

BRIDGING GAPS OF SUSTAINABILITY

IN

WATSAN PROGRAMMES OF ETHIOPIA

OUTLINE OF PRESENTATION TO IRC STAFF

AS AN OUTCOME TO

SPECIAL BRIEFING PROGRAMME ON INTERGRATED
RURAL DRINKING WATER SUPPLY AND SANITATION

20 NOVEMBER - 1 DECEMBER 1989

THE HAGUE

UNITED NATIONS
REFUGEE CENTRAL RESERVE DEPOSITORY
FOR THE VOLUNTARY WATER SUPPLY AND
SANITATION (IRC)

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BRIDGING GAPS OF SUSTAINABILITY
IN
WATSAN PROGRAMMES OF ETHIOPIA

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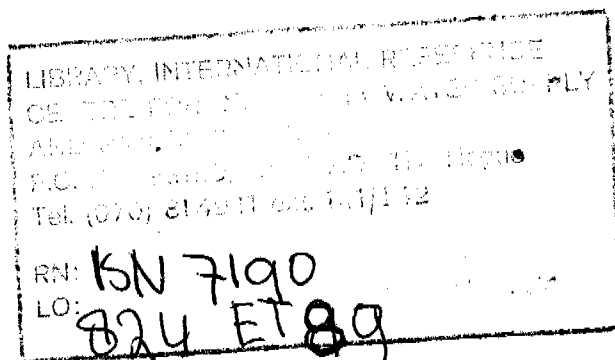
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BRIDGING GAPS OF SUSTAINABILITY
IN
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I. BACKGROUND

Ethiopia located in the North Eastern corner of the African continent is the 3rd populous (48.7 million 1989 esti) and the 10th large state (1.235 mill km²). The overall population growth is about 3% while for the urban, which makes 11 to 12% of the whole population, is between 4.5 and 5%. There has been an influx of rural population to the urban areas in search of employment and to escape the recurrent droughts over the last decade. (Refer to maps Annex 1-9)

Ethiopia is a country of great geographical diversity with high and rugged mountains, flat topped plateaus, deep gorges, incised river valleys and rolling plains. During the ages, erosion, volcanic eruptions, tectonic movements and subsidence have followed and continued through millenia resulting the formation of three major geologic structures:-

- a) The basement rock complex of precambrian origin.
- b) Sedimentary rocks of the paleozoic and Cenozoic ages.
- c) Volcanic and inter-volcanic Sedimentary rocks

The altitudinal contrast ranges from 4550 m (at Rash Dashen) to 120 m below sea level at lake Asale. The great rift valley extends across the Ethiopian plateau bisecting it into two by a series of north-south trending escarpment.

There are two distinct seasons - dry season (October - May) or "Bega" and the wet season (June - September) or "Kiremt" with the little rains falling on some parts of Ethiopia through February to April. The annual rainfall volume varies throughout the country, as high as 2,600 mm in

Illubabor to less than 50 mm in the low lands of Red Sea Coast. The maximum mean temperature is 39°C (during Bega Season).

There are 9 major rivers in the 14 macro and micro basins. A total of $104.4 \times 10^9 \text{ m}^3$ flows through these basins, of which 75% flows to Sudan, 15% to Kenya, 6% to Somalia, 1% to Red Sea and less than 3% remains in the country. The volume of water that flows through these rivers is very much influenced by the seasons. During the rainy seasons they carry large

quantities of water and silt while in the dry seasons the amount of water decreases very much. Most of the rivers flow through deep valleys and canyons frequently interrupted by falls and rapids. Only Baro river, in the South West, is navigable during the rainy season. There are also 9 major lakes with surface areas ranging from 3600 km^2 to 20 km^2 and depths from 230 m to 4 m. The potential for hydropower is estimated at $60 \times 10^9 \text{ kWh}$ but less than 2 % has only been harnessed. Forest cover has been continuously depleting due to uncontrolled exploitation, clearing for shifting cultivation, forest-fires and clearing for permanent cultivation and has gone as low as 3% from 30% about 9 decades ago.

Agriculture constitutes the country's basic economic activity with about 9% of the population depending on it for livelihood. The farming methods are very much traditional and primitive hence the economy remains at subsistence level. The Gross National Product per capital is as low as \$130.

Basic public facilities such as schools, health service units etc. are at disparity with the demand and the distance from urban centres. Water, one of the basic human needs, remains as one of the essential commodities of life and yet the majority of the rural population are suffering firstly owing to its scarcity - because of the time and energy spent to fetch it, and secondly owing to poor quality - because of the health related problems attributed to this characteristics. At present the country coverage is only 16% when it should have been close to 40%. The rural population coverage is only 11% the majority of whom depend from traditional sources - ponds, wells, cisterns, rivers and springs - often exposed to all kinds of pollution. The sanitation aspect is least attended to, the total coverage being less than 6% (estimate).

II. SECTOR PLANNING

All planning for the development of the Sector is made by the Central Planning Office in cooperation with the professional Ministries - Water supply by WRC and Hygeine and Sanitation by the MOH. The Government sets annually budgets designed to meet the targets. Since the economic requirements are far beyond the capacity of the Government and since there are other priorities, the input of external agencies is highly needed. An office in the council of Ministers, called Office of the State Council For Economic Relations is assigned to coordinate all external assistances in all sectors.

The water supply sector, one of the mandates of the Water Resources Commission, is developed and and maintained by its executive organs EWCA WSSA who have branch offices in the eight water regions. EWCA acts as a Contractor and WSSA takes the client's role. Once a system is completed it is to be taken over by WSSA who acts as an owner and has the responsibility for the operation and maintenance. WASSA is responsible for all rural and Urban Water Supplies except for Addis Ababa. (Refer to Organization charts Annex 10-12)

The Government allocations have been reducing from year to year which directly reduced also matching inputs from donors. Hence at present the sector is suffering from lack of priorities by the Govt. According to the 10 year perspective plan a target of reaching 35% of coverage for the rural population by providing access to potable water is stipulated.

The sanitation component is handled by the Environmental Health Department which exists as a Section in each of the Regional Health Departments. The people who are responsible in the field are the sanitarians the training for which exists in Jimma & Gondar Health Science Institutes. Plans or targets in this sector are not clearly defined. The sector suffers from lack of support by donors and motivation to participate by beneficiaries. The financial allocation by the Government is also very low.

Yet the cost of treatment of diseases associated with lack of proper sanitation is of great national economic concern.

III. CONSTRAINTS TO SUSTAINABILITY

All plans and targets set and implementations carried out in the sector are aimed at increasing coverage, access to potable water or proper sanitation hence are expressed in a number of shallow wells, boreholes, springs or latrines to be completed. Government budgets, donations and local contributions are all calculated to match the construction costs. With several problems the constructions are completed, water comes out of the tap and inaugurations take place. The story is different for most of such schemes not very long after their inaugurations - they have stopped giving services and people are already using their traditional sources or methods. Why? Project with such endings reveal that they carried gaps of sustainability in all or most of their steps of development. Water supply and environmental sanitation projects in the third world countries are stumbling over these gaps - and yet can be filled with the resources that brought them to the beneficiaries. Following are some of the important constraints to sustainability of water and sanitation projects.

a) Neglect of involvement of the beneficiaries:- projects are designed without due involvement of the people.

