(4) 水資源開発に係わる組織及び管理の検討

1）水資源開発に係わる組織の機能、責任、権限範囲の検討

2）水資源開発施設を含めた河川管理の検討

3）水利調整

(5) 水資源開発プロジェクトの費用・便益分析

(1)及び(2)で検討された段階的水資源開発計画案の費用便益分析を行う。

1）水資源開発施設の建設に係わる費用積算

2）水資源開発施設による便益・効果

(6) 水資源開発プロジェクト評価

水資源開発計画案の費用便益分析結果及び初期環境調査の結果等をふまえて水資源開発案の総合的評価を行う。

(7) マスタープラン実施計画

開発計画案の総合的評価を行い、最適なルブ河水系の水資源開発のマスタープランを作成する。

1）実施計画(Action Plan)の作成

4－5 調査工程

本件調査の全体所要月数は17カ月とし、第一段階：基礎調査、第二段階：詳細調査・解析、第三段階：計画策定、第四段階：評価の四段階に分けて実施するものとする。

その調査工程は概ね図4－2のとおりである。

4－6 報告書作成

(1) 調査報告書

1）インセプション・レポート

英文60部（内先方政府へ50部）

インセプション・レポートには調査の基本方針、方法、作業工程、要員計画等の調査実施計画等を記載する。

インセプション・レポートは、日本国内既存資料により作成し、現地調査開始時に先方政府に提出する。

2）インテリム・レポート

英文60部（内先方政府50部）

インテリム・レポートは現地で実施した各種の調査（水文観測、水質調査、氾濫域調査、土壌調査、測量調査）の進捗状況及び調査結果や開発計画案のレビュー、水需

要予測、流出解析、水源地適地調査、施設計画の検討結果等に基づき作成する。

3）インテリム・レポート

英文60部（内先方政府50部）

インテリム・レポートは水資源ポテンシャル、水需給バランス、水資源開発施設、水資源開発計画案の検討結果に基づき作成する。

更に水資源開発目標の設定を予備的に検討し提示する。

4）プログレス・レポート

英文60部（内先方政府50部）

プログレス・レポートは、水文調査、水質調査、初期環境影響調査結果、水資源開発に係わる組織及び管理、各開発計画案の費用、便益等の分析結果等に基づき作成する。併せて、マスタープランの実施計画案を予備的に明示する。

5）ドラフト・ファイナルレポート

ドラフト・ファイナルレポートは、水資源開発計画案の評価、マスタープラン実施計画、優先プロジェクトの実施計画等、全ての調査結果を含み、十分なサポーティング情報により裏付けられてなければならない。

6）ファイナル・レポート

先方政府よりドラフト・ファイナルレポートに対するコメントを請けてから60日以内に提出する。

主報告書	英文	部（内先方政府　部）
サポーティング	英文	部（内先方政府　部）
要約（英文）	英文	部（内先方政府　部）
要約（和文）	和文	部

(2) 業務実施報告書　　和文2部

業務終了時に提出する。

本報告書は、調査背景・経緯・目的等のプロジェクト概要、調査手法、内容、作業フロー、投入量（人月・費用、技術移転、機材、現地業者委託業務内容）についての計画と実績等を含むものとし、先方政府との協議議事録、作業管理委員会の議事録等必要文書を別添として作成する。

最終契約終了時に提出する分については、調査結果（プロジェクトの概要、費用、評価、結論と勧告）を加え第一年次以降の業務実施報告書を統合したものに編纂し、業務完了報告書として作成する。

(3) 収集資料

調査時に収集した資料及びデータは分野別に整理してリスト（事業団様式）を付したうえで事業団に提出する。

(4) その他・事業団への提出物

1）議事録等

1　先方政府の各レポート説明・協議にかかる議事録を作成し、当事業団に速やかに提出する。

2　当事業団が別途設置する作業管理委員会における議題、出席者、質疑内容等についての議事録（案）を、事業団様式でＡ４版・タイプ打ちにて４～５枚に取りまとめのうえ、３日以内に当事業団に提出する。

2）調査業務報告書

当事業団の規定により調査業務日誌を添付した月例の調査業務報告書を翌月15日まで当事業団本部に提出する。

4－7　要員計画

調査団を構成する専門分野は次のとおりとする。

(1) 総　括
(2) 水資源開発計画
(3) 水　文
(4) 地下水、水文地質
(5) 水需要予測（水収支含む）
(6) 河川計画（氾濫域調査、治水計画）
(7) ダム計画
(8) 環境調査（水質を含む）
(9) 農業開発
(10) 土壌調査
(11) 社会・経済
(12) 組織・法制度
(13) 電力計画
(14) 施設計画及び積算
(15) 測量（監督・指導）

4－8　本格調査資機材

(1)	車両（4輪駆動車）	4台
(2)	パーソナルコンピューター	2機
(3)	プリンター	1機
(4)	複写機	1機
(5)	水文気象観測機器	1式
(6)	水質分析機器	1式
(7)	測量用機器（GPS）	2機

（最終版）

全体調査工程計画表

調査内容	1	2	3	4	5	6	7	8	9	10	11	12	1 13	2 14	3 15	4 16	5 17	6 18	19
WORK IN TANZANIA																			
WORK IN JAPAN																			
1　基礎調査																			
1-1 国内準備作業																			
1-2 既存資料の収集および見直し																			
2　現地調査																			
2-1 現地踏査																			
2-2 水文観測																			
2-3 洪水氾濫域調査																			
2-4 土壌調査																			
2-5 水質調査																			
2-6 測量調査																			
3　調査及び解析																			
3-1 開発計画案のレビュウ																			
3-2 水需要予測																			
3-3 低水流出解析																			
3-4 洪水流出解析																			
3-5 水資源開発施設の適地調査																			
3-6 施設計画																			
3-7 水資源の評価																			
3-8 水需給バランスの検討																			
4　マスタープランの策定																			
4-1 水資源開発目標の設定																			
4-2 水資源開発プロジェクトの策定																			
4-3 初期環境調査																			
4-4 水資源開発に係わる組織及び管理																			
4-5 水資源開発計画案の費用，便益																			
4-6 水資源開発プロジェクト評価																			
4-7 実施計画																			

▲ インセプション　▲ インテリウム(1)　▲ インテリウム(2)　▲ プログレス　▲ ドラフトファイナル　▲ ファイナル

付　属　資　料

1. 要　請　書

GOVERNMENT OF THE UNITED

REPUBLIC OF TANZANIA

MINISTRY OF WATER ENERGY

AND MINERALS

NATIONAL URBAN WATER AUTHORITY

STUDY ON THE UTILISATION OF WATER

—

FROM RUVU RIVER

NOVEMBER 1990

PROPOSAL FOR TECHNICAL ASSISTANCE FOR THE STUDY ON THE UTILIZATION OF WATER FROM RUVU RIVER

1.	Project Title	Study on the utilization of water from Ruvu river.
2.	Executing Agency	Ministry of Water, Energy and Minerals - National Urban Water Authority.
	Incorporated Institutions.	Ministry of Agriculture and Livestock Development, Ministry of Lands Housing and Natural Resources, Tanzania Electrical Supply Company.
3.	Objective of the Study	To identify and formulate a comprehensive development plan on the utilisation of Ruvu River and to prepare a detailed feasibility study on Kidunda Multipurpose dam.
4.	Project Description	The study will cover basin area of about 17,700 square kilometres in the administrative areas of both Morogoro and Coast Region. The study will cover the city of Dar es Salaam, its water demand (present and future). Through regulation of the river flow with provision of storage dams, it is expected that water supply to Dar es Salaam will be augmented to meet increasing demands for domestic and industrial use, vast fertile lands lying under-utilized will be brought under irrigation and flooding will be alleviated. In addition, generation of hydropower and fishery development at the storage dam could be expected.

TERMS OF REFERENCE

1. Introduction

Since its independence in 1961, Tanzania has made considerable progress in social and economic development. However, like many other developing countries, Tanzania still faces great difficulties in raising and maintaining level of supply in production and services in all major sectors of the economy. In order to correct such basic structural weakness in the economy and restore economic growth, the Tanzanian Government launched a three - year Economic Recovery Programme (ERP) in 1986 emphasizing the revitalization of such areas as agriculture, industries and transport on which its economy mainly depends.

. Although the response of the productive sector has been relatively favorable, the Government has become increasingly concerned about the deterioration of the social sectors. It is generally recognized that improvement in the performance of the productive sectors and the attainment of economic progress cannot be sustained if the basic needs of the population are not being met, and the prospects for the consistent delivery of social services are poor.

