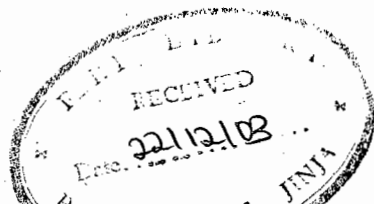


MARKET OPPORTUNITY IDENTIFICATION FOR FISHERY PRODUCTS OF SOUTHERN SUDAN

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Executive Summary

The USAID-supported "Southern Sudan Agricultural Revitalization Program - SSARP is seeking to establish agricultural training centres within southern Sudan, that will emphasise support for the development of agricultural business opportunities serving both the local, regional and international markets.

This Market Opportunities Identification study was undertaken to provide information to develop the training curricula for the centres, as well as to guide the subsequent technical support and training to communities and individuals for the development of their various agricultural businesses.

The objective of this first cut study was to establish and describe the major fishery products currently produced within Southern Sudan and marketed both internally and to external markets.

Data collection was carried out at Yei in Eastern Equatoria Province, Yambio in Western Equatoria Region and Yirol in Bahr El Ghazal Region. Secondary data on the fishery products were collected from statistics and expert interviews.

Eastern and Western Equatoria Regions are endowed with several rivers and ponds. There have also been many fish ponds, of which only a few have been rehabilitated for fish production. The main fishery products are *Clarias* Tilapia *Heterotis*, Nile perch *Mormyrus kannume* and *Citharinus citharus citharus*. However, production is less than demand, so fish is imported from Uganda or brought in from Bahr El Ghazal Region. The main products imported from Uganda are *Rastrineobola argentea*, *Alestes nurse* and *Bagrus bayad*.

Bahr El Ghazal is the main production Region, due to the rivers, lakes and sudds there. *Heterotis*, tilapia and Nile perch are the main products marketed. Rumbek used to be a major gathering point from where fish was sent north through Wau and south through Juba. However, only a little of this long-distance trade takes place at the moment.

Upper Nile and Blue Nile Regions are also producers of fish, mainly from the River Nile and the floods. *Heterotis*, tilapia and Nile perch are the main products. Historical trade to the North and to Juba have not resumed, due to insecurity.

Generally, fish production is constrained by seasonal floods, shortage and high cost of fishing gears, poor handling, processing and storage facilities. Marketing is hindered by price volatility, lack of infrastructure, poor business organization and lack of management skills.

It is anticipated that the market opportunities will increase as a result of increased population and paid jobs, improved earnings from trade, crops and livestock, improved infrastructure and utilities and services.

In order to realise the opportunities, it will be necessary to improve fisheries management to ensure resource sustainability, attract investment resources into the fisheries and improve business skills through training.

Acknowledgements

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Acronyms

IDP	Internally Displaced People
CRS	Catholic Relief Services
SSARP	Southern Sudan Agricultural Revitalization Programme
USAID	United States Agency for International Development
MOI	Market Opportunity Identification
FAO	Food and Agriculture Organization of the United Nations
CSTR	Council of Scientific and Technical Research
DRC	Democratic Republic of Congo
CAR	Central African Republic
FIRRI	Fisheries Resources Research Institute
IITA	International Institute for Tropical Agriculture

Vocabulary

Scientific Names	Common Names	Local Names in S. Sudan
<i>Alestes baremose</i>	Silverfish	Angara
<i>Alestes nurse</i>	Silverfish	RC
<i>Bagrus bayad</i>	Bayad	Mandefu
<i>Citharinus citharus citharus</i>	Moon fish	Betkoya
<i>Clarias,</i>	Catfish	Abu shanab
<i>Distichodus niloticus</i>	Perch	Khraish
<i>Gymnarus niloticus</i>	Aba	Weer
<i>Heterotis niloticus</i>	Heterotis	Nauk
<i>Mormyrus kannume</i>	Elephant snout	Khashm al banat
<i>Oreochromis niloticus</i>	Nile tilapia	Tilapia
<i>Polypterus bichir bichir</i>	Nile bichir	Abshire
<i>Rastrineobola argentea</i>		Ngeje

Currency Conversions

1 Dinar	=	10 Sudanese Pounds
500 Pounds	=	1,000 UShs (Yambio)
500 Pounds	=	1,500 UShs (Yei)
6,000 Pounds	=	1 KShs (Rumbek, Yirol)