- The Community leader only decides on behalf of the people
- The people have no clear idea on their responsibilities for O & M
- The scheme is considered as property of the Government or donor
- The project could be resource initiated/driven
- System once completed is not accepted or used

b) Hardware-oriented managers

- Have no positive opinion on the role of the beneficiaries at every level of implementation of the project.
- Make designs without reference to the convenience of the users
- Unaware of post-tap role of water

c) Two Counterparts for the Sector

- There is no coordination between WRC & MOH which makes planning difficult
- WRC is concerned with the supply of domestic water and does not have the responsibility of integrating it with sanitation
- MOH does attempt to integrate water with sanitation but is in small-scale and designs on water supply works are not upto the standards of WRC
- Government has not given enough emphasis and support to sanitation

d) Less attention to training on O & M

- The users are often not given enough training on the O & M of their schemes
- The WSSA is forced to takeover many schemes and bear the O & M responsibility which is far beyond its capacity
- Most rural population have never been exposed to taking complete responsibility in covering at least the operation and minor maintenance costs.

e) High Construction Costs

- Systems are designed with the use of imported items - which are expensive and often scarce when replacements are needed.
- Development costs such as drilling are very expensive, hence increases cost recovery rating, i.e major part going to offshore supplies.

f) Varied technology

- Large number of pumps, generating sets, vehicles, rigs with different makes purchased or donated

- Little or no spare parts are supplied with each procurement or donation
- Know-how on maintenance or repair is not sufficiently present in the local areas. (Refer to Annex 13)

g) Impending perceptions and cultural taboos

- Quality of water VS taste and colour - preference for unfit waters
- Personal hygiene and the use of water in various cultures - very little use
- Attitudes to women - male dominance in the Sector
- Pit latrines within compound - not common
- Running water say from streams or rivers - often believed to have good quality

h) Communication infrastructure

- The nature of the topography, rough and rugged
- Habitations often located on higher elevations Vs water sources
- Road network and density is very low

i) Low distribution of basic public facilities

- Poor distribution of schools, clinics and health personnel, teachers etc.

j) Weak Monitoring

- Follow up by donors is very rare
- Supervision during construction are very limited
- Evaluations are rarely carried out

k) Droughts & complicts

- Draining development resources
- Distorting national plans and priorities

IV. FACTORS FOSTERING SUSTAINABILITY

Despite the above constraints, there are some positive local facts that foster sustainability, some are briefly stated below:-

a) Local Structures

- Structures going down to the grass root level such as (AP) Peasant Association, (REWA) Revolutionary Ethiopia Women Association, (REYA) Revolutionary Ethiopia Youth Association, help to facilitate the establishment of Health & Water Committees down at each village level.
- In almost all rural areas, an attitude of cooperation and support for any development activity exists.

b) Training Institute

- The Arba Minch Water Technology Institute (AMWTI) is a source of trained manpower (such as aid engineers, drillers, technicians, engineers, (CPP) Community Participation Promoters) in water supply related courses - providing certificates, diplomas and degrees. This institute can be a venue of training for neighbouring countries.

c) Local Technology

- Research and development has been continuing on handpumps & windpumps by WRC
- The MOH has carried out studies on appropriate sanitation methods/technology applicable to the rural areas.

- Skills are available at almost all places which with upgrading can be depended for village level operation and maintenance.
- Factories to produce some materials and workshops with capacities to modify or fabricate parts of pumps and spare parts also exist in country.
- There is a well established vehicle assembly plant in Addis Ababa
- Appropriate technology development unit also exists in Addis Ababa

d) Villagization Programme

- The fact that people have been brought together through the villagization programme has made it easy and less expensive to develop water supply schemes. It has also a positive effect for the environment protection and control of pollution.
- The structures necessary for handling O & M, Community Participation, Hygiene Education and Environmental Sanitation exist within the Government Organizations of WRC & MOH

e) Accepted level of services

Standards of services are:-

- Provision of 20 lit/c/d of safe water at a location of 500 m from dwellings.
- Basic sanitation with personal hygiene to be practised.

V. EXTERNAL COOPERATION AND ASSISTANCE

a) Type of Donors

There are four group of donors for the Sector:-

- Project based: upgrading training in the sector, O & M of a specific area, reconstruction of water supply system of a city, improving the water supply of a drought affected area - FRG, UK, Norway, The Netherlands etc.

- Region based: One specific region assigned to one donor; Sweden - Eastern Region (USSR has also entered); Canada - Southern Region, Finland - North-western Region, Italy - Central Region.
- Area Based: This applies mostly to NGOs. NCA: Bale, World Vision: South Shoa, SIM: West Shoa, Redd Barna: South Omo, etc.
- Region and project based: UNICEF, UNDP, EEC, UNHCR, etc.

b) Content of assistance

The assistance for the sector from the above donors are varied - hardware supplies from fittings and pipes to drill rigs; software - training inputs, expertise etc.

c) Role of External Aid Organizations

Objectives for assistance are expected to be:

- Establishing sustainability of service coverages
 - Enhancing technological and economic self-reliance of Ethiopia.
- Donors have major and decisive roles in achieving these objectives.

i) Aid policy revisions

- Avoiding tied-aid programmes
- Provide assistance on humanitarian grounds and set aside political biases.

ii) Involvement in the sector planning

External Aid organizations can produce a positive impact on the planning for the Sector by influencing the Government in order:-

- to give more priority to the sector and keep balance between the hardware and software parts of the Sector.
- to establish coordination of agencies for a national approach to achieve the goals and

- to bring to the attention of policy makers, planners and designers on the sources of information on appropriate technologies.

iii) Promotion of Appropriate Technology

The positive contributions of external aid organisations in the field of appropriate technology is through increase of resources to expand research and development programmes leading to standardization and local production of water supply and sanitation technologies.

iv) Manpower Development

- Support existing institutions and assist in the establishment of new village level training institutes to develop self-reliance in the production of trained manpower.
- Influence the Government to give more attention and budget allocations to the training component.

v) Keeping the balance for the software

- Ensure that each project proposal contains a software component well integrated into and through the implementation period. To promote such programmes increase level of support
- Influence and reorient officials on the relevance of soft components such as Community Participation, Women In Development, Hygiene Education etc. to the achievement of programme goals.

vi) Towards sustainability of country level O & M

- The establishment of a sustainable O & M system to Sector projects be part and parcel of the package.
- Influence Government to raise allocations to O & M and extend support to rehabilitate several malfunctioning systems.
- Develop a policy with the Government in several levels of cost recovery for all sector projects.

VI) SOME OF THE IMMEDIATE ACTIONS PLANNED BY UNICEF

a) Establishment of a Women's Desk

A desk or a bureau to be responsible for the affairs of women in Water Supply and Sanitation activities is planned to be established within the frame work of Water Resources Commission. The concerns of women and children is known to have received less attention in the Sector. This bureau with representation at each regional office is expected to follow up that the needs of women are addressed in each project and women are given the managerial, decision making and training opportunities at every level in the Sector development. UNICEF plans to assist the Government in the establishment of this Desk.

b) Standardization of a local handpump

A research on the development of an Afridev handpump has been in progress for over 10 years. UNICEF plans to promote this R & D by supporting the workshop and field testing and assist the Government in achieving standardization of one or two makes. Workshops shall be carried out to orient all agencies active in the sector and support the Government to start on the production of such pumps.

c) Influence Govt. for more priority to the Software and O & M

One short workshop to orient officials and engineers on the role of the software to achieve national Sector goals is necessary. After being introduced to the Hygiene and Environmental Sanitation programmes of the MOH, UNICEF plans to work on such a workshop aimed at promoting the Community Participation in an integrated approach - Water and Environmental Sanitation.

The O & M component in rural water supplies has been receiving less attention. UNICEF plans to bring to the attention of the Government as to raise the allocations to the component in the form of supplies, spares and training inputs.

Workshops geared towards raising the awareness of beneficiaries on the relationship of water and sanitation, the role of Community Participation with emphasis on involvement of women, appropriate technology, operation and maintenance etc. is planned to be carried out within a couple of months.

