Development of the Awash Valley

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The Awash River is the only large river which starts and ends within the Empire. It starts from the Highlands of Ginchi, Shoa Governorate General and flows towards the east and north of the country for a total length of about 1,200 *kms. forming the Awash Valley. Since the valley has considerable potential in water resources, irrigable lands, livestock development and other resources as well and because of its favourable geographical location, its proximity to the market centers and to the sea ports and because of the net work of transportation facilities it enjoys the needs for its immediate development are quite obvious. It was with this in view that in* 1962 *the Ethiopian Government established the Awash Valley Authority (AVA) as an autonomous public authority to administer and develop the natural resources of the Valley.*

Introduction *

The mainstay of the Ethiopian economy is agriculture. Approximately 85% of the population of about 23 million is agricultural and about 60% of the Gross Domestic Product originates in agriculture. Nearly 75% of the G.D.P. originating from agriculture is non-monetary. Despite great efforts and considerable progress made in recent years, the rate of growth of the agricultural sector has been 2.3% per annum in contrast to an average growth rate of 9.4% for the non-agricultural sector.

Agriculture contributes about 85% of the total value of Ethiopian exports. Coffee, the major export crop accounts almost for about 55% and 70% of the total value of exports and agricultural exports respectively. Hides and skins, oilseeds, pulses fruits and vegetables in that order of importance account for the rest of agricultural exports. The annual growth rate of exports of goods and services has been of the order of 9.3% in recent years.

Imports of goods and services increased at a rate of about 11% per annum. Of the total value of exports over 30% are accounted for by consumer goods, while 27% each is accounted for by intermediate goods and raw materials. Capital goods and fuel each account for 28% and 7% respectively. Of consumer goods food imports have of recent been showing considerable increase. Of raw material imports raw cotton and artificial fibres have been significant.

Recent performance in foreign trade has thus resulted in a widening trade deficit. The problems of the Ethiopian economy can thus be summarized as being:

1. One dominated by agriculture most of which is still in the subsistence and low productivity sector whose growth rate of food production hardly keeps pace with population growth.

2. One in which exports are dominated by a single crop and is thus very dependent on its price fluctuations.

3. One in which imports of capital goods, raw materials, and consumer goods together with the lower growth of exports thus created trade deficits.

On the other hand, the country has good potential for increasing agricultural production. The challenge in the current programmes of agricultural development is:

1) to transform the traditional subsistence agriculture to bring it within the orbit of the market economy and

2) to increase overall agricultural production by exploiting the potentially productive but yet underutilized resources of the country both to contribute to the demand for increased local food consumption, increased and diversified exports and imports substitution. The transformation of peasant farming to commercial agriculture is a long process and, at that, a difficult one. This is to be looked within this framework. However, a major strategy, among others, of the Ethiopian Government in its current and future development programmes is the development of commercial agriculture considered to have considerable scope for a rapid production growth and thus immediate impact on the entire economy. In such a strategy the goal of regional development, where areas have been and can be identified for development yielding results in a relatively short period, have been given top priority. The Awash Valley programme, one of the earliest of similar regional projects, has been given special emphasis.

The Awash Valley

The Awash Basin covering an estimated area of about 70,000-100,000 sq. km. is found on the

* *This part is mostly drawn from the IEG Third Five Year Plan* (1961-1965 *E.C.*) (1969-1973 *G.C.*).

southern and eastern parts of the central Ethiopian Plateau. It is bounded by the Danakil Depression in the north, by the Blue Nile Basin in the west, by the Wabi Shebeli Basin in the east and by the Ethiopian Rift Valley in the south. The greater part of the basin lies within the Great Rift Valley. The river covers a distance of some 1,200 km. from its headwaters northwest of Addis Ababa to its final destination in Lake Abe in the Danakil depression

fall in the lower reaches of the basin is limited both in amount and duration.

The basin is centrally located, both in regard to the major sea ports of Assab and Djibouti and the major consumption centres of Addis Ababa and its surrounding towns. The railroad connecting the capital with the port of Djibouti passes through the upper, middle and eastern reaches of the basin.

Map 1 — Map of Ethiopia showing the Awash Basin.