. Among the measures taken by the Government to address this concern is the preparation of the Priority Social Action Programme (PSAP) as a component of the Second Economic Recovery programme (ERP II) or Economic and Social Action Programme (ESAP) 1989/90 - 1991/92. PSAP has been designed to address the decline in the delivery of basic social services i.e. water supply health education, as well as promote the goal of food security, and generation of gainful employment.

. In view of the above, Ruvu River water utilization project is being proposed on the basis of its responsiveness to changing national development objectives and priorities as outlined in ESAP. The project is considered as the most promising and urgent. The main objectives of the Ruvu River water utilization project are to enhance water supply to Dar es Salaam for domestic and industrial use and to increase food crop production through a smallholder/large scale irrigation development of fertile lands in the basin.

2. Project Background and Need for the Study

. The Ruvu River Basin is located at the West - Southern

side of Dar es Salaam (see attachment - 1) and covers the administrative areas of Morogoro and Coast Region.

The water resources of the Basin are virtually unexplored. The River which rises in the Uluguru Mountains in Morogoro Region and flows towards the Indian Ocean, North of Dar es Salaam is the main source of water supply to the City of Dar es Salaam.

Water for the City of Dar es Salaam

- Ruvu River is at present supplying most of the water used in the city.

Water for the city is drawn from two intakes located 20 kilometres apart; the older one called 'Upper Ruvu' is located at about 65km to the West of City along the Dar es Salaam - Morogoro Road and the second one "Lower Ruvu" is located downstream from the first one near Bagamoyo, about 18km from the Indian ocean.

- The present supplies do not satisfy the present demand estimated to be around 270,000 cubic meter. The demand for water in the City due to the increasing population and expansion in the industrial commercial and institutional establishments calls for rehabilitation of the existing water systems. The rehabilitation of the systems should be coupled with development of the existing water sources in order to meet future water demands which are estimated to be:
85 million gallons per day (MGD) (4.5m3/s) by the year 1995; 116MGD (6.1m3/s)in 2000; 160 MGD (8.5m3/s) in 2005; 220MGD (11.6m3/s)in 2010 and 309 MGD (16.4m3/s) by the year 2015.

- According to the Dar es Salaam/Coast Region Water Master Plan Report (1979), studies were conducted on alternative water sources to prove their viability as future water sources for the City of Dar es Salaam but, apparently, it was found that the major source for Dar es Salaam water supply should continue to be the Ruvu River.

- In order to cater for the growing water demand the capacity of the Lower Ruvu Treatment Plant will need to be expanded from the current production of 40 million gallons per day (2.1m3/s) to 60 million gallons per day (3.2m3/s). However, according to the same Master Plan dry weather flow in the Ruvu River can not be enough to allow abstraction of 60mgd from Lower Ruvu and 20mgd (1.1m3/s) from Upper Ruvu.

It is therefore to impound enough water during wet weather season for use during dry weather season.

Water for irrigation and other purposes

The Ruvu River Basin is highly graced with fertile alluvial lands. However, most of those lands remain unutilized due mainly to shortage of water in the dry season and flooding in the rainy season. It is roughly estimated that only 500,000 ha or 4.5% of the total lands of the Morogoro and Coast Regions are presently cultivated mostly under the rainfed conditions. Major crops grown are sorghum, paddy, cotton and sugar cane, but their yields are very low owing to poor farming technics, insufficient farm inputs, draught due to uneven distribution of rainfall and poor irrigation facilities.

As earlier mentioned, most of the dry season flow of the River is at present drawn for supply to the City Dar es Salaam and for irrigation of a few estate farms located along the River. Therefore augmentation of water supply to Dar es Salaam which will be essential to meet rapidly increasing population, and a large scale irrigation development of agricultural lands could not be made without regulation of the river flow i.e. impounding the rainy season flow and releasing it in the dry season.

Need for Regulation dam at Kidunda

In early 1960's, several preliminary studies were conducted on the resources development of the Ruvu River Basin by the Tanzanian Government, FAO, French Mission, Chinese Mission etc; focussing mainly on irrigation development and flood control. Most of these studies suggested the provision of multipurpose storage dams at four locations of Mkombezi, Mgeta, Ngerengere and Kidunda. Among these promising damsites, the most favorable and efficient damsite was selected at Kidunda.

Kidunda is topographically an ideal damsite, and the provision of a less than 30m-high dam there is expected to create a reservoir of more than 1500 million m3 in gross storage capacity. This means the reservoir would impound most of the rainy season runoff of the River and the stored water can be released as needed for beneficial use damstream. According to the preliminary studies made by the French-Mission, the dam and reservoir at the Kidunda site would have the following principal features:

1)	Mean annual run off	1,475	MCM
2)	Dam : Total height	26	M
	Crest length	1,500	M
	Embankment volume	1,500,000	M3
3)	Reservoir : Gross Capacity	1,560	MCM
	Max reservoir area	280	km2
4)	Storage capacity/Annual run off	1.06	
5)	Storage capacity/Embankment volume	1,040	

With the above dam and reservoir, it is expected that

i) Some 370 MCM of water will be made available to Dar es Salaam to meet its water demand of around 2010

ii) Some 60,000 ha of lands extended along the river will be brought under perennial irrigation

iii) flooding in the lower reach of the River will greatly be alleviated

iv) hydropower of 6 to 8mw could be generated. In addition, the reservoir will provide a great opportunity for fresh-water fishery development.

In order to identify the most advantageous strategy, the need for formulating the Master Plan of the Ruvu Basin Development is thus highly recognized so as to utilize the basin resources in a Comprehensive and Co-ordinated manner within the framework of the social, economic and financial policies of the Tanzanian Government.

Priority on the use of Ruvu River

Small catchments south of Dar es Salaam were investigated for water supply by Howard Humphrey's in 1967. The optimum yields of the Kizinga and Mzinga catchments were determined to be 6 million gallons per day (0.3m3/s) and 11 million gallons per day (0.6m3/s), respectively. Mbezi catchment further south was also investigated and

according to the present, development of this catchment would represent a marginally worthwhile final extension of the sources south of Dar es Salaam.

. The total yield for catchments south of Dar es Salaam have therefore been estimated to be not more than 17 million gallons per day (0.9m3/s). For a planning period ending in the year 2000, the next increment of demand for Dar es Salaam water supply is estimated to be more than 100 million gallons per day (5.3m3/s). Clearly, developing the catchments south of Dar es Salaam won't be enough.

. The other source that was also investigated was the Wami River. It was however found that the low flow regimes of the Wami River provide an unattractive alternative, particularly as low flows on the Wami and Ruvu Rivers are likely to occur at the same time.

. It is apparent therefore, that the major source for Dar es Salaam water supply should continue to be the Ruvu River. More so it is in the interest of the Government of Tanzania to see that water supply to the Dar es Salaam city is assured before other considerations are made on the utilisation of the Ruvu water.

3. Objective of the Study

The objective of the study is to identify and formulate the optimum development plan of the utilization of Ruvu River placing emphasis on water resources development for water supply for the city of Dar es Salaam and for irrigation. Due attention should be paid to the seasonal fluctuation of the river flow, which will need to be regulated through dam and reservoir construction.

The study will also look into the possibility of using the Ruvu River for producing hydropower and for fishery development.

By regulating the flow of the river flooding will also naturally be regulated.

4. Scope of the Study

The study will be divided into two phases; phase master plan study and phase II, feasibility study. The main objectives of each phase study are as follows:

Phase I	To identify and formulate a long term overall development plan of the Ruvu River water utilization.

Phase II — To conduct a feasibility study on the Kidunda multipurpose development project or other priority scheme(s) identified through the phase I study.

4.1 Phase I : Master Plan

The scope of the Master Plan Study is as follows:

1. Review and analyse all the previous studies, data and information, particularly those on water, land and human resources availability and use, including Dar es Salaam City water supply, agriculture, socio economics, electric power, transport and communications of the River Basin.

2. Dar es Salaam City Water Supply

   (i) Carry out studies on present water demand and supply conditions and estimate the future water demand in major cities and towns including Dar es Salaam.

   (ii) Make plans of Dar es Salaam water supply systems taking into account existing supply systems and newly identified water sources.

   (iii) Identify potential storage damsite in the Basin and study the use of the dams for Municipal/City water supply, irrigation, flood control and hydropower generation and the problems caused by the creation of the reservoir.