A one day workshop for the regional managers of EWCA & WSSA is also planned in order to orient them on project planning, implementation procedures, monitoring and reporting requirements by UNICEF.

d) Inputs to Arba Minch Water Technology Institute

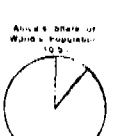
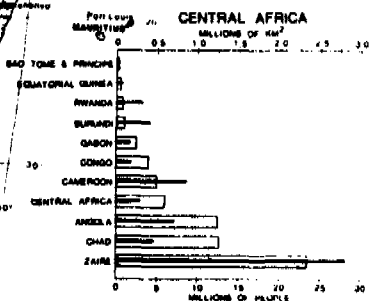
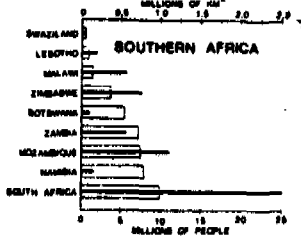
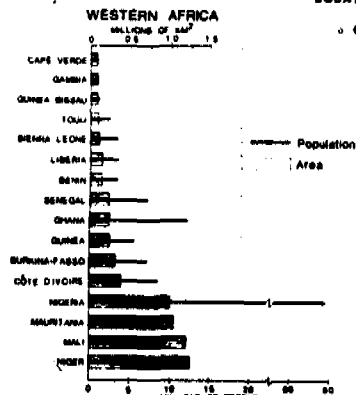
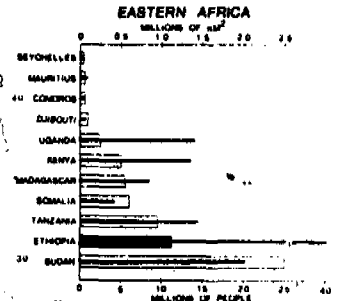
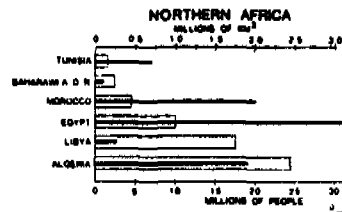
This institute has been receiving assistance from UNICEF and other organizations. It may be one of the training institutes for many African nations not in a distant future. UNICEF along with its assistance to improve the training facilities plans to review the curriculum and see to it that relevant subjects are incorporated into their packages. These are Community Participation and Management, Women Involvement, Hygiene Education, Environmental Sanitation, Cost Recovery, Appropriate Technology etc.

e) Introduce incentive scheme in drilling

A drilling programme to embark within a couple of weeks in the western part of Ethiopia for the benefit of Sudanese refugees and local population is targeted to complete nearly 50 boreholes within a year. This target cannot be achieved with the regular drilling performance by the Government. UNICEF plans to introduce an incentive scheme to enhance quality and quantity of completed boreholes with the budget limits provided. The objective of this programme is to respond to the water supply requirements of the people and also demonstrate on how the cost of drilling can significantly be reduced by the application of the bore well and handpump technology.

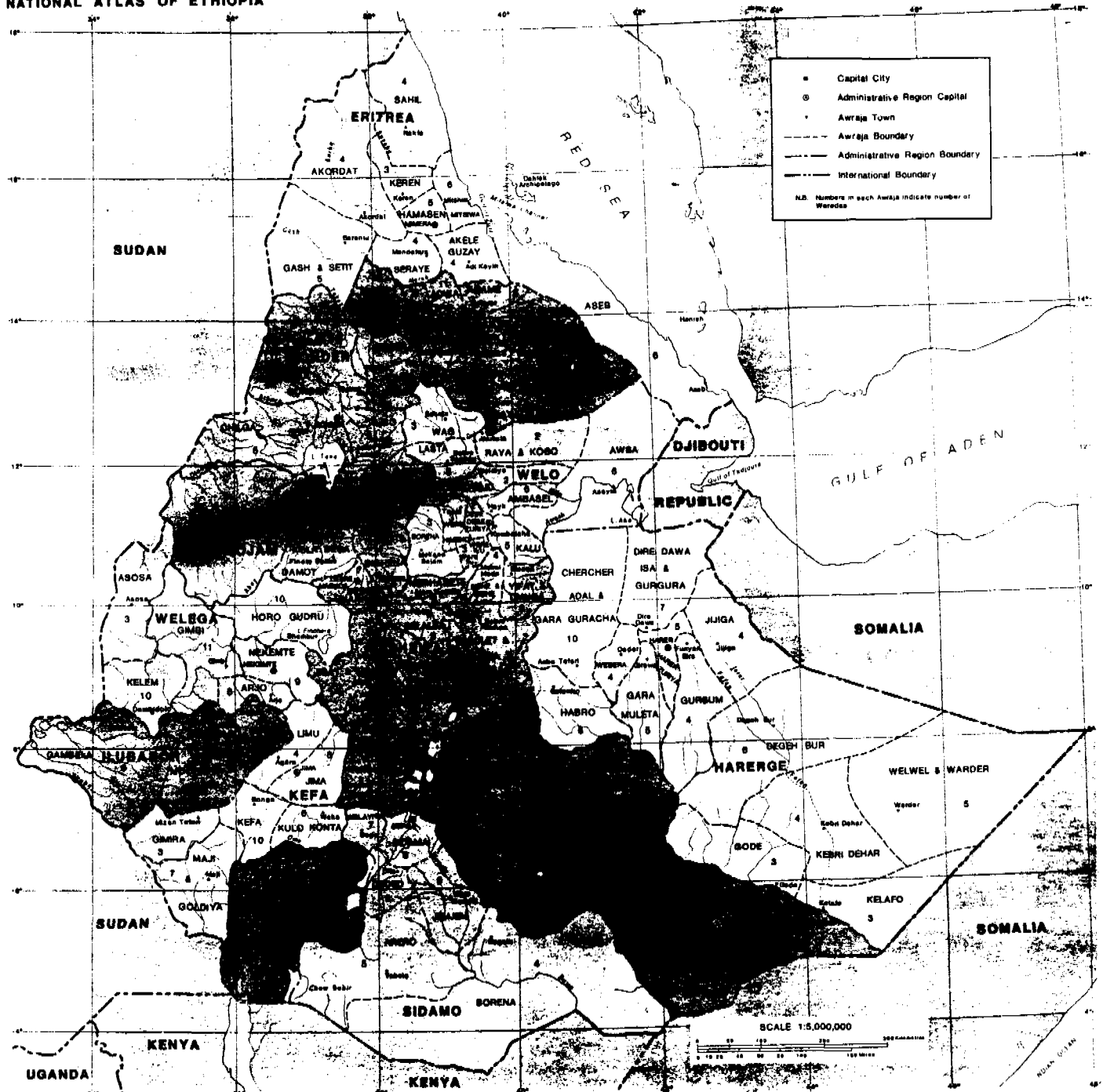
NATIONAL ATLAS OF ETHIOPIA

ETHIOPIA IN AFRICA
(Area and Population)