(see maps 1 and 2). Altitude in the basin ranges from 3,000 to 250 m. above sea level.

In contrast to many other large rivers found in the country which flow in deep canyons and gorges and which are much less accessible, the Awash Basin is in many parts relatively open. The Basin contains considerable areas of land with fertile soils which have been used to a very limited extent. Rain-

Interest in the development of the basin has long preceded the establishment of the Awash Valley Authority (A.V.A.). Projects undertaken by private interests such as the Wonji Sugar Plantation and Awara Melka Farm have been started in the early 1950's. The commissioning of the Koka Dam in 1960 marked the beginning of power development in the basin. Studies that were made at the

time in connection with power development have indicated the potential of the basin for irrigated agriculture. The need to have a total survey made of the area and to determine the potential of the land and water resources of the basin became evident. At the same time it was realized that there is a need to coordinate all prospective development in the basin in order to avoid haphazard development and to determine the priorities that should be set in proper perspective for maximum benefit to the nation.

The UNSF - assisted survey of the basin started in 1961 with a nucleus organization that eventually became the Awash Valley Authority (AVA). The AVA was chartered in 1962 with powers and responsibilities to conduct and have conducted surveys of the Valley, to administer all water rights in the Valley, to control the flow of water in the Awash, to coordinate activities of all Government ministries and public authorities in respect of the use and development of the Valley's resources and to establish plans and programmes for their use.

In cooperation with the Ethiopian Government the United Nations Special Fund started a survey in 1961. The final five - volume report covering soils and agronomy, climatology and hydrology, water storage and power development and irrigation and water planning was submitted in 1965.

The conclusions and recommendations of the survey have been generally accepted by the Government and overall development planning for the Valley is based on the results of this survey. The survey had indicated the need to carry out more detailed technical and economic studies for specific schemes within the overall priority established. Before going into further studies, the Government and the Special Fund realized that there is need to strengthen the Awash Valley Authority. The Plan of operation for a two-year project of "Assistance in Strengthening the Awash Valley Authority" was signed on August 10, 1966. The purpose of the project was to:

a/ assist the Government in strengthening the AVA to enable it to discharge its responsibilities effectively to control the use of the natural resourses under its jurisdiction and to take various economic technical and social measures needed for the development of the Valley.

b/ assist the AVA to plan, organize, coordinate and, where necessary, supplement the activities of other governmental agencies and organizations concerned with or responsible for the several aspects of agricultural development.

c/ assist the Government in drafting the necessary legislation and in strengthening the organizational structure and staffing of the AVA to achieve the above aims.

The project has been the subject of two review meetings (Oct. 1967 & Oct. 1968) in the presence of representatives from UNDP, FAO, IBRD and the Ethiopian Government. The first meeting had indicated further requirements in adjustment to the Authority's organization and to that of the project. A number of recommendations mainly concerned with legislation were put forward.

The meeting had also recommended that, in line with the findings of the survey which had indicated the Middle Valley as a priority area of development, a feasibility study for a 20,000 ha, project in the Melka Sedi Amibara area be carried out. The complete feasibility study of this irrigation project was made available by July 1969.

The Second Review Meeting was held in October 1968. Against the background of what has been achieved so far and the long and medium term objectives, it looked closely into what future requirements of the Government for assistance to AVA would be. A summary recommendation by the meeting has been drawn up covering a) follow-up action on additional and / or more detailed resource surveys and studies and legislative and coordinating measures; and b) requirements of further assistance in strengthening the Awash Valley Authority.

It is expected that for the coming five years AVA may receive assistance from UNDP and a twinning set up of AVA with a UNDP financed Government institution with wide experience in river basin development will be arranged to provide the required expertise to the Authority.

Land Resources in the Valley

The UNSF assisted survey identified areas of prospective development in the Valley including those that were developed at the time.

On the basis of a reconnaissance soil survey covering some 2 million hectares and a semi-detailed soil survey on selected areas totalling 500,000 ha. the total area estimated to be available for irrigated agriculture in the whole Valley approximates 170,000ha.

