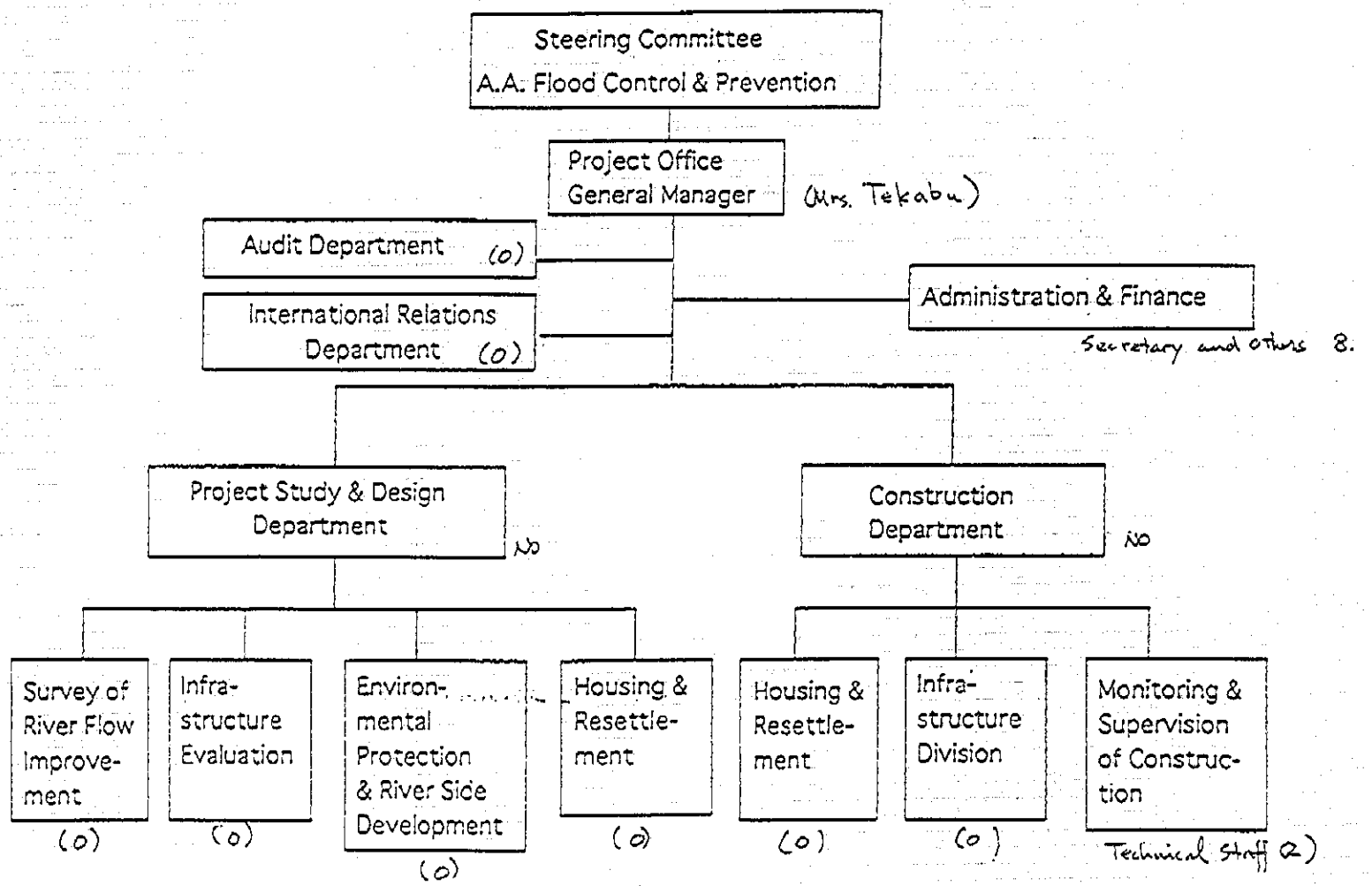


Figure-5 Organization Chart of Addis Ababa Flood Control and Prevention Project Office

2 present staff

THE STEERING COMMITTEE MEMBERS

-The President:
- Member of the Economic Committee
- Urban Development & Works Bureau
- Finance Bureau
- Economic Development & Planning Bureau
- Environment Bureau
- Agriculture Bureau
- Economic Advisor
- Head of the A.A flood control Project Office (Secretary)