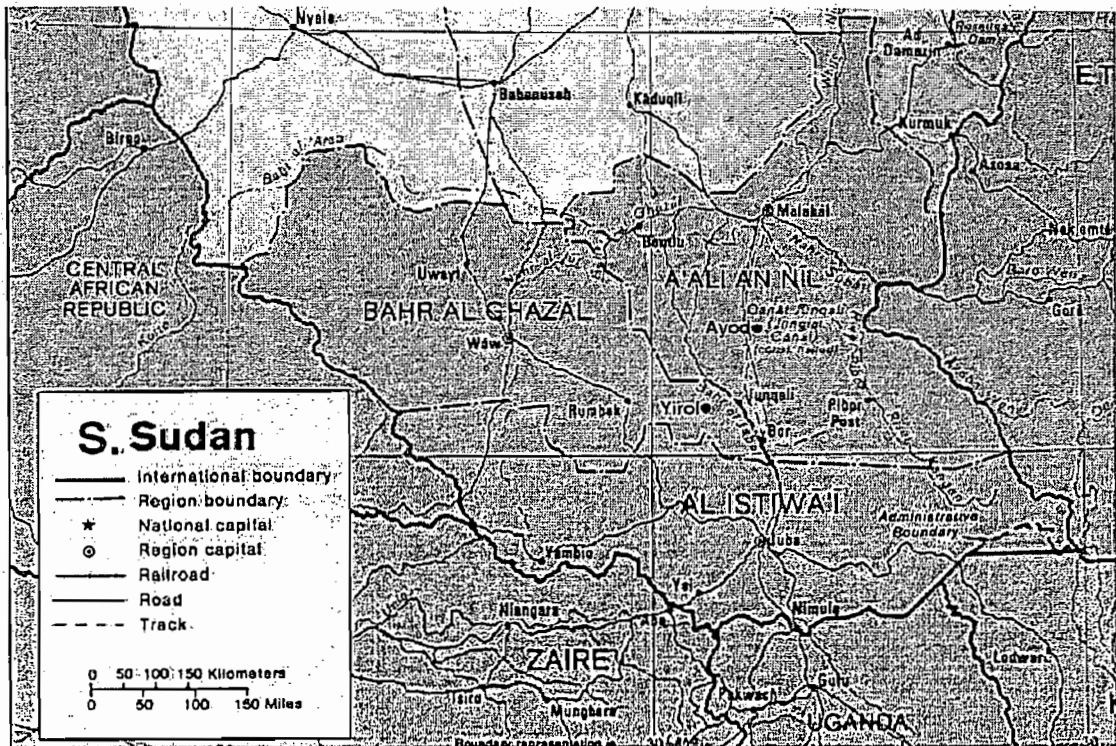
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Figure 1: Map of Southern Sudan



MARKET OPPORTUNITIES FOR FISHERY PRODUCTS OF SOUTHERN SUDAN

1. INTRODUCTION

Catholic Relief Services (CRS) Sudan leads a four member consortium implementing the USAID-supported "Southern Sudan Agricultural Revitalization Program - SSARP". In partnership with the authorities in Southern Sudan this five-year programme aims to establish agricultural training centres within southern Sudan covering six topic areas - livestock, crop production, agricultural technology, wildlife, forestry and fisheries. The training centres will emphasise support for the development of agricultural business opportunities serving both the local, regional and international markets.

As part of the start-up phase of the programme CRS commissioned a Market Opportunities Identification (MOI) study that would be used to develop the training curricula for the centres, as well as to guide the subsequent technical support and training that would be provided to communities and individuals for the development of their various agricultural businesses.

2. BACKGROUND

Southern Sudan is endowed with considerable inland fisheries resources, centred on the Blue Nile, the main River Nile, and their tributaries and several lakes. In addition, there is the Sudd area, estimated to cover an area of about 100,000 km². These inland waters are said to be practically free from pollution from domestic, industrial and agricultural wastes that might cause fish mortality (George, 1975).

A great variety of fish species are found here, with the Sudd area alone providing over 100, of which 60 are said to be of commercial importance (FAO, 1982). However, little is known about the fisheries because they have always been characterized by lack of data, due to the distances involved, and remoteness of a large sector of it. Whatever little statistics available do not, therefore, reflect the true situation and are at best professional guesses.

Various estimates of the potential production have been made but Vanden Bossche and Bernacsek (1991) adopted the moderate value of 75,000-100,000 tonnes per year. Catch estimates were between 20,000 to 30,000 tonnes per year between 1970 and 1987, which were considered far below the potential.

