

SOMALI DEMOCRATIC REPUBLIC

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MINISTRY OF FISHERIES & MARINE RESOURCES

FRESH WATER FISHERIES REPORT OF

SHABELLE RIVER

22 - 7 - 1987 Mog.

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FRESH WATER FISHERIES DEVELOPMENT PROJECT

INTRODUCTION

The fishery resources living in the Rivers form a valuable source of food, recreation and beauty in many parts of the world. However, the aquatic system which support such resources is under constant pressure from a number of other users to provide a range of benefits to the human community.

This pressure often confronts with the interests of fisheries by inducing changes in the quantity and quality. The development and management of fisheries under such conditions becomes not only a problem of direct manipulation of stocks and fisheries to ensure optimum yields, but also of minimising changes in the environment which are detrimental to the fisheries. All this requires a level of information which is sadly lacking through-out most of the World. To compensate for that there has to be a high level of exploration from systems whose ecology has been more thoroughly studied and understood.

THE IMPORTANCE OF INLAND FISHERIES

Inland fisheries provide a major source of food and employment for millions of individuals living in the developing areas of the World. In 1980 fish harvested from inland waters as opposed to Marine environment accounted for 10% of the total nominal World yield of 72,000,000 M/T of fish (FAO 1980).

For some of the land-locked Countries, 50% of the animal protein consumed comes from inland waters. Such high quality protein helps to prevent the malnutrition.

Since inland fisheries often supply only the domestic market and contribute little to export of the most developing World, and because the quantity of fish harvested is usually overshadowed by that of marine fisheries, fresh water fisheries are often given low priority by national governments.

Lack of research materials for inland fisheries is another

SOMALIA - INLAND FISHERIES

Almight ALLAH has bestowed on Somalia two rivers, artificial reservoirs, dams and many swamps which are rich in fish and has never been fully studied or exploited.

Both rivers originates from the highlands of Ethiopia and run through the Southern regions of the Country.

RIVER JUBBA:- is 800Km long and 122.5M width, enters Somalia at Dolow and runs to Indian Ocean at Gobwein about 10Km North of Kisnio.

RIVER SHABELLE:- 1100Km long and 80m wide, it enters Somalia at Defow and menders at Hawaii. In the recent years several artificial reservoirs and dams have been constructed, these rendered the fishing activity ever more prospective.

A part from the fish species, shrimps have been observed in the Jubba and in its associating waters. Further research with this respect must be undertaken in Shabelle river. Upto 13 different species of fish have been observed in both rivers.

PRELIMINARY ASSESSMENT

From September 1982 to July 1983, a feasibility study was undertaken by the Ministry of Fisheries together with a donor aid Agency (World Concern) in the vicinity of Lugh refugee camps of the Jubba river. The study succeeded in demonstrating that the fresh water fisheries in Somalia can be developed, within the technical financial capabilities of the farmers and other settlers along the rivers. During this study, the project succeeded to experiment and demonstrate a various types of fishing gear including, hooked set-lines (longline), cast nets, trammel nets, gill nets and hoop traps. Hoop traps were most favourite. This device is cheap, easy to make and operate. Eleven traps were set at a random sites and harvested in the mornings. The catch result of eleven fish trap/night gave average catch of 17.6Kg with a variability or ranging from 0-180Kg/trap. As the water level increased the catch increased and as water level decreased the salinity increased and catch decreased.

In addition to that baited traps often increased catch. After baiting the traps with animal wastes, the total catch from eleven traps ranged from 100-300Kg/day. 36 fishermen and women were initially, trained in the manufacturing and using of the traps in the Halba area and further 12 more traps were subsequently introduced giving a total of 23 traps. The traps were set in 10 Km. The average daily catch were about 400Kg/day. The catch estimate of Jubba river is about 2407M/T/Yr. While Shabelle yields 2238M/T/Yr. Annual estimated yield of the fresh waters are 8000 - 10,000M/T (including reservoir and the Deshegs).

In 1984 a Somali businessman (Arab Issa) began to invest in fresh water fisheries in middle Shabelle Region. To begin with the output was tremendous. Initially he intended to produce an animal food but when he realized the potential richness of the fresh water resources he changed his mind and started to produce commercial fish and he was the first person who introduced fresh water fish to the Mogadishu Market. This Ministry fully participated the successfulness of this private project. But after two years the project ceased operation for the following reasons:-

1. There was no sufficient fuel and transportation to operate.
2. The fishing was seasonal.
3. The Market was poor.
4. The Somali marine products who promised to take a large amount of fish failed to do so.