3. Water and Land Resources.

   (i) Carry out macro-studies on availability and problems with respect to rainfall, run off, sedimentation, water quality etc to evaluate potentiality of water use and needs of water control in the Basin.

   (ii) Carry out hydrological analyses at anticipated project sites on surface run - off, flood run off, salinity intrusion etc for project formulation.

   (iii) Carry out macro - studies on land use, soils, land capability, geology, topography etc for delineation of potential area for irrigation development.

4. Irrigation and Agriculture

(i) Undertake base line surveys of the present situation in relation to the farming system.

(ii) Identify irrigation development areas based on soils, land capability, topography etc.

(iii) Evaluate all available data related to present land use, soil classification, cropping patterns, crop yields, input levels and cultural practices.

(iv) Carry out studies and surveys on soils, cropping patterns, anticipated crop production and agricultural inputs, etc in identified areas for irrigation development.

(v) Estimate irrigation and drainage requirements in the Basin.

5. Flood Control

(i) Carry out the river survey covering the Ruvu River and its main tributaries to determine carrying capacities of the rivers.

(ii) Estimate the flooding conditions such as flood stages, flooding areas, duration, flood damages etc.

(iii) Study such flood preventiaon plans as flood control by reservoirs, provision of dikes, channel excavation, flood plain zoning etc.

6. Hydro - Power

(i) Study the present and future power supply and demand characteristics in the Basin.

(ii) Make plans of hydropower generation and power distribution network.

7. Examine the adequacy of existing network of roads and railway lines in the Basin and recommend as appropriate.

8. Identify fishery development potential in the Basin and in the reservoir to be constructed.

9. Study the necessity of afforestation in the Basin and recommend appropriate measures if necessary.

10. Study on permanent institutional arrangements for implementation and operation management of the basin development plan.

11. Prepare a comprehensive master plan, containing

(a) formulation of development concept and framework
(b) estimate of costs and benefits for identified projects
(c) evaluation of the projects
(d) priority setting of the projects and
(e) preparation of implementation schedule.

4.2 Phase II - Feasibility Study

The scope of the feasibility study on the Kidunda dam project is as follows:-

1. Topographic survey

(i) Prepare topographic maps with a scale of 1 in 10,000 covering the entire project area.

(ii) Prepare detailed topographic maps with a scale of 1 in 1000 for major structure sites including longitudinial and cross sections.

2. Carry out detailed geological surveys for the proposed dam site.

3. Conduct detailed hydrological surveys, including measurement of river flows, analysis of hydrological characteristics of the river, water sampling for sedimentation and water quality analysis etc.

4. Study and analyse meterologocial data in the project area.

5. Dam and Reservoir

(i) Study and determine the optimum scale of dam and reservoir to be constructed under the project.

(ii) prepare feasibility - level design and layout of the dam and appurtenant facilities.

(iii) Derive water supply benefit by alternative means on the basis of preliminary cost estimate.

5. Dar es Salaam Water Supply System Study.
Make preliminary engineering plans which are sufficiency accurate and complete to indicate the location, arrangement, evaluation and principal features of the project, which serve as the basis for sound cost estimates, including drawings, design criteria and analysis, all sufficiently detailed to define the project.

(i) Prepare cost estimates for the engineering, construction, operation and maintenance of the project recommended for the first period (10 years). Each of the cost estimates shall be defined in terms of local and foreign exchanges. Total cost estimated shall be summation of the unit costs of the works including a bill of quantities and unit prices which consist of materials, equipment and labour costs or other bases used for the estimates.

(ii) Prepare economic analysis of the project audits implications to the population with regard to health, income and social benefits as well as determine the communities willingness and ability to pay in terms of water tarrif.

(iv) Prepare a financial plan based on the required investment of the recommended project indicating source of funds and timing of the investments. Carry out a detailed analysis of the existing and projected financial operation including yearly estimate of revenue, operating expenditure, borrowing capital investment etc., and its effects of expected price escalation and water rate increase.

(v) Prepare economic justification for the net benefits and costs. Costs shall be converted to economic cost to reflect alternative uses of resources by the nation. Benefits shall include effects of the project on water users and national interest extended beyond local bounds.

(vi) Formulate proposals for further activities and respective terms of reference of detailed designs and tender documents etc.

7. Irrigation and Agricultural Study.

(i) Prepare a semi - detailed soil maps and land capability map for the project area.

(ii) Recommend practical and suitable cropping patterns, and determine input level, labour requirements and crop yields.

(iii) Estimate irrigation and drainage requirements for the project area.

(iv) Prepare feasibility - level design and irrigation and drainage systems.

(v) Evaluation the maintenance procedures to determine the optimum balance between machine and labour and provide recommendations for future farmers operated system.

(vi) Assess the adequacy of existing agricultural support services and recommend appropriate measures to strengthen such services under the project.

(vii) Evaluate income profits of typical farm households under the project.

(viii) Recommend social infractructural facilities as needed for inhabitants in the project area.

8. Flood Control Study

(i) Evaluate flood control capability of the project and study the inter relation between the downstream river improvement and the project.

(ii) Study the alignment of the lower reach of the Ruvu River and land enhancement of flood plains.

9. Hydropower study

(i) Investigate power market and evaluate projection of power demand.

(ii) Study and determine the optimum installed power plant capacity associated with the dam to be constructed under the project.

(iii) Prepare feasibility design of the power station and transmission lines.

10. Assess impacts of the project on social and natural environment, including resettlement problems of inhabitants, loss of social and cultural properties effects on wild life etc.

11. Project Implementation

(i) Conduct construction materials survey including physical tests and analysis

(ii) Prepare a detailed implementation schedule for the project and recommend construction methods suitable to local conditions.

12. Operation and Management

(i) Recommend organization and procedures best suited for effective operation and management of the project.

(ii) Estimate annual costs of the project operation and maintenance.

13. Cost Estimate and Project Evaluation

(i) Estimate investment costs of the project

(ii) Conduct cost allocation among Municipal/City water supply irrigation etc.

(iii) Estimate economic costs and benefits.

(iv) Evaluate economic and financial feasibility of the project and carry out its sensitivity analysis.

14. Prepare a comprehensive feasibility report

Schedule of the Study and Reports

The period required for the Study (Phase I & Phase II) is estimated at 18 months in total. The following reports will be prepared in the course of the study.

- Inception Report	:	Within 2 months from commencement of the study.
- Interim Report	:	Within 6 months from the commencement of the study.
- Master Plan Report	:	Within 10 months from commencement of the study
- Draft Feasibility Report	:	Within 16 months from commencement of the study.
- Feasibility Report	:	Within 18 months from commencement of the study.

6. Experts Inputs

For executing the study, the following foreign experts will be required.

- Team Leader
- Water Resources Engineer
- Water Supply Engineer
- Hydrologist
- Dam Engineer
- Engineering Geologist
- Soil Mechanic Engineer
- Irrigation and Drainage Engineer
- Agronomist
- Agro - economist
- Socio - economist
- Soil Scientist
- Hydro - Mechanical Engineer

- Environmentalist

- Forestry Development expert

- Fishery Development expert.

Justification for Requesting Experts

A team of experts with multi-disciplinary fields of study will be required to solve such complicated yet delicate problems as water supply system, irrigation agriculture etc and come up with solid master plan and feasibility studies. It is anticipated that through the mission of these experts their technical know-hows will be transferred to the local counterparts thus reducing, if not eliminating, the use of private consulting services.

Justification for Requesting Fellowships

In order to receive the most benefits possible from the project local personnel should be given a chance for study tours so that the analyses and other important studies can be followed.

Complete knowledge of master planning and feasibility study can readily be transferred. As a side benefit, arrangements can also be made for local counterparts to visit some water supply and irrigation systems etc in other more developed countries.

7. Undertakings of the Tanzanian Government

In order to facilitate the smooth and effective implementation of the Study, the Tanzanian Government will undertake the following measures.

(1) To provide available information necessary to carry the study, including maps, statistics, meteo - hydrological and geological data, socio-economy and previous study reports relevant to the Project.

(2) To nominate a counterpart group, including a project co-ordinator responsible for the study and resolving any trouble arising throughout the study period.

(3) To provide logistic support including office space with appurtenant furnitures and facilities, cleaning and guard services.

(4) To provide the foreign experts with any necessary entry and exit visas, work permit and travel permit, if required, for the study in Tanzania.