Right from the early days, development of the fisheries was hindered because of the distance between resource and market, lack of landing, transport and storage facilities and lack of quality control. The industry was basically centred on subsistence fishery, with rudimentary techniques. Not only was there shortage of trained personnel but there was unwillingness among a large portion of the Sudanese people to accept fishing as an occupation because it was regarded as an occupation of low status. Many of the fishers were also seasonal or part-time operators.

Much of the fish was consumed fresh, the rest being crudely smoked and sun-dried often without salt. There was no use of ice within the industry. This resulted in low quality and short shelf life for the products, unsuitable for large scale long distance trade.

Domestic fish marketing was mainly in the towns. Most of the towns had some form of fish marketing facilities incorporated in the general market places, consisting of stalls in a covered or even open area. The market authorities leased these facilities to traders, who bought their supplies from the fishermen at the landing sites. Retailers also often operated in the area outside the markets.

FAO (1983) estimated that about 20% of the catch was lost due to poor quality resulting from inadequate transport, distribution and marketing facilities, the lack of ice and poor handling.

Carleton and Para (1982) noted that trade specialization was limited, the same person would be fisherman and trader and there was a large cross section of retailers in the main markets, such as Juba and Malakal.

According to FAO (1983), originally exports of Sudanese dry/salted fish, valued at US\$ 1 million a year, went mainly to the Congo. This was later halted and only export of fish to Egypt remained. Estimates of quantities of fish exported during the various periods are conflicting and unreliable (CSTR, 1982, Carlton and Pina, 1982). However, there were major fish gathering points for trade, namely Wau for trade to the north and Juba for the southern area trade. Rumbek was a stop-over for fish going in either direction.

Prior to the war, the government's fishery development objectives within the six-year plan 1977-1983 stipulated for:

- a) Completing surveys of fish resources.
- b) Introducing fish culture on private farms especially in the south.
- c) Organizing fishers co-operatives to supply services and guidance to fishermen.
- d) Training of fishermen and supply of modern fishing gear.
- e) Development of fish markets and facilities for processing wastes and other related products.

For the implementation of the programme, the Regional Government in the south, with headquarters in Juba and stations in all provinces, had its own Fisheries Department, concerned with extension, training, licensing and statistics. The Department also operated seasonal fishing camps, where it was involved in commercial production and trade of sun-dried fish. However, the operation did not appear successful and was due to be phased out.

The policy on aquaculture development was initially driven by the need to address protein deficiency problem of the Sudan. In the south, there was chronic shortage of meat due to the prevalence of the tsetse fly. In the Sudd region, significant reduction in the fisheries was expected as a result of the Jonglei Canal scheme, thus the need for aquaculture to compensate for this.

3. OBJECTIVE

The objective of this first cut study was to establish and describe the major fishery products that are produced currently within Southern Sudan and marketed both internally and to external markets. This market identification process would be done for each of the pre-defined sub-regions for Southern Sudan.

4. METHODOLOGY

Primary production and market information was collected inside Southern Sudan, namely types of products, production and marketing constraints, exports and imports, including volumes and prices of the fishery products, using the specific questionnaire provided (Appendix 4). Interviews were conducted with experts, individuals or groups of fishery operators (Appendix 2).

Data collection was carried out at Yei in Eastern Equatoria Province, Yambio in Western Equatoria Region and Yirol in Bahr El Ghazal Region (Appendix 1). Information on Upper Nile and Blue Nile Regions was put together from expert interviews with the local team members and from literature.

Secondary data on the fishery products were collected from statistics and expert interviews.

5. EXPECTED OUTPUTS

The expected outputs of the study was a report containing:

- i) A list of the ten most important products produced and consumed/marketed for each of the regions for current marketing in local, regional and international markets.
- ii) A description of constraints to production, marketing etc. as indicated in the questionnaire provided.
- iii) An estimation of future development of markets and possible constraints for marketing and market growth for each of the products.
- iv) The report should also include value added products.

After the opening sections, the report presents details of the results of the survey for each of the regions. This is followed by the analysis section where a synthesis of the findings is done. The anticipated market development and the constraints that could hinder its exploitation are discussed. Recommended interventions are outlined, identifying the training needs for fisheries business.

6. RESULTS

The results of the survey are given for the five regions of Southern Sudan, namely Eastern Equatoria, Western Equatoria, Bahr El Ghazel, Upper Nile and Blue Nile.