Of these, about 24,000 ha. are located in the Upper Valley while about 78,000 ha. will be in the Middle Valley and 70,000 ha. in the Lower Plains. Irrigated land and land for potential development (in hectares) listed below:

Location	Presently irrigated area	Total potential irrigable area
1. **Upper Valley:**		
Wonji	7,000	7,000
Tibila	300	10,000
Nura Era	2,100	5,400
Others	800	1,600
Total Upper Valley	10,200	24,000
2. **Middle Valley:**		
Abadir	2,800	4,000
Metahara	3,000	8,000
Melka Sedi — Amibara	1,200	13,000
Awara Melka	560	17,500
Kessem — Kebena ...	300	
Angelele	—	5,000
Bolhamo	—	8,000
Marogala	—	22,000
Total Middle Valley	7,860	77,500

3. **Lower Plains:**

Logia	60	
Dubti	6,000	
Dit Bahri	2,150	70,000
Berga	800	
Aussa	11,000	
Others	2,000	
Total Lower Plains ...	22,010	70,000
Grand Total	40,070	171,500
Say	40,000	170,000

In addition there exists about 300,000ha. which could be utilized as grazing lands.

The location of development areas is shown in Map 2.

Water Resources in the Valley

Existing Structures:- The first dam constructed in the Valley is the Aba Samuel on the Akaki River about 12 km. south-east of Addis Ababa. The dam is of masonry structure of 25 m. high and a storage capacity of 40,000 m^3. The dam was built for the production of electric power; its average yearly production is 23 million kwh.

The first dam built on the Awash River is the 42 m. high Koka Dam (Awash I) with a storage capacity of 1,840 hm^3 and the power production capacity of 110 million kwh per year. Recently two wiers have been constructed down-stream of the Koka Dam. These two facilities (Awash II & III) draw their waters from Koka Reservoir and together command production capacity of 360 million kwh per year.

Water Supply & Possible Reservoir Sites:- The Awash River has several tributaries and some of these tributaries provide good sites for the construction of impounding dams. The Arba Dima river in the Middle Valley is very uneven with low water flows likely to fall to as low as 100 l/sec. Storage possibilities on this tributary are very limited. The Kessem River is the most prolific tributary of all. Its annual average yield is about 500 hm^3 but its seasonal flows are even more irregular than Arba Dima ranging from low flows of less than 500 l/ses. to flood flows exceeding 500 m^3/sec. It provides excellent site for erecting a big dam (Kessem Dam) giving a storage capacity of 350 hm^3 which is sufficient to irrigate about 20,000 ha. in the Kessem Kebena plains of the Middle Valley. Power production from this facility would reach 50 million kwh per year.

The Kebena River features a dam site likely to give a storage capacity of over 50 hm^3. This dam, if built, would be employed to reinforce the water supply from the Kessem Dam.

The first permanently flowing river farther down the Middle Awash Valley is the Awadi which springs from the Tarmaber Uplands. This river also provides a site for a small dam but the capacity of the reservoir would not exceed 5-10 hm^3.

Beyond Dessie towards Asmara the road runs across high valleys of Awash tributaries ultimately forming the Mille and Logiya rivers. The dam on the Mille is foreseen to be 30 m. high with a storage capacity of 100 - 200 hm^3.

Dam sites already identified on the Awash River include the Compensation Dam at Awash Station and the Tendaho Dam at the entrance of the Lower plains. The Compensation Dam would be required to regulate the variations of the flow from the Koka hydro plant. The dam would have an available storage volume of 50 - 100 hm^3 which would be sufficient to irrigate an additional area of 10 - 15,000 ha. in the Middle Valley.

The Tendaho Dam sited at the entrance of the Lower Plains of the Awash and downstream from all the most prolific tributaries has the possibility of creating by means of a 35m. high dam a reservoir of a capacity of 970 hm^3. The dam will have dual use, since it can help generate electrity of about 90 million kwh per year and at the same time controls the flood.

The Meki River which is outside the watershed of the Awash River drains into Lake Zuway in the Rift Valley. The Meki River carries annually about 336 hm^3 out of which about 200 hm^3 per year could be diverted to Koka Reservoir. If the diverted water could be employed fully for irrigation, it is possible to irrigate an additional area of about 40,000 ha., but on the other hand if used for combined purposes of irrigation and power production the total irrigable area would be reduced to about 10,000 ha.