(5) To exempt the foreign experts from tax and charges of any kind imposed on or in connection with the living allowance remitted from abroad and from import and export duties, imposed on their personal effects, and instruments, equipment and materials necessary for the execution of the study.

(6) To secure permission for entry into areas as required for the proper conduct of the study.

2. S／W

SCOPE OF WORK

FOR

STUDY

ON

WATER RESOURCES DEVELOPMENT IN THE RUVU RIVER BASIN

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

MINISTRY OF WATER, ENERGY AND MINERALS

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

DAR ES SALAAM, OCTOBER 22 ,1992

Mr. Patrick Rutabanzibwa
Acting Principal Secretary,
Ministry of Water, Energy
and Minerals

Mr. Osamu Yamaguchi
Leader,
Preparatory Study Team
of Japan International
Cooperation Agency

I. INTRODUCTION

In response to the request of the Government of the United Republic of Tanzania (hereinafter referred to as "the Government of Tanzania"), the Government of Japan has decided to conduct the Study on water resources development in the Ruvu River basin (hereinafter referred to as "the Study"), in accordance with the related laws and regulations in force in Japan and in Tanzania.

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

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

II. OBJECTIVE OF THE STUDY

The objective of the Study is to formulate a master plan on water resources development in the Ruvu River basin, placing emphasis on water supply for the city of Dar es Salaam and for irrigation in the basin area.

III. STUDY AREA

The study area will cover the Ruvu River basin area of about 17,700 square kilometers in the administrative areas of Morogoro and Coast Region and the city of Dar es Salaam as shown in Annex 1.

IV. SCOPE OF THE STUDY

In order to achieve the above objective, the Study will cover the following items:

1. Review and analysis of previous studies and existing data:
   (a) Socio-economic conditions

(b) Relevant ongoing and planned projects

(c) Water Supply

(d) Agriculture and Irrigation

(e) Industries

(f) Fishery

(g) Flood and Erosion

(h) Land Use

(i) Navigation

(j) Hydro-power

(k) Physical conditions

-Meteorology, hydrology and hydraulics

-Geology and geography

-Vegetation and soil

(l) Environmental conditions

(m) Law, Regulation, Policies and Customary practices

(n) Institutions, Organizations and Administrations

(o) Others

2. Field investigations

(a) Field reconnaissances

-General

-Existing Facilities

-Geology

-Agriculture

-Environmental aspects

(b) Hydrological observation

(c) Soil investigation

(d) Water quality

(e) Surveying

3. Study and analysis

(a) Review of development plan

-Water supply for the city of Dar es Salaam

-Agriculture

-Others

(b) Water demand forecast

(c) Run-off analysis

(d) Flood analysis

(e) Site examination for water resources development

(f) Preliminary facility planning

(g) Evaluation of water resources

(h) Water balance and allocation

4. Formulation of master plan

(a) Establishment of development target of water resources

(b) Formulation of projects for water resources development

(c) Initial environmental examination (IEE)

(d) Institutional and managerial consideration

(e) Estimation of cost and benefit of the projects

(f) Project evaluation

(g) Implementation schedule of master plan

V. SCHEDULE OF THE STUDY

The Study will be carried out in accordance with the tentative schedule attached in the Annex2.

VI. REPORTS

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

1. Inception Report:

Twenty(20) copies at the commencement of the field survey in Tanzania.

2. Interim Report(1) :

Twenty(20) copies within five(5) months from the date of the commencement of the study.

3. Progress Report:

Twenty(20) copies within nine(9) months from the date of the commencement of the study.

4. Interim Report(2)

Twenty(20) copies within thirteen(13) months from the date of the commencement of the study.

5. Draft Final Report:

Twenty(20) copies about three(3) months after the presentation of the Interim Report (2).

The Government of Tanzania will submit their comments to JICA within thirty(30) days after the receipt of the Draft Final Report.

6. Final Report:

Forty(40) copies within two(2) months after JICA's receipt of the said comments on the Draft Final Report.

VII. UNDERTAKINGS OF THE GOVERNMENT OF TANZANIA

1. To facilitate the smooth conduct of the Study, the Government of Tanzania shall take the necessary measures as follows:

(1)to inform the members of the Team of any existing risk in the Study area and to take any measure deemed necessary to secure the safety of the Team,

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

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

(4) to arrange custom clearance, handling and storage at the airport and custody of equipment, machines, instruments, tools and other articles brought into Tanzania, for implementation of the Study.

(5) to exempt the members of the Team from income tax and charges of the 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,

(6) to provide necessary facilities to the Team for the remittances as well as utilization of funds introduced into Tanzania 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 Team to take all data and documents (including photographs and maps) related to the Study out of Tanzania to Japan, and

(9) to provide medical services as needed. Its expenses will be chargeable on members of the Team.

2. The Government of Tanzania 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 of willful misconduct on the part of the members of the Team.

3. The Ministry of water, energy and minerals (hereinafter referred to as "MWEM"), as counterpart and contact agency to the Team, shall act in relation with other governmental and non-governmental organizations concerned for the

smooth implementation of the Study.

4. MWEM shall, at its own expense, provide the Team with the followings in co-operation with relevant organizations:

(1) available data (including photographs and maps) and information related to the Study

(2) counterpart personnel

(3) suitable office with necessary equipment and furniture in Dar es Salaam

(4) credencials or identification cards

VIII. UNDERTAKINGS OF JICA

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

1. to dispatch, at its own expense, the study team to Tanzania,

2. to pursue technology transfer to the Tanzania counterpart personnel in the course of the Study.

IX. CONSULTATION

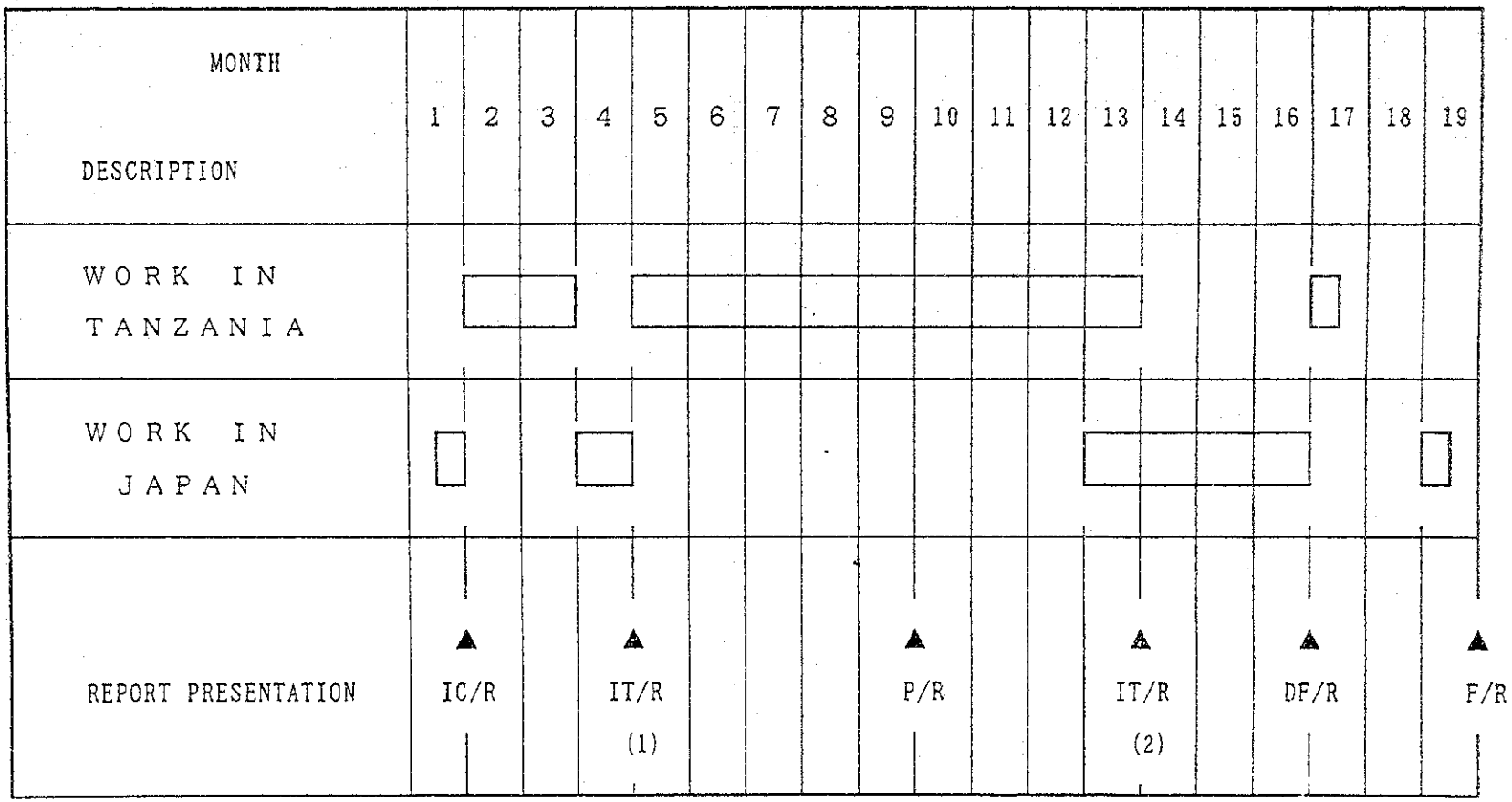
JICA and MWEM shall consult each other in respect of any matter that may arise from or in connection with the Study.