The data collected from this project can be seen in the attached data table 1.

After these two feasibility studies, the Ministry of Fisheries and Marine Resources of Somalia realized the importance of inland fisheries and took the responsibility of the research and training for its self.

In August 1986 an inland fisheries development and extension project (IFDE) was established with two Somali specialists. Its main objectives are:-

1. To ~~make~~ ^To make continuous research through the both rivers and associating waters.
2. To organize and give training the riverine community.
3. To identify the species available in the fresh water.
4. To test the most suitable fishing gear in the fresh water fisheries.
5. To initiate aqua-culture.
6. To create jobs for riverine community in-order to up grade their living standard.
7. To int^rroduce the fresh water fish to the bigger markets.
8. To increase the national production as a whole.

The research started at K/warey Dam the project started its work at K/warey Dam in August 1986 in the lower Shabelle Region. Dams, such as those already in place on most of Somali rivers adversely affect downstream fisheries primarily by (1) altering the seasonal flood to which many species of fish and many fishing flock have adapted and (2) blocking the migratory route of such commercial valuable species. The losse of flood plain area necessary for feeding and breeding of many riverine fish species can significantly reduce the productivity fisheries downstream ~~from~~ the Dan. The restriction of the migratory route of many fish species can also lead to a serious decline in the productivity of riverine fisheries though some dams have successfully employed " ladders " that allow fish to pass through the dam. ^future Dams should be constructed like that.

ARAB ISSA PROJECT

PRODUCTION TABLE 84/85

<u>DATE</u>	<u>PRODUCTION IN KG</u>
May 84	8,545.5
Jun	7,655
August	13,498
September	5,625
October	6,600
November	5,500
<u>Disember</u>	<u>8,800</u>
Total	62,791.5Kg.

<u>DATE</u>	<u>PRODUCTION IN KG</u>
Febaruary 85	2,200
March	2,900
April	3,600
May	1,800
June	800
July	600
August	2,900
September	--
<u>Oktober</u>	<u>900</u>
Total	13,700

List of Identified Species

- ✓ - Clarias
- ✗ - Labeo
- ✓ - Tilapia
- ✗ - Dagrus
- ✗ - Mornyrus
- ✗ - Eutrpius
- ✓ - Lung fish
- ✓ - Barbus
- ✗ - Eu. orientals
- ✗ - Clariotus
- ✗ - Laticipes
- Sinodontes
- Shrinps

In the high season (when the water level of the river is high) a large number of fisheries concentrate at K/Warey Dam for fishing. The main reason being that the water flow creates high oxygen and lot of food. The project started its task at the 10th August, 1986 with 4 conoes, 10 setlines (i:e 100 hooks on each line), 16 gill-nets (with variety of mesa sizes), 10 fish traps, two seinenets and 12 scoopnets. 20 fishermen were trained. We tested all the gear, and found out that the fish traps were the best for river fishing. The number of traps were increased by the fishermen themselves. When 20 - 30 traps were set, the average catch was 400Kg/day. September to November the catch was 24,000Kg. The catch were taken by business people or fishermen or their wives to the best markets in the region.

Similar training and trails were going on Arbow-Heerow which is located about 20Kn S. East of K/Warey. It is a large village and most of its inhabitants are engaged in cattle rearing as well as farmers. Some of this farmers are seasonal fisheries. 15 persons were trained, from October to November they caught 2000Kg of catfish (mainly ^{ly}clarias). They dried and sold in Janale ^{market} /which/ the best fresh water fish ^{market} in that area. The road is very rough and in the rainy season, it is total unexcessable. After introducing then, the modern fishing gear they improved their production.

LULO UKASH(NEAR SABLALÉ)

About 20Kn North of Sablale district there are 5 small villages whose dlwlers are farmers. These farmers are traditional fisheries but their capture methods were very poor. They have been organized and trained for all methods of fish capturing and processing. 60 fishermen and 15 women were took part for the training from 20th of November to the 3rd of February. ^Their production during the training period reached 45Tones of catfish which when dried became 15Tones.