6.1 EASTERN EQUATORIA REGION

Eastern Equatoria Region covers the southern portion of South Sudan, bordering the Republic of Uganda. It consists of 8 Counties, namely Budi, Kapoeta, Magwi, Torit, Kajokeji, Yei River, Juba and Terekeka.

Budi County is a rather arid region and has, therefore, no fisheries resources nor aquaculture activities. The economy of the County is based on cattle and gold mining, both of which bring in cash incomes to the population, which could make the County a potential for fish market. However, the potential is limited by the fact that of

the two main tribes in the area, the Topopsa are traditionally non-fish eating people and only the Didinga are fish eaters. However, Chukudum, the County headquarters, could become an important fish market centre.

Kapoeta, like Budi County, is situated in an arid area with no aquatic resources that could be exploited for fisheries production. Its main inhabitants are the Toposa, who are non-eaters of fish. Narus is the headquarters and could be a starting point for fish marketing as people's attitude to fish begins to change.

Magwi County is situated on River Nile, one of the major sources of fish production in Southern Sudan. However, there are no aquaculture activities here. The main sources of income are fish, crops and gold and the main tribes, the Madi and Acholi, are fish-eaters. Nimule, the County headquarters, provides some market for the fish but is limited by the low population and lack of jobs in the Town. Magwi, the second town is affected by insecurity. Much of the fish from Magwi County used to go to Juba. However, as Juba is still in the hands of Government forces, the fish goes out to Yei River and Torit Counties.

Torit County is an important source of fish production because of the Kohr English River. Aquaculture is not practiced here because it is a semi-arid region. Some aquaculture activities by the Norwegian Church Aid have been reported at Torit, but there is no documentation of their success. Gold, cattle and crops are the sources of cash in the County and the inhabitants, the Lotuko, Lango, Acholi and Lopit are all fish-eaters. Ikatos and Torit are potential centers for fish marketing.

Kajokeji County is endowed with the River Nile and Kaya River. It also has potential for aquaculture, which could be exploited. The Kuku, who are the main tribe, are fish-eaters but their cash income sources are limited to crops and milk, both of which have poor market due to infrastructure problems. Potential market centers in the County are Kajokeji, Bamure and Mangalatore Towns. However, much of the fish from here goes to Yei.

Yei River County is endowed with a number of rivers, namely Yei, Kaya, Kembe, Kobo, Yembe and Ras Ulo. It used to have about 13 fish ponds, of which 9 were owned by Mugo Development Forum, 1 at Kotogo, 2 at Yei and 1 at Mondu. but most have not been rehabilitated following the war.

The tribes here are the Kakwa, Pojulu, Keliko, Mundo, Baka and Avukaya, who are all fish-eaters and their cash incomes are from sale of crops and honey.

Yei is an important market because it is presently the "capital" of New Sudan, although this is likely to be moved to Rumbek. It is also an important commercial centre, providing trade links not only to smaller centres in the Eastern Equatoria Region but also with Uganda and the Democratic Republic of Congo (DRC). It has, therefore, the potential of becoming an important trade centre for fish in the region. Other smaller fish market centers in Yei River County are Bazi, Morobo, Tore, Ombasi, Lasu and Lanyu Trading Centres.

Juba County is situated on River Nile, a major source of fish supply. The people are of the Bari Tribe, who are fish-eaters and could realize cash incomes from their agricultural activities. However, fishery activities of the County are limited by the insecurity. Juba Town was once a major distribution point for fish from Southern Sudan, from where it was transported to Yei, to Western Equatoria and to Congo. However, trade at Juba has not resumed because the town is under the control of

the Government. Other trading centers that could become important in the marketing of fish within the county include Tali and Onduruba.

Terekeka County is also situated on River Nile. Despite the potential for fish production, fishery activities are not so important and there is no aquaculture here. The Mundari Tribe, who are the main inhabitants, are mainly pastoralists and farmers. They are, however, also moderate consumers of fish. Tali could develop into a fish market centre in the County.

General Information on Fishery Production

As indicated in the profiles of the counties above, the main water resources of the Eastern Equatoria Region consist of rivers and ponds. The main rivers and ponds are as given in Table 1, which gives information on their portions within Eastern Equatoria Region.