N
LEGEND
ROAD
RAILWAY
CATCHMENT BOUNDARY
EXISTING PIPELINE
MOROGORO
Uluguru Mt.
UPPER RUVUPIL
LOWER RUVUPIL
DAR ES SALAAM
KENYA
TANZANIA
ZAMBIA
RUVU BASIN
0
10
20
30
40
50KM

104

ANNEX 2

TENTATIVE STUDY SCHEDULE



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

3．議事録（M／M）

MINUTES OF MEETING

FOR

STUDY

ON

WATER RESOURCES DEVELOPMENT IN THE RUVU RIVER BASIN

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

MINISTRY OF WATER, ENERGY AND MINERALS

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

DAR ES SALAAM, OCTOBER 22, 1992

Mr. Patrick Rutabanzibwa
Acting Principal Secretary,
Ministry of Water, Energy
and Minerals

Mr. Osamu Yamaguchi
Leader
Preparatory Study Team
of Japan International
Cooperation Agency

1. In response to the request of the Government of Tanzania, the Government of Japan has dispatched a Preparatory Study Team for the Study on Water Resources Development in the Ruvu River Basin, from 14th to 30th October 1992, through the Japan International Cooperation Agency (JICA).

2. The Preparatory Study Team headed by Mr. Osamu Yamaguchi and Tanzania Official headed by Mr. P. Rutabanzibwa had a series of discussions and exchanged views, on the draft of the Scope of Work (S/W) for the Study. As a result of the discussions, some revisions were made and both Tanzania and Japanese sides agreed upon and signed the Scope of Work.

3. In addition to the Scope of Work, both sides confirmed the following:

(a) The objectives of the Study are to evaluate the water resources potential and to formulate a master plan, considering comprehensively various aspects such as water supply for Dar es Salaam, irrigation, hydro power, flood control, and environmental conservation. The master plan which is the integrated river development plan, won't include the detailed development plan, but the action plan in each item mentioned above

(b) The Study area will cover the Ruvu River basin as shown in the attached map of the Scope of Work, and the area should be estimated precisely in the beginning of the Study.

(c) In order to formulate a master plan, facilities for water resources development will be preliminarily designed and their costs and benefit will also be estimated.

(d) For the consideration on the environmental aspects, following items were agreed by both sides;

1) The IEE (initial Environmental Examination) should be done because it has been clarified through the screening that some important environmental components are mostly negligible, however, they might be affected by implementation of water resources development.

(2) IEE (Initial Environmental Examination) in the Study should be carried out on the basis of the screening of environmental components.

(3) The following environmental components are selected to be studied in the study.

- Resettlement
- Public Health and Hygienic Conditions
- Geographic and Geological Condition
- Soil Erosion
- Surface water, water quality

- Ground water
- Terrestrial fauna
- Vegetation

(e) Target year of Master Plan is set at year 2020.

4. Concerning the Introduction of Scope of Work, Tanzania side requested to add the words "in Tanzania" after the sentence of "in accordance with the related laws and regulations in force in Japan". Japanese side accepted its request, however, confirmed that Tanzanian side will continue to undertake all items described in the Scope of Work till the end of the Study even if the laws and regulations are reformed.

5. Tanzanian side expressed the difficulties of provision of vehicles with drivers, fuel and spare parts. Japanese side considered the conditions of Tanzanian side and omitted the item concerning vehicles from its undertakings.

6. Tanzanian side requested Japanese side to convey following matters to JICA Head Quarter.

a) Equipment

To donate to Tanzania Government, the equipment which will be brought into Tanzania for the Study after completion of the study, in order to conduct its own continuous study in related areas.

b) Training in Japan

To provide the Tanzania counterpart personnel with the opportunities of trainning in Japan in order to transfer technology.

7. Both sides agreed to establish a steering committee for the smooth conduct of the study, consisting of the following Ministries and Organizations;

Ministry of Water, Energy and Minerals (Will also be the coordinator, contact agency and organiser of the Committee untill the commencement of the study.)

National Urban Water Authority,

Ministry of Agriculture and Livestock Development,

Ministry of Tourism, Natural Resources and Environmental,

Tanzania Electric Supply Company,

Ministry of Finance,

Planning Commission,

Regional Comissioner's Office, Coast Region,

Regional Commissioner's Office, Morogoro Region.

LIST OF PARTICIPANTS

JAPANESE SIDE

Mr. Osamu Yamaguchi	Senior Officer, Upstream Area Development Section, River Development Division, River Bureau, Ministry of Construction.
Mr. Hirofumi Yokoyama	Development Cooperation Division, Economic Cooperation Bureau, Ministry of Foreign Affairs.
Mr. Shigeharu Jikan	Assistant Administrative Officer, Planning Division, Planning Dept., Water Resources Development, Public Cooperation.
Mr. Akinari Kudo	Chief of Tea Marketing Section, Upland Crop Division, Agricultural Production Bureau, Ministry of Agriculture, Forestry, and Fisheries.
Mr. Toshio Hirodo	SR. Irrigation Enrinner, Construction Department, Chugoku Shikoku Regional Office, Ministry of Agriculture, Forestry, and Fisheries.
Mr. Tsutomu Kameyama	INA Civil Engineering Co., Ltd.
Mr. Hiroshi Tanaka	LANDTEC Inc.
Ms. Fumiko Tatebayashi	Second Development Study Division, Social Development Study Department Japan International, Cooperation Agency (JICA).
Mr. Tomiaki Ito	Tanzania Office, Japan International Coopertion Agency (JICA).

TANZANIAN SIDE

Mr. P. Rutabanzibwa	Acting Principal Secretary, Ministry of Water, Energy and Minerals, Dar es salaam,
Mr. S.N. Lupimo	Acting Commissioner for Water Affairs Ministry of Water, Energy and Minerals, Dar es salaam,
Mr.J.Y. Mwakatobe	Acting Director of Administration and Personnel, Ministry of Water, Energy and Minerals, Dar es salaam,
Mr. L.M. Sechu	Acting Head of Design Unit, Ministry of Water Energy and Minerals, Dar es Salaam,
Mr. H.A. Hashil	Director of Project Planning and Implementation, National Urban Water Authority-NUWA
Mr. M. Mbwambo	Electrical Engineer, Energy Sector, Ministry of Water Energy and Minerals, Dar es Salaam,
Mr. B.M. Mbangati	Ag Commissioner, Mineral Resources,Ministry of Water Energy and Minerals, Dar es Salaam,
Mr. M. A. Macha	Senior Executive Engineer Design Unit, Ministry of Water Energy and Minerals, Dar es Salaam, (Poject Coodinator)
Mr. I.E. Mwakalinga	Senior Hydrologist, Ministry of Water Energy and Minerals, Dar es Salaam,
Mr. P.E. Itanisa	Regional Commissione's Office, Coast Region
Mr. R.L. Ishengoma	Regional Commissione's Office, Coast Region
Mr. K.M. Nanai	Ministry of Natural Resources and Tourism, Dar es Salaam
Mr. G.M Kalinga	Civil/Irrigation Engineer Ag.A/C (Irrigation Dept.) Ministry of Agriculture
Mr. A.J. Kaaya	Design Engineer, Ministry of Water Energy and Minerals, Dar es Salaam,

4．面談者リスト

官公庁名、面談者氏名　　職　名

Planning Commission

Mr. Odundga	Deputy Principal Secretary
Mr. Zayumba	Director, Social Community Service, Board of Member, National Urban Water Authority (NUWA)
Mr. Kimolo	Director of Economic Service, In charge of Urban Water