The smaller species such as barbus, tilapia, sinodontes, heads and guts of catfish are either used for bait or thrown away, as they have no market in this villages and there is no transportation to take them to the distance markets.

THE RESERVIOR

The large multipurpose reservior in Somalia at the middle Shabelle region has become one of the most important freshwater fishery resources, providing food and new source of livelihood to the local population. Fish yields in this reservior is sometime extremely high, socio-economic impact comparing favourably with those derived from the streams. Jowhar reservior was constructed 1978, occupying 108Km². Most of its land is thick forest and was not suited for fishing.

In January 1986 a training center was established at reservior. 100 fishermen were involved the training. On this site the production is high despite the small fishing efforts.

Before this training center, there was small scale fishing activities, operated by indigenous persons, for human consumption or local exchange. The fish stocks are under utilized and most of the time women and children involved the fishing activities. Fishing material were local made such as spears and handline. Their production was not economically viable. As population density increased, in this area and other similar areas, the market demands increased, therefore this project started to increase the production and encourage fishermen to begin to exchange a portion of their product for cash. To satisfy the demands we introduced modern fishing gear, especially gillnets, scinenets because this will permit the fishermen to catch large quantity of fish. Having done that, the traditional fishing methods will remain in use for daily food. We Marketed the production and found out that the Mogadishu market can take upto 12 tones of fish/week in the Monsoon period

(when marine fish is not too much). The price of fresh water fish is 30 Shillings/kg in Mogadishu. But even with that high price, some time^s it is not profitable because the fishermen pays the cost of fuel, rent of the truck and ice and also they accomodate and feed the driver and his assistance during the days they are in the fishing sites.

From February to March 1986 we were training the fishermen and during this training 7 tones of fish were caught. Then we transferred the fishing equipments to the trainees, and their weekly catch was 2-4tones, most of their catch were dried and sold in high price. At the moment they are using 4 conoes and 6 meter boat powered with 8 Hp outboard engine. If/^{the}number of fishermen as well as boats and fishing gear are increased then the catch will be increased.

DATA COLLECTED FROM JOWHAR

RESERVIOR

1984	-	62791.7Kg
1985	-	13700Kg
Feb-May 87	-	20000Kg

OTHER AREAS

1985	-	14000Kg	K/Warey
1986	-	45000Kg	Bulo Ukash

CAPTURE METHODS

used in

A great number of fishing methods can be/ the rivers. This is response to the numerous species in riverine communities, the variability of conditions and many different types of fishing grounds.

There are various systems of fishing gears but usually they can be divided into active and passive fishing gears.

PASSIVE GEAR:- Passive gear fishing rely on the movement of the fish to effect their own capture. Passive fishing gear is thus particularly useful during times of year when fish are actively migrating.

The passive gear we tested in Fresh water of Sonalia includes baited hooklines (setlines), fish traps, fyknets, gillnets and seinenets.

In the reservoir, swamps and similar waters, gillnets and setlines are the most effective while in the rivers, channels, waterfalls and streams, the most effective gears are fishtraps and fyknets.

When the traps and fyknets were baited with animal wastege, the catch were increased.

FISHERMEN

RELATIONSHIPS:- Every fishing site has boss or leader that no-body can disputy with him. He can permit or prohibit fishing. Every body can not have this type of power but, he should be succcessfull socerier. He inherits from his past generation. The leader usually bans, the use of some fishing gear (gillnets, seinenets) in Sonali they are called " bahaaris " they have good reputition in their community and most of them are good managers. Their communities beleif that, these soceriers can give order to crocodils and can prevent the fish to get into the nets. They also beleif that socery can prevent some dangers to happen, such as crocodile and hip-patamuse attacts. However the fishermen whether marine or inland have long been associated with a lot of magics. The outsiders who come for fishing must share a protion of his catch as a form of tribut. Leader can prevent some fishermen from fishing ^{if} they disagree or do some thing bad in the community.

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JUBBA

Similar trials with more scientific research is going on Jubba river with the help of Ministry of Jubba valley and USAID.