Table 1: The Main Rivers and Ponds in Eastern Equatoria Region:

	Length (miles)	Width (metres)	Surface Area (hectares)
Rivers			
The Nile	n.a.	n.a.	n.a.
Kohr English	65	50	520
Tore	n.a.	n.a.	n.a.
Bandame	n.a.	n.a.	n.a.
Kaya	70	20	224
Yei	300	20	960
Kembe	65	15	156
Kobo	40	10	64
Yembe	40	8	51
Ponds			
Modu			1.0
Balamuke			0.5

Source: MOI Survey

Although many of the rivers stretch for hundreds of miles and traverse regions, the absence of lakes means that the surface area covered by water is quite small, relative to total land surface area of the Region.

Eastern Equatoria was originally important for aquaculture production, with some 40 ponds reported in the Region, of average size 40m.x70m. However, as a result of the war, they have not been managed and there are only recent efforts to rehabilitate some of them.

The Institute for Promotion of Civil Society (IPCS), a local NGO based at Yei is engaged in providing support to fish farming through technical training, with funding from Action Africa Hilfe. Their activities cover Maridi, Mundri, Juba and Kajokeji. They have a training officer and one field trainer for each of the counties above. Recently, they delivered 400 tilapia fry from Abi Farm, Arua Uganda, which were distributed to four farms in Yei.

Gender issues

There is participation of women in the fishing, processing and trading of the main species produced in the Region, namely *Clarias*, tilapia, *Alestes baremose*, and *Mormyrus kannume*, locally known as khashm al banat. However, none of these species is fished, processed or traded mainly by women. Sun-dried Nile perch, supplied from Bahr El Ghazal Region, known locally as aburupta, is regarded culturally as a man's product and traded only by men. Products imported from Uganda, namely sun-dried *Rastrineobola argentea* (ngeje), salted and sun-dried *Bagrus bayad* (mandefu) and sun-dried *Alestes nurse* (RC) are also traded by women as well as men within the Region.

Product Information

Importance of products

Fishery products from the Eastern Equatoria are partly for subsistence and partly traded domestically, as given in Table 2.

Table 2: Subsistence and Domestically Traded Fishery Products from Eastern Equatoria

Subsistence/local market products	Production from Region (t)	Domestically traded products	Production from Region (t)
<i>Clarias</i> (fresh, smoked)	3	<i>Clarias</i> (smoked)	12
Tilapia (fresh, sun-dried, smoked)	3	Tilapia (sun-dried, smoked)	15
<i>Alestes baremose</i> (fresh, smoked)	1	<i>Alestes baremose</i> (smoked)	2
<i>Mormyrus kannume</i> (fresh, smoked, sun-dried)	1	<i>Mormyrus kannume</i> (smoked, sun-dried)	2
<i>Citharinus citharus</i> (fresh, sun-dried)	1	<i>Citharinus citharus</i> (sun-dried)	1

Source: MOI Survey

No products from the region are sent to other regions or exported to neighbouring countries, indicating the magnitude of demand, relative to supply.

Constraints to production

The main constraints to fish production are lack of availability of fishing gears and the high prices for them. Gillnets are hard to come by, so the main gears used are traps, hooks and baskets used particularly during floods. The few nets used are made from twines, imported from Uganda and are considered expensive. Facilities for handling, smoking and sun-drying fish are also lacking, including salt for more effective preservation of many of the fatty products.

Cost of labour is also considered a constraint, as labourers are paid a share of up to half of the product for helping with the catching and processing the products before selling.

For *Clarias*, the catch is poor during the floods, which take place between May and November each year. Other species are, however, reported to be less affected by seasonal changes in availability of water.

The main constraints within aquaculture production of tilapia and *Clarias* are lack of equipment for pond construction, lack of fry and feed supplies, lack of knowledge of pond management and lack of seine nets for harvesting.

Marketing Issues

Marketing patterns

All the marketed products are sold at two levels, namely at the landing sites, or pond side for aquaculture, and at the markets. No significant gathering points were identified, mainly because of the low scale of operations characterizing the current fish trade in the Region. All the products are also sold directly to consumers, to retailers and to a lesser extent to wholesalers.

Marketing constraints

Virtually all the products encounter a wide range of marketing problems as follows:

- i) Lack of storage facilities at the markets, free of moisture and pests, makes it difficult to keep the products long, especially since the processing methods used can only allow for short shelf life for the products.
- ii) Preservation of quality is another constraint, as there are limited handling facilities at the landing sites and markets. Furthermore, lack of ice and cold storage facilities means that the quality of the fish products cannot be maintained long.
- iii) There is lack of market information, as communication between the various places is poor.
- iv) Fishers are cheated by traders, as their bargaining power is weakened by their inability to hold on the fish too long due to its perishability.
- v) Poor infrastructure is also a major constraint, not only raising the cost of transportation but often hindering movement of the products to potential markets.