Other water resource development possibilities exist on the tributaries of the Awash River, such as on the Robi, Jawaha, Ataye, Jara and Borkena in the Middle Awash. However, such rivers require further studies.

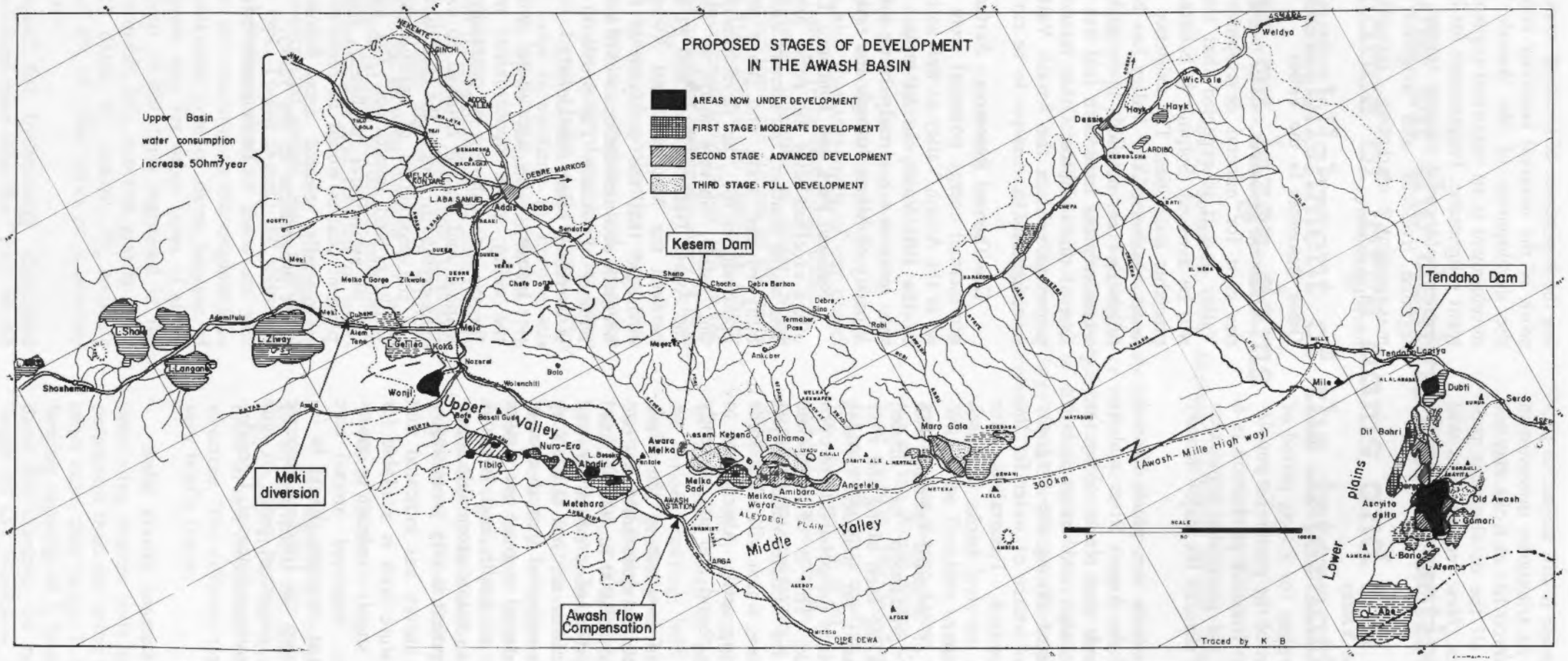
Prospecting for additional dam sites in the Awash Basin is primarily needed to meet irrigation requirements. It has also the secondary purpose of enabling a certain amount of electricity to be produced for newly developed regions.

The swamps of Gewane and Borkena in the Middle Valley could be considered as additional resources for water supply.

Ground water resources in the Valley are not yet explored, but it is suspected that such possibilities for development also exist.

Flooding problems and irregular water supply situation.