Ministry of Finance

Dr. Jonas P. Kipokola	Principal Secretary
Mr. Kibwana	Commissioner of External Finance
Mr. Muneni	Assistant Commissioner of External Finance
Mr. Lungu	External Finance

Ministry of Water, Energy and Mining (MAJI), (MWEM)

Prof. Mwandosya	Principal secretary (Official Vissiting to London UK.)
Mr. Patric Rutabanzibwa	Acting Principal Secretary
Mr. S. S. Mambali	Commissioner for Water Affairs
Mr. S.N.Lupimo	Acting Commissioner for Water affairs
Mr. L.G.Sechu	Acting Head of Design Unit,
Mr. Mrumge A. Macha	Senior Exective Engineer, Design Unit, (Coordinater)
Mr. G.M.Kalinga	Civil/irrigation engineer, Acting A/C (Irrigation Depart ment)
Mr. Alex Kaaya	Design Engineer,
Mr. I.K.Mlakalinsa	Senior Hydrologist - UBUNGO
Mr. Shrima G. Kni	Water Officer- UBUNGO,
Mr. M. Mbwambo	Electrical Engineer, Energy Division,

Ministry of Agriculture

Dr. Ben Moshi	Principal Secretary
Mr. Muro	Acting commissioner of Agriculture
Mr. E.H Masija	Assistant Commissioner of Irrigation
Mr. Peniel M. Lyimo	Assistant Commissioner for Planning and Marketing
Mr. R. Temu	Acting Assisstant Commissioner of Irrigation
Mr. G. M. Kalinga	Civil / Irrigation Engineer

Ministry of Tourism, Natural Resources and Environment

Mr. E. M. Mnzava	Director, Forestry and Beekeeping Division
Mr. Eric.K. Mugurushi	Acting Director, Environmental Division
Mr. Kimacha Nanai	Environmental officer, Environmental Division
Mr. Gervace T. Mosha	Distrect Game Officer, Wildlife Division
Mr. Simon Kaihula	Game Management Officer, Wildlife division
Mr. S. B. Mbwana	Senior Forest Officer, Head of Forest Management, Forestry and Beekeeping Division
Mr. Baraka S.M.Masular	Fisheries Officer HQ, Fisheries division
Miss. Ann Aih Millanzi	Fisheries Officer (Planning), Fisheries Division

National Urban Water Authority (NUWA)

Mr. H.A.Hashil	A.P.P.I

R.D.D. Cost Resion

Mr. R.E.Itanisa	
Mr. R.L.Ishengoma	RDD Coast Region
Mr. J.Y.Muwakatobe	Acting Director of Administration and personnel
Mr. B.M. Mbangati	Acting CMR

University of Dar es Salaam, Institute of Resources assessment (IRA)

Dr. R. B. B. Mwalyosi	Integrated Resource Management and Environmental Studies

5．収集資料リスト

資料入手先及び収集資料

SOURCE: MOWEM

1. Coast/Dar es Salaam Regions Water Master Plan 1979
   (Summary ,Water Resources)
2. Mbeya Water Master Plan Study
   (Summary)
3. Water Policy
   (Wizara Ya MAJI,Nishati Na Madini)
4. Budget Speech
   (Jamhuri Ya Muungano Wa Tanzania)
5. Water Utilization (Control and Regulation)
   No.42 Act,1974
   NO.10 of 1981
6. Hydrological Year-Book
   (1965-1970)
   (1971-1980)
7. Mindu Dam Drawing
   (General Arrangement No-1117,2 sheets)

Source: President Office

1. Economic Survey for 1991 and the Annual Development Plan for 1992/1993
2. Long Term Perspective Plan (1981-2000)
3. National Assembly Estimates of Public Revenue and Expendture (1992/1993)
4. Statistical Abstract (1990)
5. 1988 Population Census
6. 1978 Population Census

Source: Directorate of Meteorology

1. Tanzania Climatological Bulletin
   (1985,1987)
2. Monthly Summary Data for May,1990
3. Monthly Climatological Summary
   (1989,6-1992,7-1992)

SOURCE: ENVIRONMENT DIVISION

Map title	Map scale	Year issued
1. Hydrogeological map of Tanzania	S=1:1,500,000	1990
2. Hydrometeological map of Tanzania	S=1:4,000,000	1990

SOURCE: SURVEY DEPARTMENT

1.	Tanzania, Vegetation cover types map	S=1:2,000,000	1990
2.	Map of Tanzania	S=1:2,000,000	1972

SOURCE: SURVEY DEPARTMENT

1.	Map of Africa	Graphic scale	1972
2.	Physical map of Tanzania (Rear side description: Geology)	S=1:3,000,000	1972
3.	Geology map (Rear side description: Soils)	S=1:3,000,000	1972
4.	Soils map (Rear side description: Capability of soils for agriculture)	S=1:3,000,000	1972
5.	Capability of soils for agriculture map (Rear side description: Geophysical map of Tanzania)	S=1:3,000,000	1972
6.	Geophysical map (Rear side description: Geophysical map of Tanzania)	S=1:3,000,000	1972
7.	Hydrology map (Rear side description: Hydrology)	S=1:3,000,000	1972
8.	Mean annual rainfall map (Rear side description: Rainfall)	S=1:3,000,000	1972
9.	Rainfall probability map (Rear side description: Rainfall)	S=1:3,000,000	1972
10.	Climate map - Seasonal distribution of rainfall - Water balance - Rainfall / Evaporation - Mean daily range of temperature (° C) (Rear side description: Vegetation)	Graphic scale	1972
11.	Vegetation map (Rear side description: Vegetation)	S=1:3,000,000	1972

	Map title	Map scale	Year issued
12.	Forest reserve map (Rear side description: Game conservation)	S=1:3,000,000	1972
13.	Game conservation map (Rear side description: Fisheries)	S=1:3,000,000	1972
14.	Fisheries map (Rear side description: Fisheries)	S=1:3,000,000	1972
15.	Administration map (Regions and distrects) (Rear side description: Population distribution)	S=1:3,000,000	1972

16. Population distribution map (Rear side description: Population distribution)	S=1:3,000,000	1972
17. Population characteristics - Population change 1948 - 1967 - Estimated birth rates 1967 - Infant mortality 1967 - Dependency ratio 1967 (Rear side description: Population characteristics)	Graphic scale	1972
18. Antiquities and monuments map	S=1:3,000,000	1972
19. Educational facilities map (Rear side description: Expantion of education mainland Tanzania since independance)	S=1:3,000,000	1972
20. Medical facilities map (Rear side description: Medical services, Public health)	S=1:3,000,000	1972
21. Tsetse fly and sleeping sickness map (Rear side description: Tsetse fly and sleeping sickness)	S=1:3,000,000	1972
22. Disease map - Malaria - Trypanosomiasis (Sleeping sickness) - Shistosomiasis (Bilharzia) - Onchocerchiasis (River blindness) (Rear side description: Water development)	Graphic scale	1972
23. Improved water supply (Rear side description: Water development)	S=1:3,000,000	1972
24. Main export crops map - Cotton, Sisal - Coffee, Tea - Cachew nuts, Oilseeds - Tobacco, Pyrethrum, Beans	Graphic scale	1972
25. Food crops map (Rear side description: Cattle)	Graphic scale	1972
26. Cattle distributition and marketing (Rear side description: Cattle)	S=1:3,000,000	1972
27. Extracta from standard sheets map		1972
- Dar es Salaam	S=1:25,000	
- Arusha	S=1:10,000	
- Mbeya	S=1: 5,000	
- Morogoro	S=1: 2,500	
(Rear side description: - Map of Tanzania,		

- Topographical maps,
- Physical maps,
- Special maps,
- Township maps)

28. Administrative headquarters map		1972	
- Dosoma	S=1:10,000		
- Chunya	S=1: 2,500		
- Bariadi	S=1: 2,500		
- Mkuranga	Graphic scale		
(Rear side description: Towns and other service centres)			
29. Urban centres map	S=1:3,000,000	1972	
(Rear side description:			
- Development of Ujamaa villages,			
- Dodoma distrect urban centre and Ujamaa development 1971, Graphic scale			
- Ujamaa village in Dodoma region 1972, Graphic scale			
- Kabuku-Kwaraguru scheme,Graphic scale)			
30. Rufiji delta map	Graphic scale	1972	
Ujamaa village development			
(Rear side description:			
Internal communications)			
31. Internal communication statistics map	S=1:3,000,000	1972	
(Rear side description:			
Transport and communication)			
32. Communication statistics:	Graphic scale	1972	** Not avai
lable			
33. Mineral resources map	S=1:3,000,000	1972	
(Rear side description:			
The growth of industry in Tanzania)			
34. Industry map	S=1:3,000,000	1972	
(Rear side description:			
The socialization of trade)			
35. Socialization of Tanzania map	S=1:3,000,000	1972	
(Rear side description:			
The socialization of trade)			
36. International trade	Graphic	1972	
37. Government revenue and expenditure	Graphic	1972	
(Rear side description: Employment)			
38. Employment	Graphic	1972	
(Rear side description: Employment)			
39. Gazetter	List	1972	