- vi) Insecurity, mainly from armed highway robbers, discourages the movement of fish to potential markets.

Other constraints reported included price volatility for *Clarias* and tilapia and low prices for *Clarias*.

Export of Products

No fish exports were reported from the Region. However, in the past, salted and sun-dried tilapia from the Nile used to be bulked at Juba from where it was exported to the then Zaire, now DRC.

Imported Products

Fish is imported from Uganda for the Eastern Equatoria market, through Kaya border post. The main products are sun-dried *Rastrineobola argentea* (ngeje), smoked *Alestes baremose* (angara), sun-dried *Alestes nurse* (RC) and salted and sun-dried *Bagrus bayad* (mandefu).

According to the Director of Customs, ngeje is imported in the largest quantity and the Customs Department at Yei is yet to avail some import figures to the Study, for the period dating back to 1997, when data recording was started. Prices at which imported products sell are given in Table 3 below:

Table 3: Prices of Imported Fishery Products at Yei (Ushs/kg)

Product	10 Year Average	10 Year high (Year)	10 Year Low (Year)
<i>Rastrineobola argentea</i> (sun-dried)	900	1,000 (2003)	700 (1998)
<i>Alestes baremose</i> (smoked)	1,600	1,900	1,500
<i>Alestes nurse</i> (sun-dried)	1,250	1,750 (2003)	750 (1998)
<i>Bagrus bayad</i> (salted and sun-dried)	1,800	2,000 (2003)	1,600 (1998)

Source: MOI Survey

Fish import is constrained by the poor infrastructure, which makes the cost of delivery high and the low purchasing power in the Region, due to lack of market for the crops produced by the population.

6.2 WESTERN EQUATORIA REGION

Western Equatoria Region is made up of 5 counties. The significance of these counties for fishery production and marketing is outlined as follows:

Mariti County is endowed with portions of River Iba and Ras Ulo, which support fishery activities. There is limited aquaculture here, mainly consisting of abandoned ponds but there is potential to revitalize it. A variety of fish-eating tribes live here,

namely the Baka, Zande, Mondu and Moru who could earn cash from their agricultural, wildlife, handicraft and bee-keeping activities as well as supply of grass and poles for house construction. Mariti and Ibba could grow into important fish markets in the County.

Mundri County depends on Yei River for its fisheries. Aquaculture has not been revived but there is potential for it. The County is inhabited mainly by the Moru Tribe, who are fish-eaters. Cash income sources include agriculture, wildlife and a variety of other activities. Mundri and Kotobi are potential markets for fish in the County.

Yambio County has the greatest fisheries potential in Western Equatoria, provided by the Sue, Ibba, Yuba and Ringasi Rivers. It was also an active aquaculture area but presently only a few of the ponds have been revived under FAO supported efforts. The population is estimated at 45,000, with the main tribes being the Zande and Balanda, who are fish-eating communities. However, their purchasing power is constrained by lack of market for the crops, particularly after the recent pull-out of World Vision from the County. Some 11,000 of the people are also returnees, without any established economic activities yet. Yambio is an important fish market in the Region as a whole but other potential fish markets would be Nzara and Nadiangere Trading Centres. The main species preferred are *Gymnarcus niloticus* and *Clarias*.

Ezo County borders the Central African Republic (CAR) as well as DRC. Its fisheries are based on Biki and Sue Rivers. Aquaculture had been active here but efforts to rehabilitate the ponds are still slow. The main tribes are also the Zande and Balanda, who are consumers of fish. Ezo is the potential fish market centre.

Tambura County is endowed with Rivers Sue and Mungu. It also has a history of aquaculture activities, although the ponds now need rehabilitation. The Zande and Balanda inhabit Tambura County as well. Potential marketing centers are Tambura and Mupoi.

General Information on Fishery Production

The main water bodies for fisheries production in Western Region are the Sue, Ibba, Yei, Tapari and Yubu Rivers, estimated at some 880 hectares. However, sustainability of the resources is threatened because they are not subjected to any fisheries management regime at all.