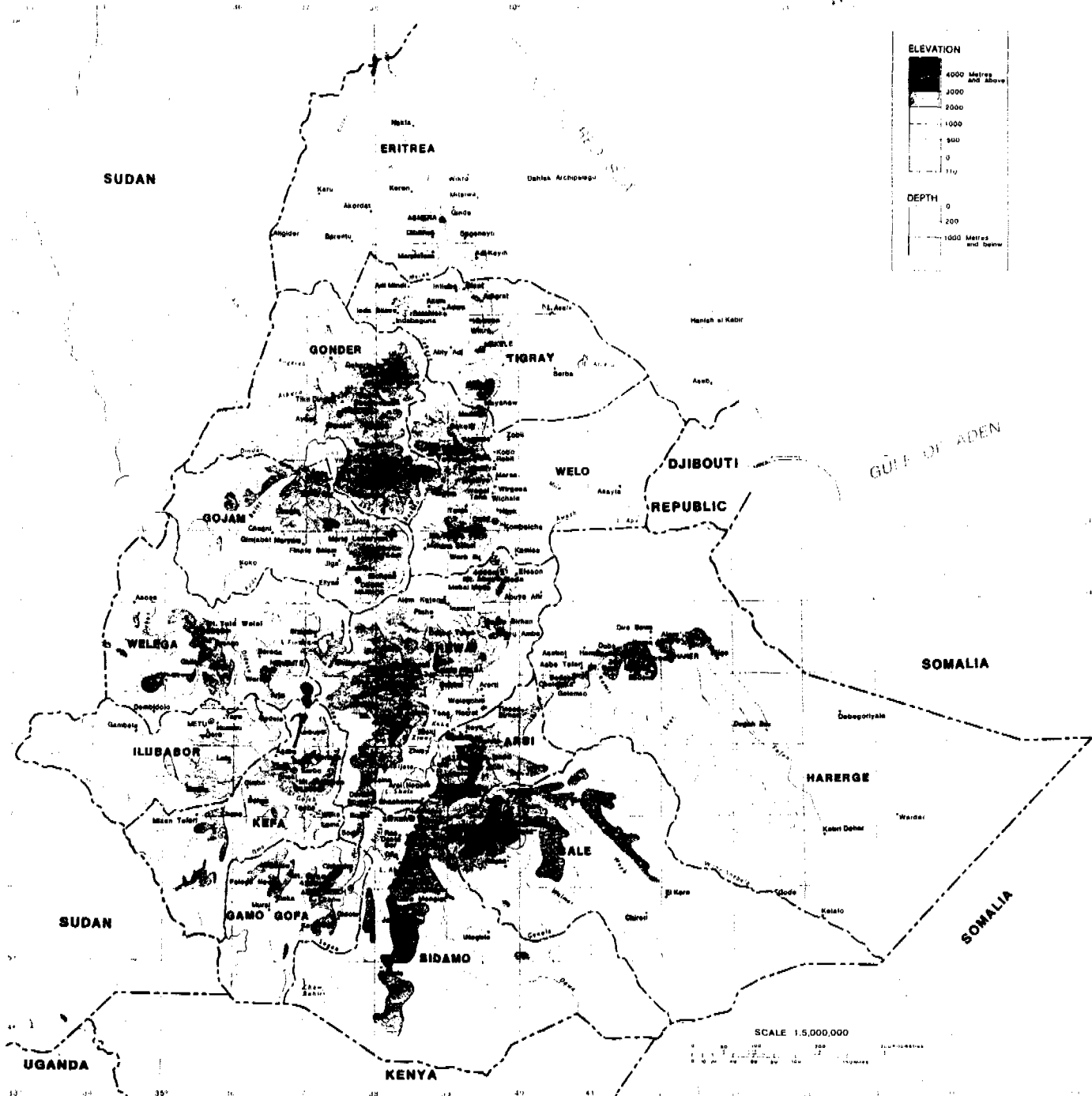
NATIONAL ATLAS OF ETHIOPIA

ADMINISTRATIVE DIVISIONS



NATIONAL ATLAS OF ETHIOPIA

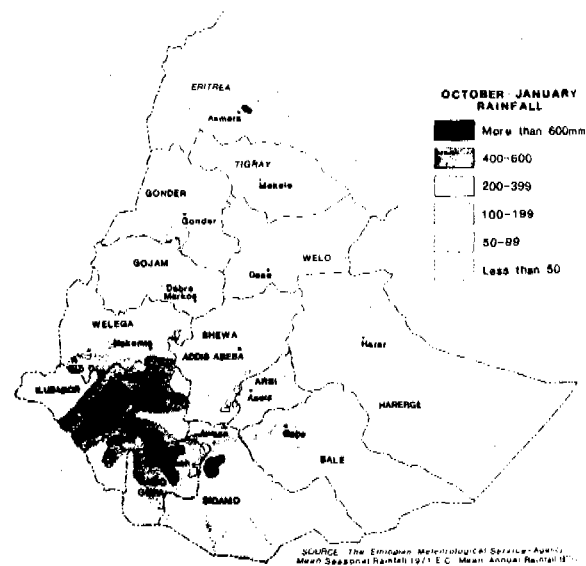
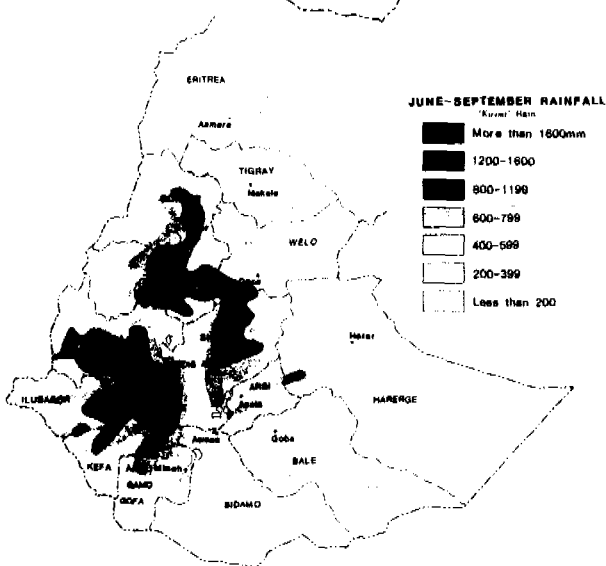
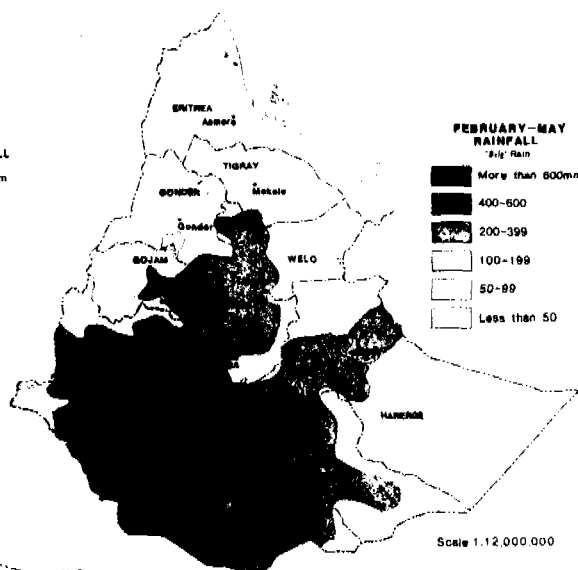
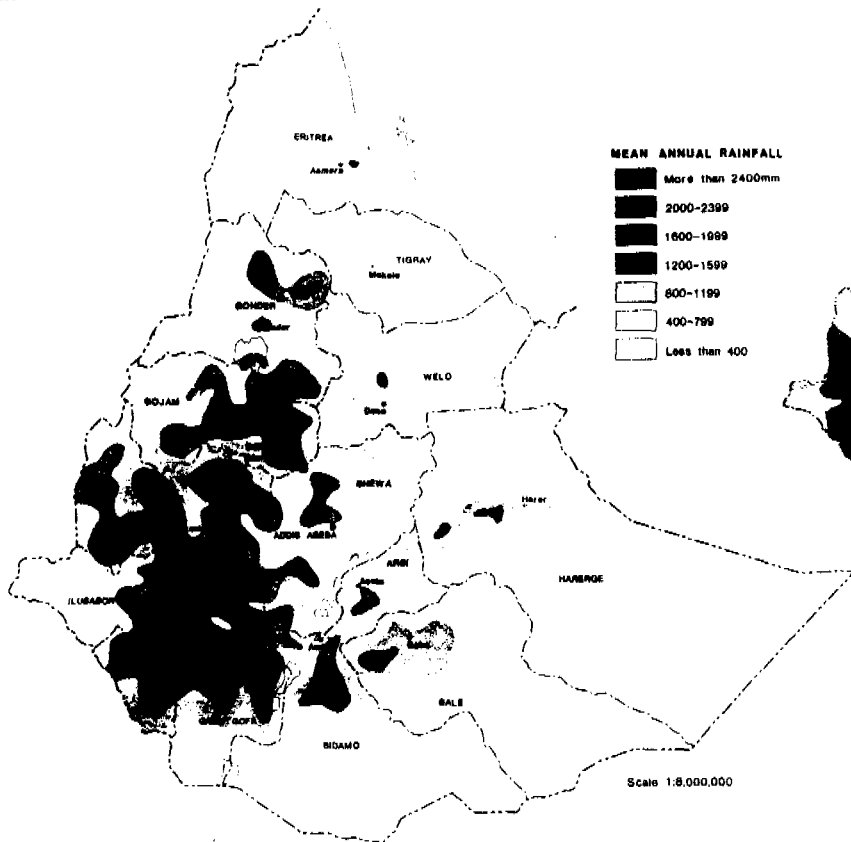
TOPOGRAPHY