添付資料５．収集資料リスト

様式第１号　（記第２関係）

収集作成資料

資料リスト（収集資料／専門家収集資料）

平成８年10月22日作成

番号	資料の名称	形態（図面、ビデオ、地図、写真等）	収集資料	専門家作成資料	JICA作成資料	テキスト	発行機関	取扱区分	図書館記入欄
7	Country Profile, EIU	コピー	Y				EIU	JR CR( )SC	
8	Country Report	コピー	Y				EIU	JR CR( )SC	
9	エティオピア	コピー	Y				国際協力推進協会	JR CR( )SC	
10	Conditional Survey of Fundamental Information on Flood Affected Area in Addis Ababa抜粋、Kono Takuji, Nov. 1995	コピー	Y				A Member JOCV	JR CR( )SC	
11	Flood Protection of Addis Ababa,Review and Proposals for Remedial Works, Dec.1994	コピー	Y				M.J.Dyer	JR CR( )SC	
12	アフリカの角の危機、保岡孝顕、1991年12月	コピー	Y					JR CR( )SC	
13	アフリカ飢餓地帯を行く、保岡孝顕、1991年８月	コピー	Y					JR CR( )SC	
14	Feasibility Study, Flood Protection and Storm Sewer System of Addis Ababa,BCEOM,Nov.1982	コピー	Y				BCEOM	JR CR( )SC	
15	アディス・アベバ市（第14州政府）行政界地図、1:50,000	青焼地図Y	Y				A.A. Master Plan Project Office etc.	JR CR( )SC	
16	アディス・アベバ市道路計画図、1:20,000	青焼地図	Y					JR CR( )SC	
17	アディス・アベバ地形図Sheet992,472－F,1:2,000（見本）	青焼地図	Y				Ethiopia Mapping Authority	JR CR( )SC	
18	アディス・アベバ地形図No14,1:5,000（見本）	青焼地図	Y					JR CR( )SC	
19	アディス・アベバ航空写真地図3W、1:10,000（見本）	オリジナル	Y				Ethiopia Mapping Authority	JR CR( )SC	

番号	資料の名称	形態(図面、ビデオ、地図、写真等)	収集資料	専門家作成資料	JICA作成資料	テキスト	発行機関	取扱区分	図書館記入欄
20	アディス・アベバ市マスタープラン目次及び抜粋、Final Report, Executive Summary. July. 1986	コピー	Y				A.A.M aster Plan Project Office	JR CR( )SC	
21	アディス・アベバ市下水マスタープラン(Master Plan Study or the Development of Wastewater facilities for the City of Addis Ababa), Executive Summary,Volume. I, Jan. 1993	コピー	Y				BCEOM, GKW	JR CR( )SC	
22	アディス・アベバ市下水マスタープラン目次、Volume 2, Final Report, Jan.1993	コピー	Y				BCEOM, GKW	JR CR( )SC	
23	Addis Negari Gaseta 1995,20 May,Addis Ababa Water Supply and Sewerage Service Regulation	コピー	Y					JR CR( )SC	
24	アディス・アベバ市下水マスタープラン目次、Volume 7, Organization and Management Review Sept.1993	コピー	Y				BCEOM, GKW	JR CR( )SC	
25	アディス・アベバ市下水マスタープラン、Existing Situation and Design Criteria Report,Volume 1, Background Data Report,Aug.1993	コピー	Y				BCEOM, GKW	JR CR( )SC	
26	The Water Distribution Nerwork Manual 目次、Final Report, Nov. 1994	コピー	Y				Shawel Consult. International	JR CR( )SC	
27	Region 1 4, Urban Development and Works Bureau	コピー	Y				Region 14 Admi.	JR CR( )SC	
	Organization chart and staff								
28	Major Project List of Document	コピー	Y				A.A Water Supply and Sewerage Authority	JR CR( )SC	
29	The 1994 Population and Housing Census of Ethiopia, Result for Addis Ababa,Volume 1,Statistical Report, Aug. 1995	図書	Y				Office of Population and Housing Census Commission	JR CR( )SC	