The magnitudes of these water bodies is indicated in Table 4 below:

Table 4: The Major Fishery Resources of Western Equatoria Region

Rivers	Length (miles)	Width (metres)	Surface Area (hectares)
Siwe	150	10	150
Ibba	200	10	200
Yei	200	10	200
Tapari	180	10	180

Yubu	150	10	150
Total			880

Source: MOI Survey

There are about 54 fish ponds of average size 20x40 metres, covering some 16 hectares. However, only 10 of them have been rehabilitated and are operational. FAO is the only organization supporting fisheries here. They are involved in providing tools such as hoes, circles wheel barrows, pangas and strings for fish pond construction and twines for making fishing nets. A Fisheries Field Assistant is stationed here by FAO for the purpose. Their target is to rehabilitate 10 ponds per year and increase pond production from the current level of 3 tonnes to 10 tonnes annually. The species reared are *Oreochromis niloticus* and *Clarias*, and the fry are obtained from other ponds.

In order to contribute towards addressing the problem of tools for aquaculture, the Agro-Industrial training Centre, situated at Nzara and headed by a Mr. Arthur Mohamed Said, is involved in fabricating slashers, hoes, axes, rakes and pangas used in fish farming. They have also designed a smoking oven that could be used for more effective processing of fish.

Formerly, feeding of the fish was on potato and papaw leaves, cassava and banana peels. However, due to shortage of these materials, the ponds rely on natural feeding, involving zoo and phytoplankton.

One of the constraints to aquaculture development has been the policy that ponds are Government owned. This is being changed and ownership of existing ponds is transferred to communities and new ones by private individuals.

Gender issues

The common fishery products of the Region are *Clarias*, tilapia, *Heterotis* and *Gymnarus niloticus*. Although they are not necessarily the main players, women are reported to participate in the production, processing and marketing of all these products.

Product Information

Importance of products

The fishery products from the Region are partly consumed by fishers at subsistence level but mainly sold on the domestic market. Information on the main products for subsistence and domestic market is given in Table 5 below:

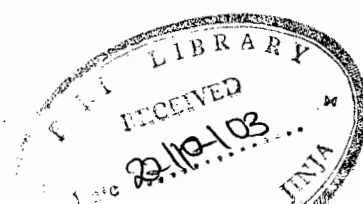


Table 5: Subsistence and Domestically Traded Fishery Products from Western Equatoria Region

Subsistence/local market products	Production from Region (t)	Domestically traded products	Production from Region (t)
<i>Clarias</i>	20	Nile perch	60
<i>Heterotis</i>	10	<i>Clarias</i>	30
<i>Citharinus</i>	10	<i>Heterotis</i>	30
Nile perch	10	<i>Citharinus</i>	30
<i>Mormyrus kannume</i>	10	<i>Mormyrus kannume</i>	10

Source: MOI Survey

Constraints to production

The main constraints with respect to all fishery products in the Region are lack of fishing inputs and the high prices for them.

The main fishing gears are gillnets and hooks. Catching of Nile perch and *Heterotis* require the use of large mesh nets of 6-7" from twine No. 36-72 and these are not only scarce but also expensive. *Mormyrus* and the other species require 2-3" mesh sized nets. The hooks used range from size 1-10 (here, unlike elsewhere, the higher the number, the larger the hook). Sizes 7-8" are the most commonly used.

Other destructive methods of fishing used include cast nets, seines, use of poisonous plants, bullets fired from the gun as well as grenades exploded in the water systems. There is no enforcement of any fisheries regulations presently.

Marketing Issues

Marketing patterns

The main marketing points for all the species domestically marketed are the landing sites, or pond side for aquaculture, and the markets. Landing site marketing reflects the level of local consumption of the products while selling at the markets shows the level of trade in the products. However, no significant gathering points exist along the distribution chain, reflecting the low volumes of the trade.

The marketing partners identified are wholesalers, retailers and consumers. However, the wholesalers are few and much of the fish is caught, processed and taken to the market by the fishers themselves. No co-operative organizations or agents of companies exist for the marketing of fish.

Marketing constraints

A wide range of constraints affect the marketing of all the products in the Region as outlined below:

- i) Price volatility resulting from unstable fish supplies on the market. The demand is also unreliable, depending on unstable population and insecure income sources from sale of crops.
- ii) Taxes, particularly the fishing permit of UShs 7,000 per year is considered a constraint.
- iii) Cheating by traders is also said to be common and is a constraint to fish marketing.
- iv) Poor infrastructure and inadequate carriers make it difficult to transport fish from production to marketing points.
- v) Insecurity, caused by armed robbers along the remote routes used by fish traders, is another constraint.