Ethiopian Mapping Agency

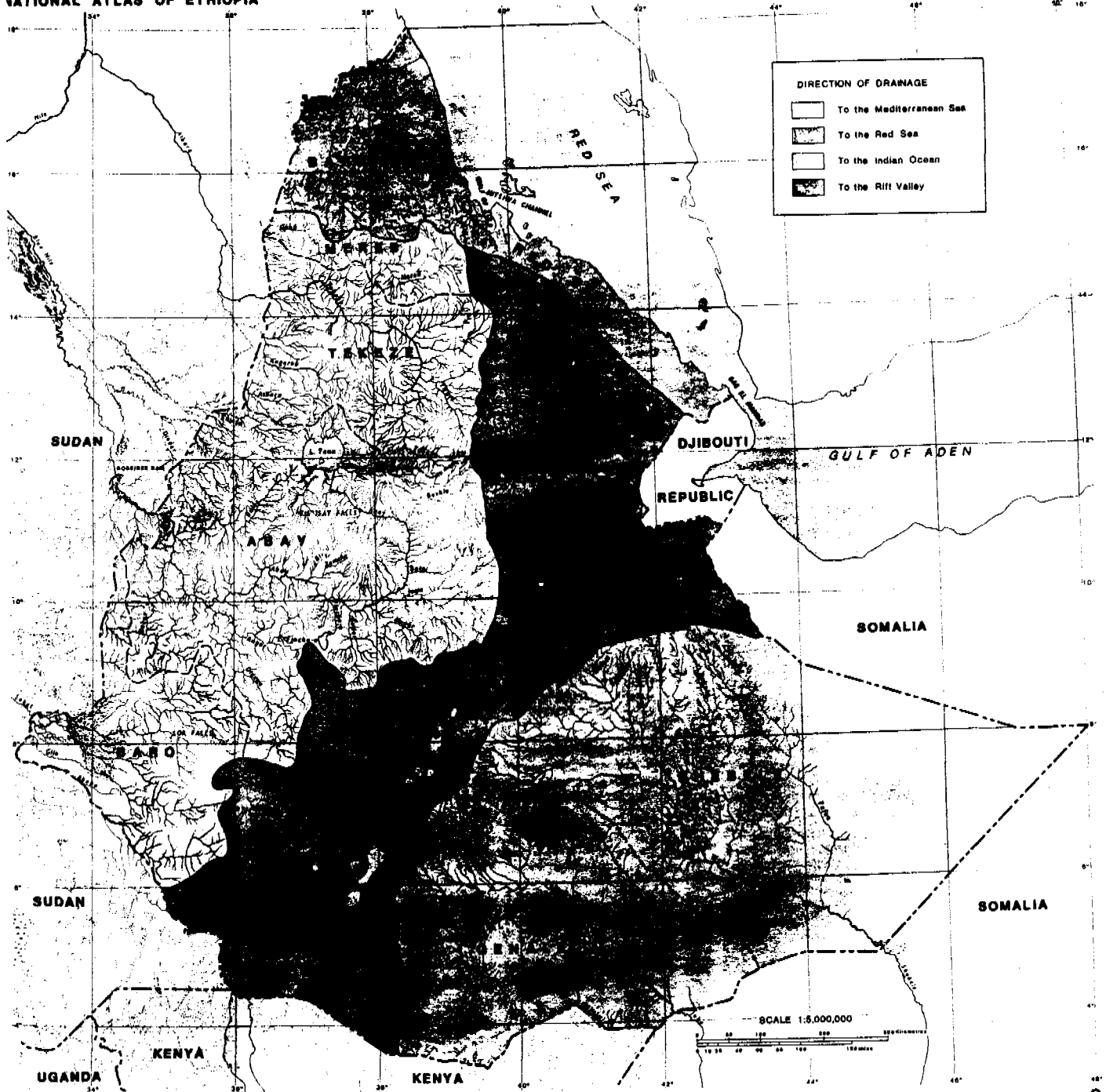
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RAINFALL



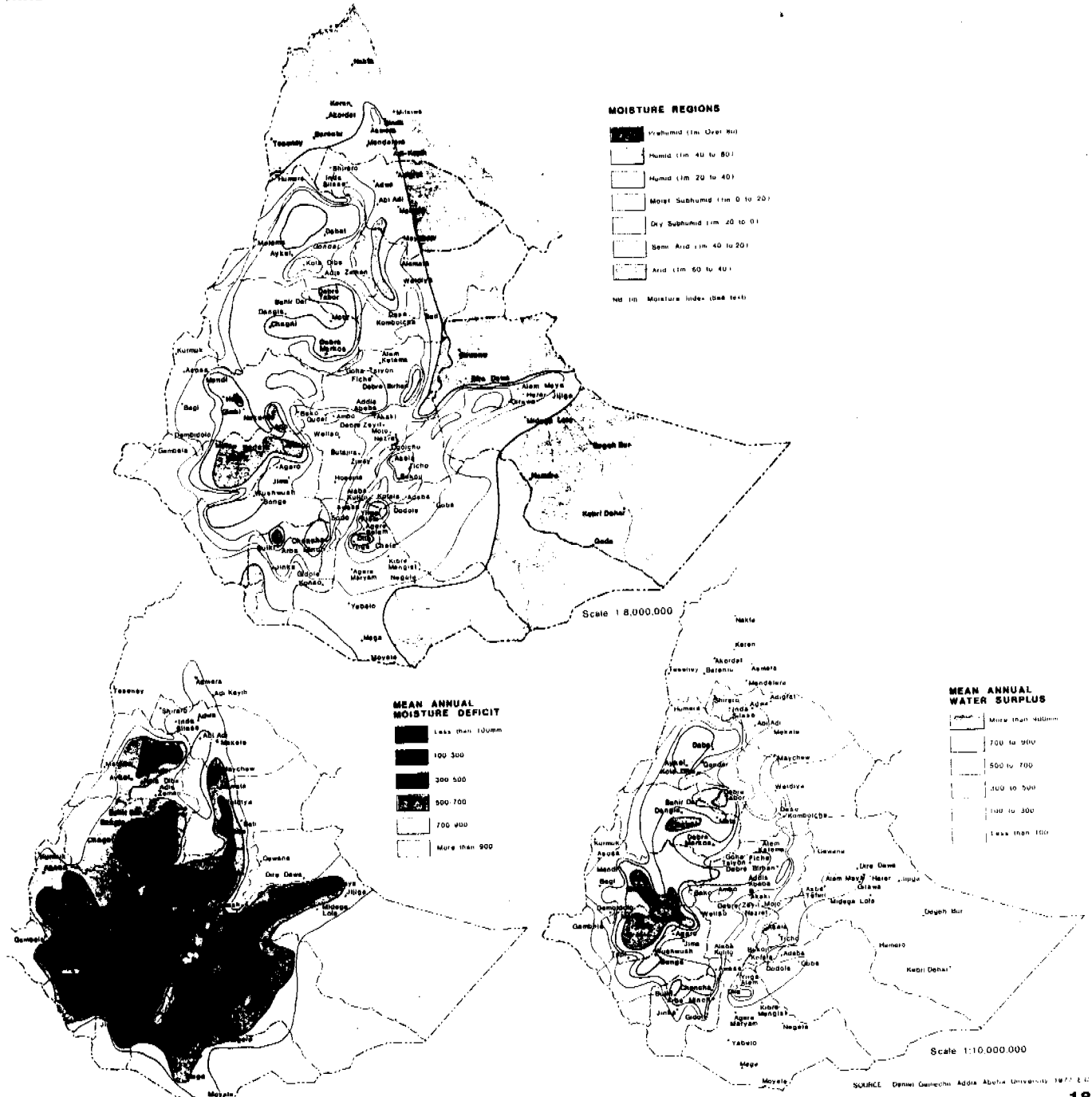
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DRAINAGE AND RIVER BASINS