Before the Koka Dam came to existence the lowest water levels up stream of the Middle Valley occurred at flows of about 200 l/sec. and the river used to dry up completely downstream of the Middle Valley. Since the Koka Dam has been in regular service the lowest rates of flow recorded at Awash Station vary from 25 - 30 m^3/ sec. Flood peaks formerly of magnitude of 700 m^3/sec. at Awash Station are now reduced to some 300 m^3/sec. The upper and Middle Valleys which suffered from flooding before are now relieved from such dangers. But



Map 2 —Map showing proposed stages of development in the Awash Basin.

the lower course of the Awash is still subject to pronounced flooding due to its tributaries downstream from Gewani marsh. A reservoir like at Koka may not suffice by itself to solve all the development problems in the Awash Basin. New requirements will have to be met, and further means of regulation found.

Livestock Resources in the Valley

Most parts of the Awash Valley have been extensively used by pastoralists for a long period of time. Milk is the main diet of the pastoralist population inhabiting the Valley; livestock production is a traditional occupation of the pastoralist population and livestock grazing still remains the major activity of this same populace.

Livestock grazing has been very much affected by the seasonal flows of the Awash River and its tributaries. The river floods the plains along its banks during the rainy season and leaves a lush growth of grass to be grazed during the long dry season. It is also a major source of water for the pastoralists and their livestock. Pastoralists have thus moved to and from the river banks in search of sufficient grass and water.

Recent development of irrigated farming with its emphasis on crop production has limited pastoralists' access to grazing land along the river banks. Planned development for irrigated farming will, to a large extent, exclude the possibility of open grazing along these banks. This is of immediate relevance particularly to the Middle Valley project areas of irrigated agriculture, which will affect some 10 -12,000 head of existing cattle. Alternatives to this situation need to be found and are currently being investigated.

The exact number of livestock in the whole valley is yet to be surveyed and determined. Current estimates put the figure at 250,000 to 300,000 head of livestock. Present levels of productivity and utilization of grazing facilities are not satisfactory as a whole. Presently it is estimated that an area of approximately 10 ha. is required to graze one mature cow. Present conditions of health and livestock feeding practices are much below acceptable standards. Potential for development is very promising.

The UNSF assisted survey has indicated that about 300,000 ha. of pasture land is available for development if the water supply condition is improved. Better management, improved animal care and a host of other related measures should be instituted in order to develop the livestock resource to its full capacity. The important point to note here is that there is a promising potential. Considering the importance of livestock resource in the framework of the national economy and in particular in the development of the Awash Valley, livestock development is an important segment of the development programme. Programmes for livestock development would cover various forms: possibility of integrated livestock and irrigation farming, range management, marketing, processing and cattle health measures.

Other Resources in the Valley

Mineral Resources:- It is noted that opportunities exist for mineral development in the Awash Valley and it is expected that these opportunities will be assessed. Sulphur is believed to exist in appreciable quantities. The existence of potash in the lower reaches of the Valley has been detected and following the detailed investigations carried out recently, plans have been laid out for the exploitation of this resource. Other minerals are also suspected to exist in the Awash Valley but detailed investigations have as yet to be carried out.

Geo-Thermal Resources:- Surface indications of geo-thermal energy potential seem to be wide-spread in the Awash Valley as well as in the other parts of the Rift Valley in Ethiopia. Investigations of this resource are already being undertaken by the Ministry of Mines through the assistance of UNDP.

National Park and Tourism:- The Awash Valley offers excellent sites for parks and game reserves. The warm weather, the scenery and its easy accessibility by car, train and plane provides attractive opportunities for the development of tourism in the valley. Surveys made so far have identified the Awash National Park and game reserve located between the Metahara and Awash Station. It is envisaged that the provision of facilities such as adequate accommodations would attract an increasing number of visitors. The provision of such facilities is currently being considered.

Industry:- As agricultural activities develop in the valley, more opportunities would be opened for the establishment of processing industries. The sulphur and potash believed to exist in the valley may eventually lead to the establishment of industries for the production of agricultural inputs such as fertilizers and insecticides. The supply and servicing of agricultural machinery, equipment and implement centres would be required to be set up in strategically selected areas following the development programme in the valley.

(To be continued in the next issue)