40. Topographic Map S=1:50,000

(Ruvu River Basin ,issued year : 1968--1990)

Section 165/4
166/3,4
167/3,4
168/2,3,4
182/2,4
183/1-4
184/1-4
185/1-4
186/1,3,4
200/2,4
201/1-4
202/1-4
203/1-4
204/1-4
218/1-4
219/1-4
220/1,2
221/1,2
222/1,2

6．質問状及び調査結果

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
General			
A1-1 Census & Statistic Data in Past 10 years a) Population by States or Prefecture Age, Sex, Race, Region, etc. b) Occupational Population c) Number of Household d) Sectorial Production (Agriculture, etc.) e) Gross National Production (GNP) f) Balance of International Payment g) International Trading h) Consumer Price Index i) Sale Price Index j) Exchange Rate	YES	President Office	○ 収集済み
A1-2 Population Density Map	YES	Survey Department	○ 収集済み
A1-3 Administration Map	YES	Survey Department	○ 収集済み
A1-4 Long Term National Development	YES	President Office	○ 収集済み
A1-5 National Development Plan			
A1-6 Other Related Data			

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Maps			
A2-1 Topographical Maps in The Rubu Basin 1/2,000,000 1/1,500,000 1/1,000,000 1/500,000 1/250,000 1/100,000 1/50,000	YES	Survey Department	○ 収集済み
A2-2 Aerophotograph in The Rubu Basin -1/40,000 -1/25,000 -1/5,000	YES	Survey Department	写真 NO. 確認済み
A2-3 Geological Data a) Geological Map -1/2,000,000 -1/250,000	YES	Survey Department	○ 収集済み
b) Geological Study Reports -Geology of Tanzania -Distribution & Chemical Quality of Groundwater in Tanzania -Fracture Map of Tanzania -Mineral Map of Tanzania	YES	MAJI	DAR/COAST WATER MASTER STUDY
A2-4 Remote Sensing & Data Base			
A2-5 Land Use Map	YES	Survey Department	○ 収集済み
A2-6 Soil Classification Map	YES	Survey Department	
A2-7 Road Map (1/2,000,000 1/1,500,000)	YES	Survey Department	

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Meteorology and Hydrology			
A3-1 Meteorological Data	YES	MAJI	NOT IN MAGNETIC MEDIA
a) Location Map of the Observation station			
b) List of Station	YES	MAJI	
c) Year Book		DAR/COAST WATER MASTER	
d) Study Report of Climatic Condition	SOME	PLAN	
A3-2 Rainfall Data			
a) Location Map of the Observation station	YES	MAJI	
b) List of Station	YES	DOM	
c) Isohyet Map	YES	MAJI	YEARLY TOTALS
d) Year Book	YES	DOM	
e) Study Report of Rainfall Characteristics	SOME	DAR/COAST WATER MASTER PLAN	
A3-3 Discharge Data	YES	MAJI	
a) Location Map of Gauging Station	YES	MAJI	LATEST UP DATE 1989 FOR WATER LEVELS IN
b) List of Station	YES	MAJI	MAGNETIC MEDIA
c) Hydrological Year Book	YES	MAJI	ON ICL COMPUTER
A3-4 Data Bank System	YES	MAJI	
A3-5 Data on Main Earthquake			
a) Location Map of Earthquake			
b) List of Main Earthquake			
c) Design Criteria for Earthquake			
A3-6 Other Related Data			

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Surface Water			
A4-1 River			
a) Map of Catchment Area & Tributaries	YES	MAJI	
b) Profile & Typical Cross Section	NO		
c) Characteristics of Main River	NO		
d) Discharge Record	YES	MAJI	
A4-2 Dam			NO DAMS
a) Location Map of Dam (Existing, Under Construction, Planning)			EXISTING ON MAIN RIVER
b) List of Dam			
A4-3 Present Water Consumption and Future Demand (Sector and Area)			
A4-4 Potential Water Resource			
A4-5 Water Right			
a) Location Map of Registered Water Right	NO		
b) Registration Form of Water Right	YES	MAJI	
c) List of Registered Water Right	YES	MAJI	
A4-5 Law or Custom on River Maintenance Flow	YES	MAJI	
A4-6 Enviromental Law to restrict Water Resources Development		MAJI	WATER UTILIZATION AND REGULATION ACT
A4-7 Previous Study Reports on Surface Water Development -Provisional National Water Resources Master Plan	YES	MAJI	DAR/COAST WATER MASTER PLAN

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
-Other Related Report A4-8 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Groundwater			
A5-1 Hydrogeology		MAJI UBUNGO	
a) Hydrogrological Map and Profile	NO		
b) Isopiezometric Contour Map	NO		
c) Groundwater Quality Map (TDS, EC, etc.)	NO		
d) Transmissivity Coefficient Map	NO		
e) Specific Capacity Map	NO		
A5-2 Well Data			
a) Location Map of Existing Well	YES	COAST REGION	UP DATE
b) Well Inventory (Table-A10)	YES	MAJI	COMPUTER
A5-3 Location & Yield of Main Groundwater Basins	NO		
A5-4 Present Usage and Future Demand by Sector & Area	YES	COAST REGION	
A5-5 Groundwater Development Project Cost and Break-down	NO		
A5-6 Previous Study Report on Hydrogeology & Groundwater Development -Project assisted by DAC and/or International Organization -Domestic Project	YES	WATER MASTER PLAN	事前報告書 3-12 参照
A5-7 Data Bank System for Groundwater	YES	COMPUTER UNIT (UBUNGO)	
A5-8 Other Related Data			

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
Urban and Rural Water				
A6-1 Urban and Rural Water Supply System (Existing, Under Construction, Planning) a) Location of Water Supply System b) List of Water Supply System	YES	NUWA	現地で収集可	
A6-2 Urban and Rural Water Supply System Development Plan				
A6-3 Previous Study Report on Water Supply Development	YES	NUWA/JICA	JICA REPORT 有り	
A6-4 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
Agriculture				
A7-1 Present Condition -Agricultural Statistic Data (Agricultural Area, Production, Export Market and Marketing System, etc.) -Areal Water Demand (Water Consumption) (Cropping Pattern, Water Requirement, - Style of Intake & Irrigation Network)	YES	Ministry of Agriculture	現地で収集可	
A7-2 Agricultural Policy & Future Condition -Demand & Required Production	YES	Ministry of Agriculture	現地で収集可	
A7-2 Present and Future Irrigation Area in Target Year by Area a) Location Map of Irrigation Area b) List of Irrigation Area				
A7-3 Agricultural Development Plan by Area -Project Name, Area, Outline -Water Source, Planned Year and Organization, etc.				
A7-4 Previous Study Report on Agriculture Development Plan				
A7-5 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Power			
A8-1 National Erectric Power Development Plan	YES	TANESCCO	
A8-2 National Hydropower Supply Program	YES	TANESCCO	
A8-3 Present and Future Demand by Area a) Average Demand c) Peak Demand			
A8-4 Existing Future Generation System a) Hydropower b) Fuel Thermal c) Others	YES	TANESCCO	
A8-5 Existing and Future Transmission System	YES	TANESCCO	
A8-6 Standard Construction Cost a) Power Station b) Transmission	YES	TANESCCO	
A8-7 Standard Electric Charge	YES	TANESCCO	
A8-8 Institutional System of Electric Supply (incl. O&M of Facilities)			
A8-9 Data Bank System for Electric Power Development			
A8-10 Previous Study Report on Electric Power Development	YES	TANESCO/JICA	