WATER BUDGET

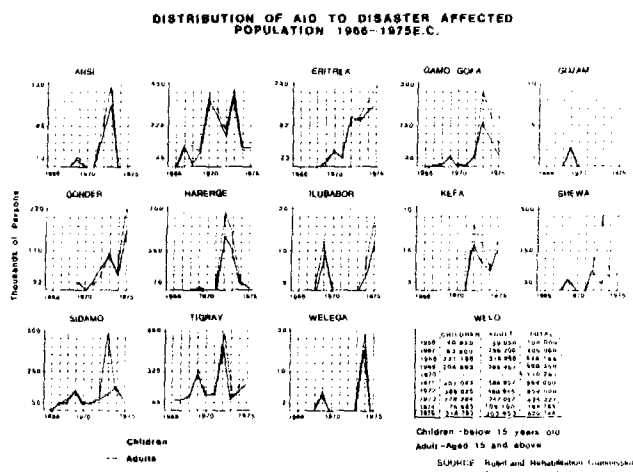
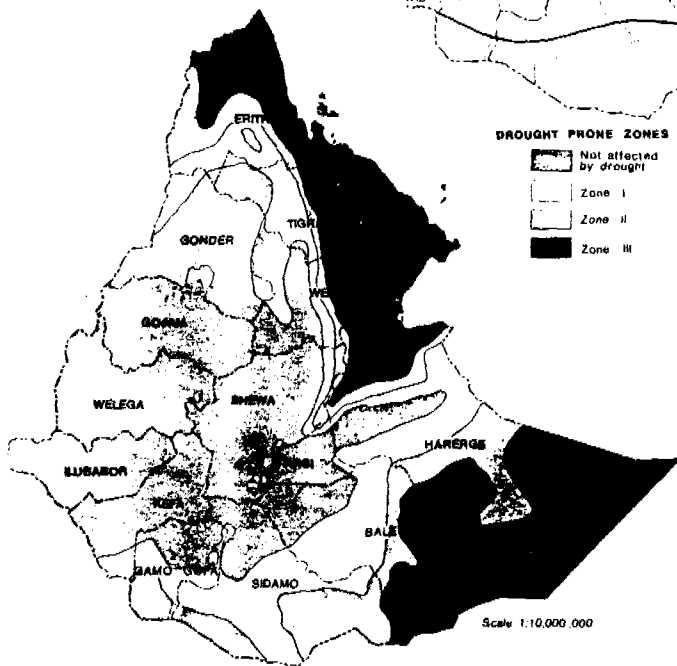
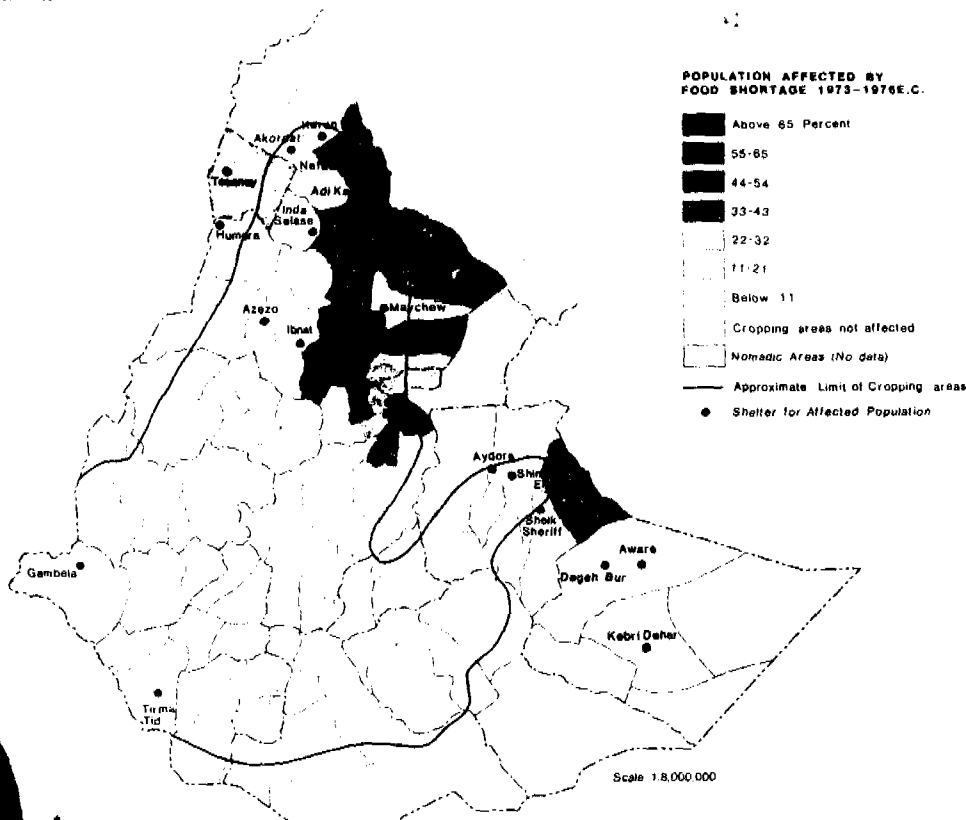
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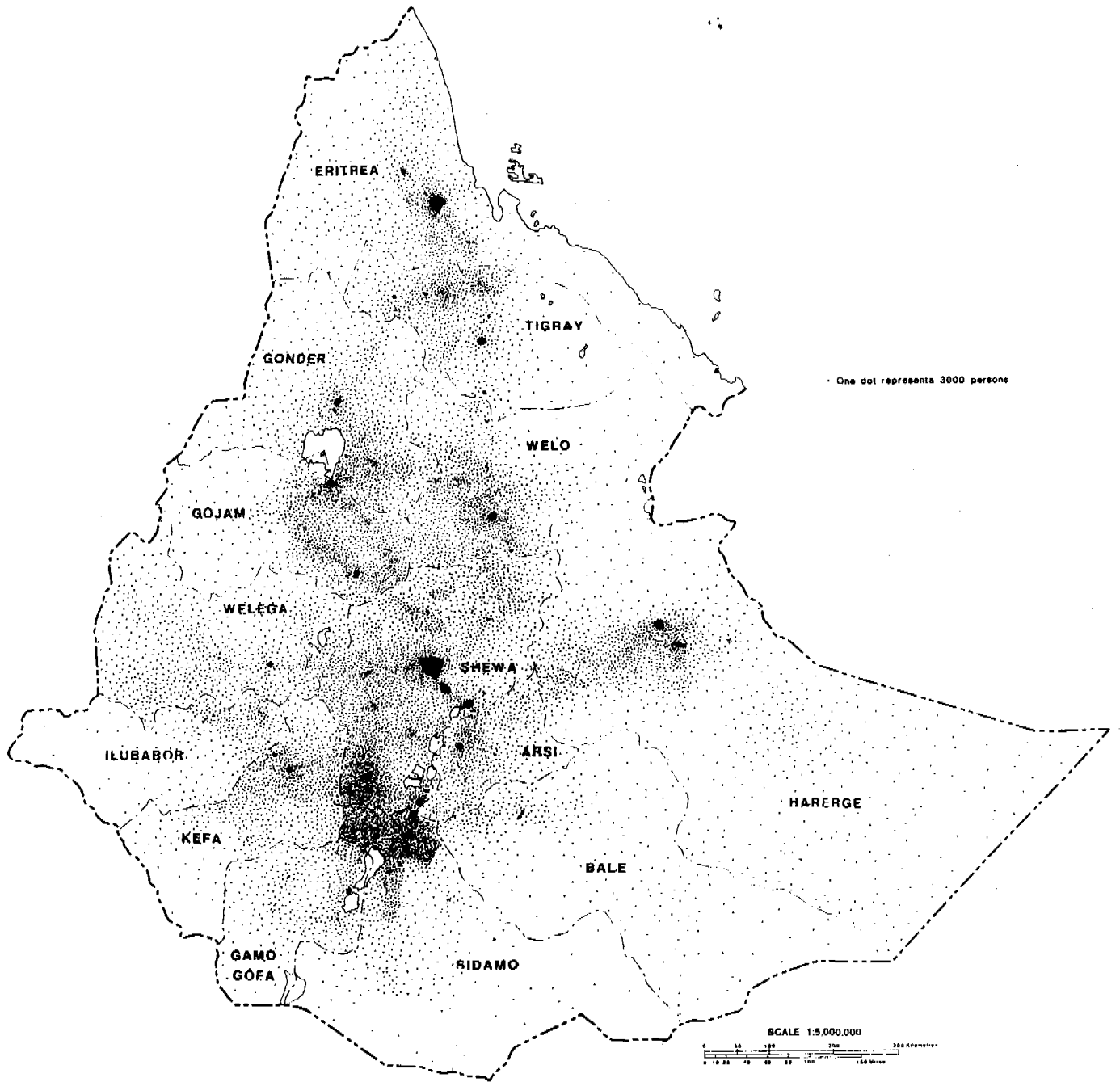
Ethiopian Mapping Agency