The Jubba river environmental and socio economic study projects is a three year program of river basin investigation in Southern Somalia. The Project is part of a larger project called Jubba Development Analytical Studies, which is a co-operative effort between the U.S. AID and the Ministry of Jubba Valley (MJVD) Development. / The long range goals of this project are to provide the MJVD with necessary information on soils/land use, natural resource utilization, social and environmental issues, staff training and technicals support. The project was under taken by Earl Meredith, Mohamed Hassan Aden and Axned Abdulahi Yassin. The first field trip was from the mouth of the Jubba river to Fanole on October 6th 1986. The results will be seen in the final report.

The Overall Objectives of this work were as follows:-

1. Conduct a ~~fish~~ survey to determine the type of fish population monitoring, programme required to document changes in the resources due to proposed development activities in the Jubba Valley.
2. Identify fish landings, market places and fishing villages for sampling frame applicable to a catch assessment surveys.
3. Design fish population and environmental data sampling programme and integrated this sampling with existant environmental and socioeconomic surveys.
4. Identify co-operating agencies and personel requirements.
5. Train identified field personel in fish sampling techniques, identification and measurement of fish, equipment use and care and proper recording of data.
6. Begin fish sampling programme, list of potential species present in the river and assess possibility of fish tagging programme to detect fish migration.

PRELIMINARY RESULTS OF THE FRAME
SURVEY

Results of the fisheries frame survey on Jubba river showed very little exploitation in the river itself during this survey but higher levels of fishing activities in the adjacent deshegs (swamps) and indications that more fishing activity during the low water seasons. This is very typical in most African flood plain fisheries as the fish is very dispersed in high water and swift flow rates hinder fishing gears. Small amounts of fishing were observed in the lower Jubba Valley between the mouth of the river close to Gob-weyn and Fanole hydro-electric Dam.

Most people interviewed in this area indicated that fishing in the river during low water level season is much more common.

GENERAL FISHERY ESTIMATES FROM
PREDICTIVE MODELS

The necessity for comprehensive preimpoundment studies for African reservoirs has been clearly recognized and discussed by several authors. Thornton (1980) Adenifi et al (1981) and Marshall (1984) were among the first to discuss this matter and make attempts at predicting the ecology and fish yields in African reservoirs using available preimpoundment informations. Wellcome (1985) discussed the effect on fish population and ecology of river basins due to many diverse management practices and flood plain development. After testing 20 African rivers Wellcome (1985) presented these models of relationships:

$$C = 0.03A^{0.97} \quad (R = 0.91)$$

Where C and A are equal to annual catch (tonnes per year) and basin area (Km²) respectively wellcome stated that " because the basin area and the total length of the longest channel of the river are also simply related," the following relationship was established for African rivers:

$$\text{Main channel length} = A^{0.45}$$

This equation transformed into a relationship for yeild in tones per year as a function of main channel length (L in km) gives the following equation: $C = 0.0032L^{1.98}$ or more simply $\frac{L^2}{300}$.

Marshall (1984) discussed the prediction of ecological parameters and fish yeilds using physical, hydrological and chemical data in preirpoundment river basin studies.

Most wellknown of his predictive nodells is the porpho - edaphic index (MEI). Henderson and Wellcome (1974) first pioneered the relationship between MEI and fish yeild (Y) for African reserviors and presented the following relationship: $Y = 14.3136 \text{ MEI}^{0.4681}$ where MEI = total dissolved solids (TDS) or conductivity divided by mean depth (MD). This relationship was subsequently modified by Toedus and Griffith (1979) using Lake surface area (A°) in km to p produce the following equation: $\text{Log } Y = 1.4071 + 0.3697 \text{ Log MEI} = 0.00004565 A$.

To predict the fish yeild in reservior the following datas are necessary:-

1. Physical Data

- Reservior shoreline length (L') km
- Surface area (A°) Km²
- Mean depth (MD) M.
- Volume (U) M³ + 10⁶
- Catchment area (Ac) Km².

2. Chemical Data

- Conductivity (Scm⁻¹)
- Total dissolved solids (TDS) Mgl⁻¹.

Prediction made by the World concern project using Wellcomes basin area model estimated that the potential annual catch for Jubba river is 2407 Meteric Tonnes. This is using the value of 98.000 KM² ($\frac{800}{X} 122.5M$) for basin area (A). more up to date estimate of basin area for the entire Jubba valley for each of the three Countries sharing this drainage basin and total area, see table I.