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
A8-11 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS
Flood Control			
A9-1 Organization and Budget for Flood Control	NONE		
a) National Level			
b) Regional Level			
A9-2 Past Flood Disaster by Each River System	UNKNOWN		
a) Inundation Area	UNKNOWN		
b) Damaged Item and Quantity	UNKNOWN		(By Crop Item)
c) Rainfall and Discharge (above Flooding)			
A9-3 Existing Flood Control Works by River System	NONE		
a) National Project			
b) Regional Project			
A9-4 Future Flood Control Plan by River System	NONE		
a) National Project			
b) Regional Project			
A9-5 Previous Study Report on Flood Control	NONE		
A9-6 Other Related Data			

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
Industry				
A10-1 Present Industry a) Location Map b) Production Item & Quantities				
A10-2 Future Industry Plan				
A10-3 Present & Future Water Demand for Industrial Water				
A10-4 Standard Charge of Industrial Water				
A10-5 Previous Study Report on Water Use of Industry				
A10-6 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
Ecology and Enviroment				
A11-1 Present Ecological and Environmental Problems and Countermeasures relating to Water Resources Development	UNKNOWN			
a) Water Pollution				
b) Fish and Wild Life				
c) Vegitation				
d) Serious Epidemic Disease				
A11-2 National Standard for Environment			事前調査 3-9 参照	
a) Enviroment Quality Act (Amendement)				
b) Enviroment Quality Regulation				
c) Enviroment Impact Assesment Procedure				
d) Superintendency of E.I.A				
A11-3 Location Map of National Park and Game Reserve	YES	Survey Department	○ 収集済み	
A11-4 National Forestry Plan	YES		○ 収集済み	
A11-5 Previous Study Report on Environmental Conservation				
A11-6 Other Related Data				

Questionnarie for Data Request

ITEM	AVAILABILITY	SOURCE	REMARKS	
Others				
A12-1 Organization of Government (Federal & States)				
A12-2 Law, Regulation and Local Rule relationg to Water Resources Development				
A12-4 National Budget in past 5 years				
A12-5 National Plan of Transportation a) Existing Road Network b) Future Plan under City Plan c) Navigation in The Rubu Basin				
A12-6 List of Govermental and Private Company & Required Job Cost a) Drilling & Pumping Test b) Survey c) Geophysics d) Water Quality Analysis e) Engineering & Consulting f) Construction				
A12-7 Local Cost				
A12-8 Labour Cost				
A12-9 Other Related Data				

7．環境配慮にかかるスクリーニング結果

STUDY ON WATER RESOURCES DEVELOPMENT IN THE RUVU RIVER BASIN

SCREENING OF ENVIRONMENTAL COMPONENTS TO BE AFFECTED
FOR INITIAL ENVIRONMENTAL EXAMINATION (IEE)

ENVIRONMENTAL COMPONENTS	PRESUMED ACTIVITIES AND ENVIRONMENTAL IMPACTS	IMPACT CONSIDERATIONS Adverse impact : Negrigible impact : : Unkown impact : : : Enhancement	REMARKS
1. SOCIAL ENVIRONMENT		: : : :	
1.1 Resettlement	Relocation and resettelment for land acquisition	□ ● □ □	Consider inhabitants at down strech if large scale dev't planned.
1.2 Economic activities	Damaging of productive opportunities ie. Changes of land and economic situation and structure	□ □ □ ●	
1.3 Transportation and public facilities	Traffic problems and accidents to the existing transportation system. Impacts to schools and hospitals	□ □ □ ●	
1.4 Disintegration of communities	Separation of communities by traffic routes, water channles and transportation problems	□ ● □ □	
1.5 Archaeological and culturtural heritage	Damages and affections to religious structures, archaeological, cultural monuments and remains	□ ● □ □	
1.6 Vested rights	Damages and Compensations for fishery, water use and common public land use	□ ● □ □	
1.7 Public health and hygenic conditions	Degradation of hygenic conditions caused by ~~west~~ waste disposal and generation of vector insects	□ □ ● □	Some vector born disease may be considered at impoundment development.
1.8 Waste disposals	Arising of construction debris, wastes, sludges and abandonments	□ ● □ □	
1.9 Accidental damages	Arising accidental dangers on earth collapses, land slides	□ ● □ □	

ENVIRONMENTAL COMPONENTS	PRESUMED ACTIVITIES AND ENVIRONMENTAL IMPACTS	IMPACT CONSIDERATIONS Adverse impact : Negrigible impact : : Unkown impact : : : Enhancement	REMARKS
2. NATURAL ENVIRONMENT		: : : :	
2.1 Geographic and geological condition	Changes of significant land forms and geological features caused by earthwork, excavation and embankment	□ ● □ □	Impacts may be considered at large scale development.
2.2 Soil erosion	Soil erosion originated by runoff through earthworks,timber felling	□ ● □ □	Impacts may be caused primary work stage,revegetation may be taken.
2.3 Surface water water quality	Water turbidity caused by runoff through excavation activities and water pollution by effusion	□ ● □ □	Temporary impacts may be caused during construction stage.
2.4 Ground water	Water turbidity caused by runoff through excavation activities and water pollution by effusion	□ ● □ □	Temporary impacts may be caused during construction stage.
2.5 Hydrological situations	Variation changes of flow regime, lake and river bed causing reclamation and effusion of drained water	□ ● □ □	
2.6 Terrestrial fauna	Environmental changes and habitation of endangered species, communities, impact to habitation	□ ● □ □	If project site is nearby game reserve, impact may be considered.
2.7 Aquatic fish fauna	Environmental changes and habitation of endangered species, communities, impact to habitation	□ ● □ □	
2.8 Vegetation	Environmental changes and habitation of endangered species, communities, impact to habitation	□ ● □ □	If project site is nearby coastal rainforest, impact may be considered
2.9 Climatic condition	Climatic changes arising by implementation of large scale development of earthworks and structures	□ ● □ □	
2.10 Aesthetic condition	Land form and landscape changes by earthworks and structures	□ ● □ □	

ENVIRONMENTAL COMPONENTS	PRESUMED ACTIVITIES AND ENVIRONMENTAL IMPACTS	IMPACT CONSIDERATIONS Adverse impact : Negrigible impact : : Unkown impact : : : Enhancement	REMARKS
3. PUBLIC NUISANSE		: : : :	
3.1 Air pollution	Air pollution originated from facilities, vehicles., etc.	□ ● □ □	
3.2 Water pollution	Water pollution caused by soil erosion through facility waste and drainage	□ ● □ □	
3.3 Soil pollution	Effusion caused by facility wastes and drainage	□ ● □ □	
3.4 Noise and seismicity	Generation of noise and seismicity originated traffics, facility equipments	□ ● □ □	
3.5 Soil subsidence	Soil surface subsidence caused by changes of soil ground submerge and underground water level	□ ● □ □	
3.6 Odour	Generation of exhaust and waste gas, odour produced by facilities and equipments	□ ● □ □	

STUDY ON WATER RESOURCES DEVELOPMENT IN THE RUVU RIVER BASIN

SCOPING OF ENVIRONMENTAL COMPONENTS TO BE STUDIED
IN THE INITIAL ENVIRONMENTAL EXAMINATION (IEE)

ENVIRONMENTAL COMPONENTS	IMPACT CONSIDERATIONS Adverse impact : Negrigible impact : : Unkown impact : : : Enhancement	REMARKS ON STUDY CONSIDERATION
1. SOCIAL ENVIRONMENT	: : : :	
Resettlement	☐ ● ☐ ☐	If large scale development is to be proposed at down strech of Ruvu river vicinity, impact considerations shall be taken for relocation and resettlement of inhabitants in the area.
Public health and hygenic conditions	☐ ☐ ● ☐	Some vector born diseases and endemic diseases may be considered their impacts, if large scale reservoir and impoundment are to be proposed.
2. NATURAL ENVIRONMENT	: : : :	
Geographic and geological condition	☐ ● ☐ ☐	Impacts may be considered when large scale development is to be proposed, especially for significant land forms and geological features.
Soil erosion	☐ ● ☐ ☐	Impacts may be caused at primary construction work stage, mitigation measures and revegetation at early stage shall be considered.
Surface water water quality	☐ ● ☐ ☐	Temporary impacts may be caused during construction work stage
Ground water	☐ ● ☐ ☐	Temporary impacts may be caused during construction work stage
Terrestrial fauna	☐ ● ☐ ☐	If proposed project site is allocated nearby the game reserve or whatever environmentally sensitive area, impacts to the wildlife shall be considered.
Vegetation	☐ ● ☐ ☐	If proposed project site is allocated nearby the Coastal rainforest or whatever environmentally sensitive area, impacts to the vegetation comunity shall be considered.