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DROUGHT AND FOOD SHORTAGE

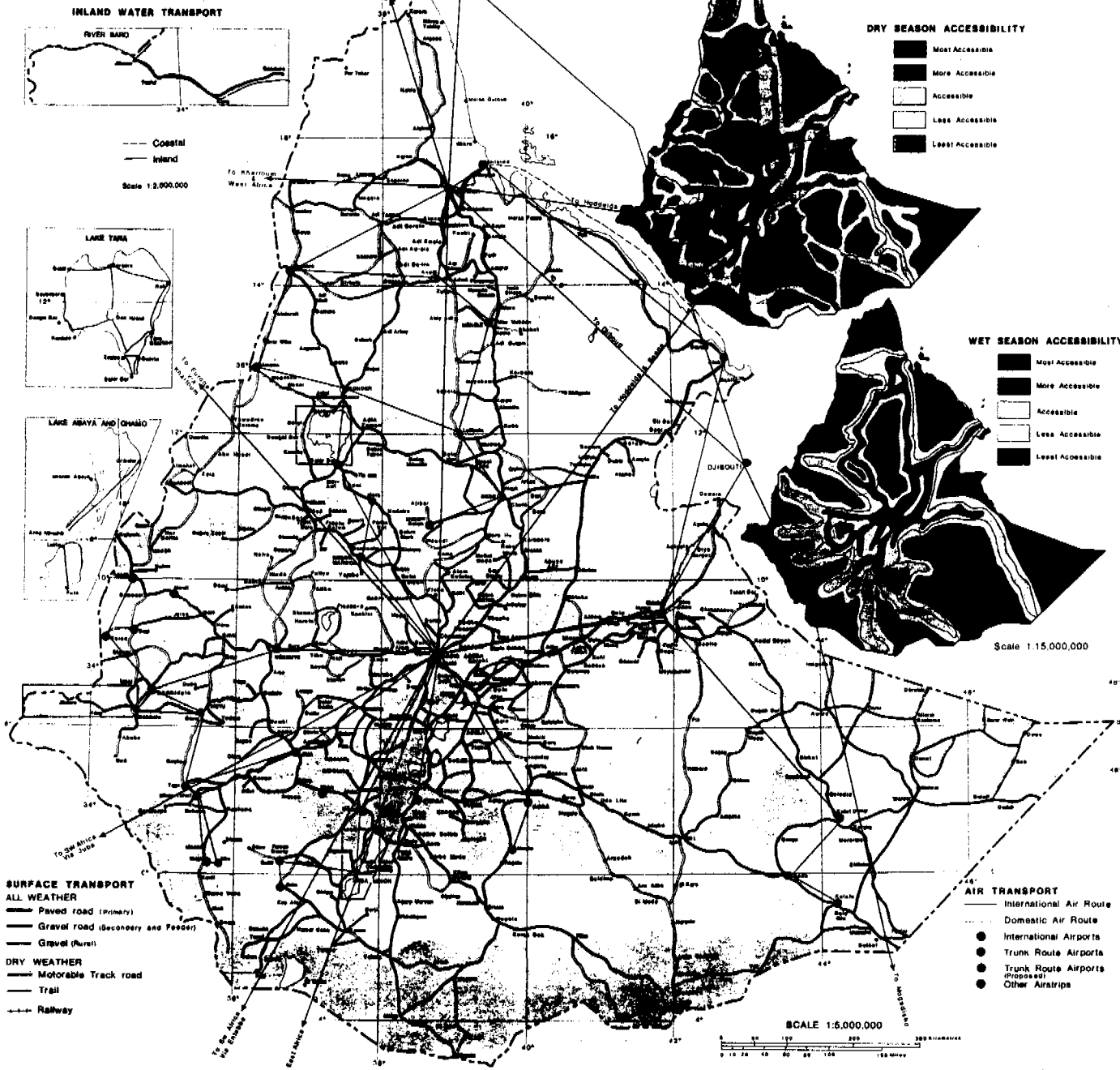


Ethiopian Mapping Agency



NATIONAL ATLAS OF ETHIOPIA

TRANSPORTATION NETWORK

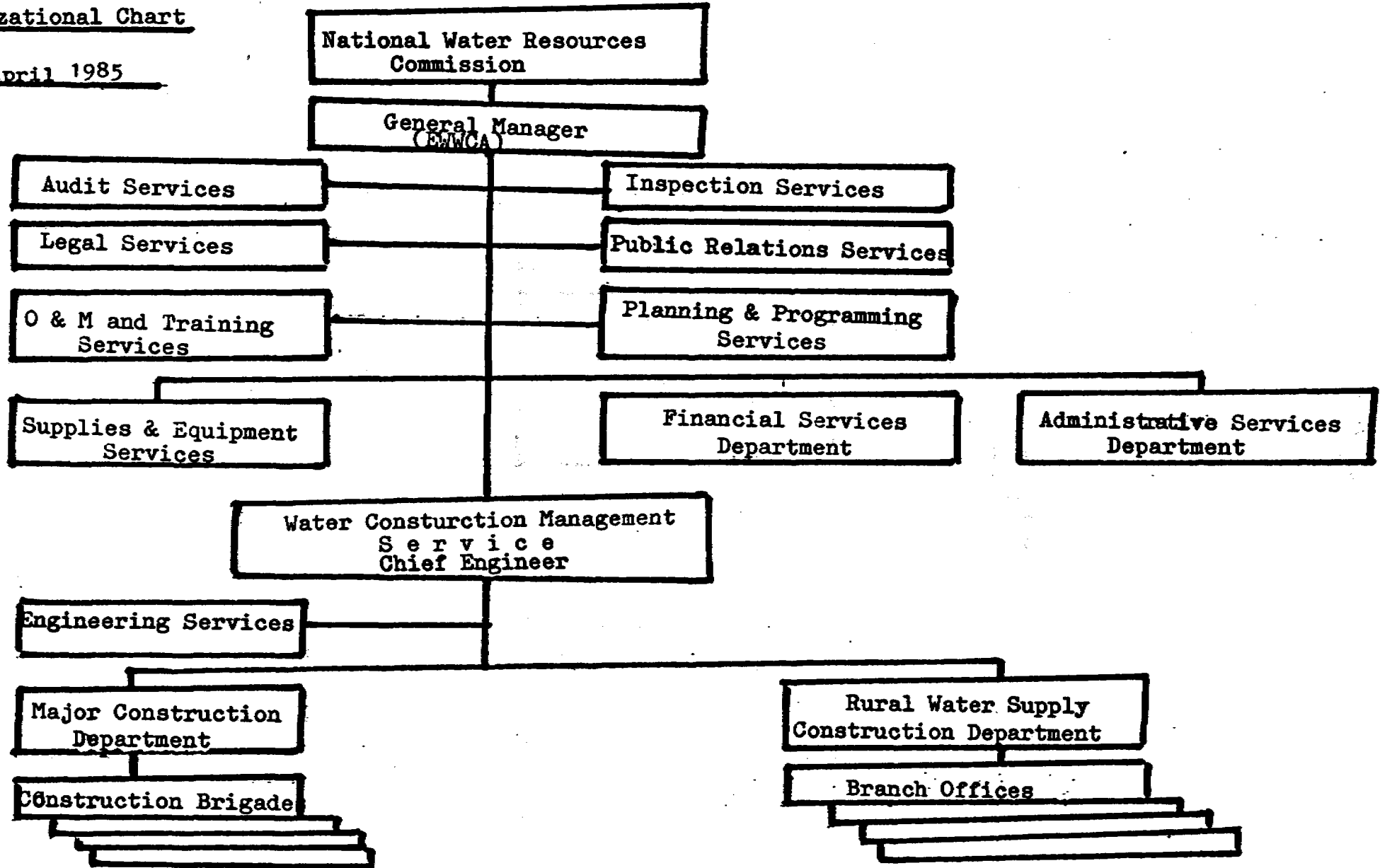


Ethiopian Mapping Agency

SOURCE - Ethiopian Transport Construction Authority
 - Ethiopian Airlines
 - Maritime Transport Authority 1976 E.C.