番号	資料の名称	形態(図面、ビデオ、地図、写真等)	収集資料	専門家作成資料	JICA作成資料	テキスト	発行機関	取扱区分	図書館記入欄
30	Water Supply Project Stage II, Water Distribution System, Draft, Volume III, Appendix to General Report 目次、June 1982	コピー	Y				BCEOM	JR CR( )SC	
31	An Overview of Environmental Problems, The Case of Addis Ababa, Apr. 1994	コピー	Y				Region 14 Administration, Planning and Economic Development Bureau	JR CR( )SC	
32	Addis Ababa Kebele 区域	コピー地図	Y					JR CR( )SC	
33	Location of Existing and Proposed Reservoirs and Pumping Stations, 30−SK−0060, June 1996 Addis Ababa Water Supply Project, Stage III A	返却済み	Y				AE−HBTAGRA Joint Venture	JR CR( )SC	現地で返却
34	アディス・アベバ地形図、NW, NE, SE 1:50,000	地図 コピー地図	Y				Ethiopia Mapping Authority	JR CR( )SC	
35	アディス・アベバ地図1:15,000	地図	Y				Ethiopia Mapping Authority	JR CR( )SC	
36	National Policy on Disaster Prevention and Management, Oct. 1993	コピー	Y				Transitional Gov. of Ethiopia	JR CR( )SC	
37	Directives for Disaster Prevention and Management	コピー	Y				Transitional Gov. of Ethiopia	JR CR( )SC	
38	アディス・アベバの概要	コピー	Y					JR CR( )SC	
39	Appendix B, Flood Damage Survey Data, 26, Aug. 1994		Y				(Region 14 Admi.)	JR CR( )SC	
40	Appendix A, Hydrogical Data		Y				(Region 14 Admi.)	JR CR( )SC	No.11と同じ
41	Water Well Work Report, Addis Ababa Water Supply Project Stage III A, Construcition of Borehole 目次及び抜粋	コピー	Y				AE−HBTAGRA Joint Venture	JR CR( )SC	
42	Satelite Maps of Addis Ababa Area, 1:50,000, 23, Dec. 1986	地図	Y				Cartagraphy and Reproduction Dept.	JR CR( )SC	

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43	Organization Chart, Region 14 Administration	コピー	Y				Region 14 Admi.	JR CR( )SC	
44	Werda Integrated Basic Services (WIBS), Baseline Survey Results, (Nov.-Dec.1993), Werda 24－Addis Ababa 目次、Mar.1994	コピー	Y				TGE／UNICEF	JR CR( )SC	
45	Werda Integrated Basic Services (WIBS), Baseline Survey Results, (Feb.1995), Werda 5－Region 14, First Version 目次、May 1995	コピー	Y				TGE／UNICEF	JR CR( )SC	
46	Budget of Region 14、予算書の抜粋	コピー	Y				第14州政府	JR CR( )SC	
47	スクリーニング資料	コピー	Y				Region 14 Admi.	JR CR( )SC	
48	スクリーニング資料	コピー	Y				Region 14 Admi.	JR CR( )SC	
49	ETCON社による機材関係資料 Informations and Activities of Marill, Groupe	コピー	Y				Establishment Marill	JR CR( )SC	
50	Geffessa Water Treatment Plant Operation and Maintenance Manual, Final Report. Oct.1993	コピー	Y				Shawel Consult. International	JR CR( )SC	
51	Legadadi Water Treatment Plant Operation and Maintenance Manual, Final Report.Oct.1993	コピー	Y				Shawel Consult. International	JR CR( )SC	
52	National Conservation Strategy, Volume IV.A Compilation of Projects Towards the Investment Program for the National Policy on Natural Resources and the Environment(Draft), May 1994	コピー	Y				National Conservation Strategy Secretariat,Ministry of NRDEP	JR CR( )SC	
53	Map Catalogue 1995, Ethiopian Mapping Authority, June 1995	図書	Y				Ethiopian Mapping	JR CR( )SC	

資料6．面会者リスト

面会者リスト

在エティオピア日本大使館

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桐原　稔	三等書記官

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河澄　恭輔	所　員

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Kinjiro Wada	Adviser, Economic and Technical Cooperation, Bilateral Cooperation Department(JICA専門家)

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Mr.Solomon Tesfaye	Deputy Head of Urban Development and Works Department
Dr.Solomon Berhe	Head of Economic Planning Bureau
Mrs.Tekabu Workagegnefu	Head of Flood Control and Prevention Office

	Mr.Teferir Tadesse	Staff of Flood Control and Prevention Office
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水資源省 Ministry of Water Resource		
	————————	Head of Hydrological Department
ローカルコンサルタント及び機材の販売会社		
	Mr.Yazew Bekele	Managing Director,Ethiopian Trade Contracts PLC (ET CON)
	Teklu Tesfaye	Sales Representative,ET CON