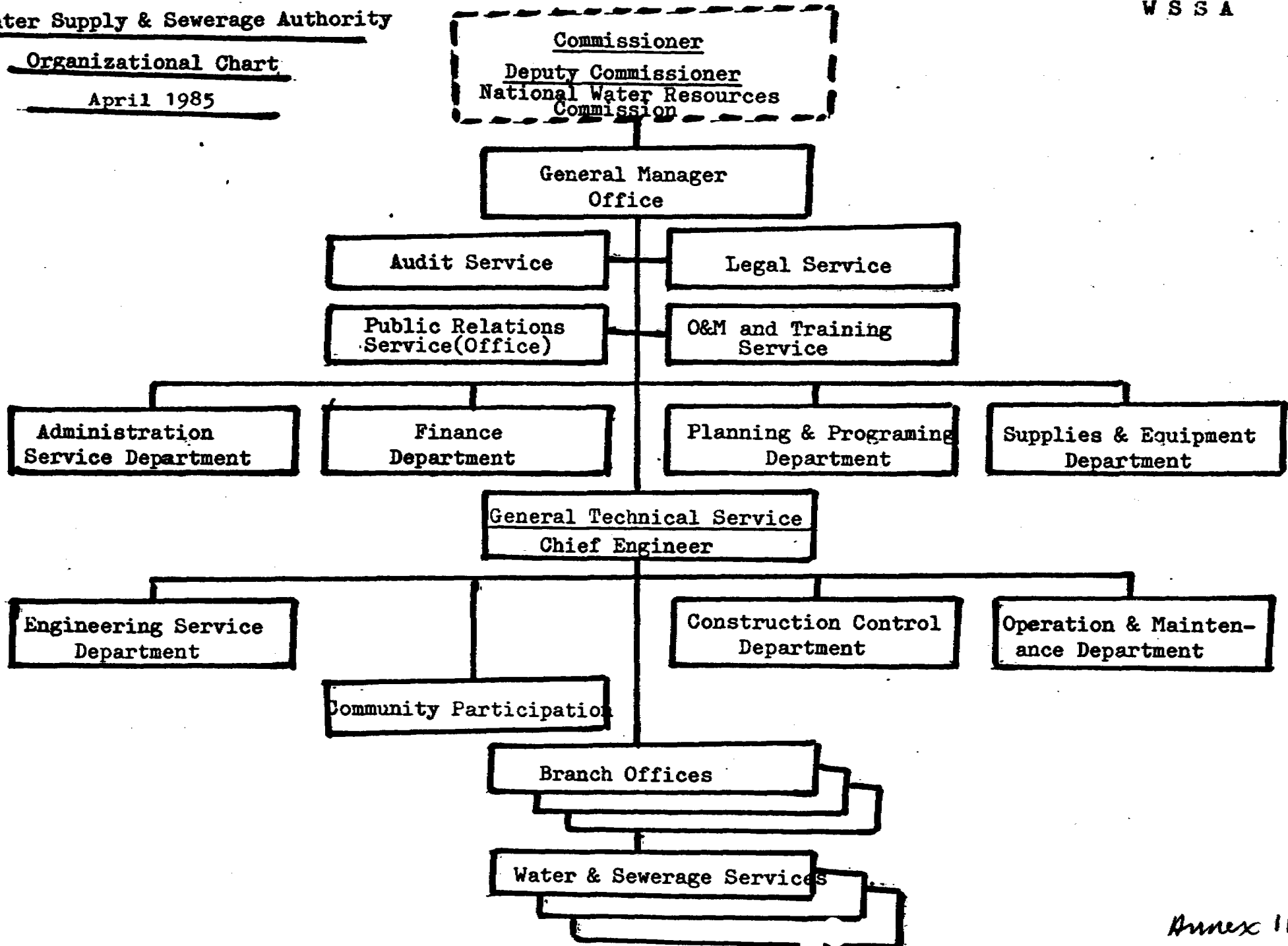
Organizational Chart

April 1985



Organizational Chart

April 1985



Arba Minch Water Technology
Institute Structure

(June 1985)

National Water Resources
Commission

A W T I

Arba Minch Water Technology Institute
Dean's
Office

Council

Academic
Commission

Audit &
Inspection
Services

Study,
Research & Plan
Co-ordination
Services

Registrar
Office

Student's
Services

Adminstrative
& Finance
Department

F a r m

Assistant Dean's
Offices

Library

Hydraulics
Engineering
Department

Sanitary
Engineering
Department

Irrigation &
Drainage
Engineering
Department

Meteorology
Department

Basic Courses
Co-ordinators
Office

Drilling and
Intermediate
Certificate
Programme
Co-ordinators
Office

BRIEF OVERVIEW OF WATSAN-RELATED TECHNOLOGY IN ETHIOPIA

A. ORIGIN OF TECHNOLOGY INPUTS

Australia	Hungary
Austria	India
Belgium	Ireland
China	Italy
Czechoslovakia	Japan
Denmark	Korea (North)
England	Korea (South)
Finland	The Netherlands
France	USA
Germany (East)	USSR
Germany (West)	Yugoslavia

B. TRUCK MAKES

Fiat	International Harvester
Magirus	Mack
Mercedes	Nissan
Unimog	Toyota
UD	Mazda
Ford	Isuzu
Leyland	Hino
Daf	Volvo
Renault	Scania
Dodge	Chinese - makes
Maz, Gaz	Hungarian - makes
USSR makes - Gaz, Waz, Maz..	

C. DRILL RIGS

ROSS	HYDREQ
SPEEDSTAR	SANKYO
WAKNEER	STONE
BUCYRUS ERIE	ROTAMEC
FAILING	AQUADRILL
INGERSOLLRAND	PORTADRILL
GARDNER DENVER	ATLAS COPCO
DAVY ROTARY	KNEBEL
HALCO	MASENZA
DANDO	Chinese - makes
HANDS-ENGLAND	Russian - makes
WELL MASTER	
ENFACE	

D. HANDPUMPS

IMPORTED

CONSALLEN
MONO
MONLIFT
MOYNO
GTS

Pb MK II
INDIA MARK II
NIRA
FLEXION
CAST

LOCALLY PRODUCED

BP - 50 (SHALLA)
IBEX
BOSWELL
2 PUMPS LOCALLY
DEVELOPED IN ERITREA

E. SUBMERSIBLE PUMPS

ATURIA
CAPRARI
GRUNDFOS
KSB

PLEUGER
GODWIN

F. DIESEL ENGINES

LISTER
PETER
DEUTZ
SLANZI

YANMAR
KIRLOSKAR
CATERPILLAR
INTERNATIONAL

- G. Pipes and fittings
Construction machineries
Chemicals
Casings & screens
Computers
Storage tanks
Investigation equipment
Test equipment
Construction materials

Originate from over 20 countries.

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