Export of Products

No fishery products from Western Equatoria Region are sold in other regions of Southern Sudan or exported to neighbouring countries.

Imported Products

Two products are reported to be imported from Uganda, namely *Rastrineobola argentea* and *Alestes nurse*, both of which are sun-dried. They enter into Eastern Equatoria Region at Maridi.

Imports resumed in 1998 and since then, their prices have been steadily rising, as a result of increasing demand and poor roads and vehicles for transportation. Table 6 gives an indication of the prices for the main imported products at Yambio.

Table 6: Prices of Imported Fishery Products at Yambio (UShs/kg)

Product	10 Year Average	10 Year high (Year)	10 Year Low (Year)
<i>Rastrineobola argentea</i> (sun-dried)	1,500	2,000 (2003)	1,000 (1998)
<i>Alestes nurse</i> (sun-dried)	2,000	2,500 (2003)	1,500 (1998)

Source: MOI Survey

Other products come into Western Equatoria Region from Bahr El Ghazal Region through Kotobi. They include *Heterotis*, *Clarias* and *Distichodus*, all of which come in the sun-dried form.

6.3 BAHR EL GHAZAL REGION

Bahr El Ghazal has historically been the main fish production Region for Southern Sudan, because of the lakes, the Nile and the sudds in the Region. Fish from here used to be sent to the North as well as to the South, some of it finding its way to the

neighbouring countries of Central African Republic, Congo and Uganda. To-day, the Region sends some quantities south to Eastern and Western Equatoria Regions.

The Region consists of 6 Counties and their fishery resource profiles are summarized as follows:

Rumbek County has no major water bodies, nor aquaculture activities due to scarcity of water, and receives its supplies of fish from Tonj and other neighbouring counties within the Region. However, Rumbek Town has historically been an important fish trade junction, used as a gathering point from where fish was sent north to Wau and south to Juba. Presently, because of the low volume of trade, Rumbek is not performing this function but fish to the south still flows through here. Rumbek is a vibrant commercial centre and is also earmarked to become the capital of New Sudan. The increase in jobs, population and commercial activities resulting from this development would increase the potential of Rumbek as an important market for fish.

Aweil County fisheries resources are based on River Lol and The Nile, together with associated sudds. No aquaculture activities are reported here. It is a rice growing area, originally the base for national supply of the commodity, thus generating cash incomes to the region. The Dinka are the main tribe and they are traditionally fish consumers. In the past, fish from Aweil County used to go to North Sudan and to Wau. Presently, it is mainly consumed within the Region. Aweil Town has the potential of growing into a market and gathering point for fish trade with Northern Sudan.

Tonj County is one of the major fisheries areas of Bahr El Ghazal Region. Production comes from River Tonj and Kubi William. There are, however, no aquaculture activities here. The County is the main source of fish supply to Rumbek Town. The Dinka Tribe are the local consumers and the main market in the County is Tonj Trading Centre.

Yirol County fisheries are based on River Payei, and Lakes Yirol, Makwach and Shambe. There are no aquaculture activities in the County. The main species are *Clarias*, *Heterotis*, tilapia, Nile perch and *Polypterus*. Marketing of heavy production of fish from the County is constrained by poor roads. At the time of the visit, the bridge on River Payei connecting to Yirol had been damaged and Shambe could not be accessed by vehicle. Yirol is a market centre and gathering point for fish from here.

Cubeit County derives its fisheries from River Payei and it has no aquaculture activities. Although the local Dinka people are fish consumers, much of their fish is marketed in Rumbek.

Mvolo County is considered to have major fisheries based on River Yei and the flood region. However, aquaculture is not possible because of the floods. The County sends fish to Mundri, Rumbek and Meridi and onward to Yambio. The people here belong to the Jurberi, Mongo and Murokodo Tribes, all of whom are fish consumers. Wau Town was originally the commercial centre with access to the North, provided by the train terminal there. It used to be a major gathering point for fish trade not only to the north but also to the south and to the Central African Republic. However, these activities have not resumed as the town is still under Government control. However, Wau has the potential of resuming its role as a major distribution centre in the fish trade of Southern Sudan.

General Information on Fishery Production

Production in Bahr El Ghazal Region is based on a wide range of fisheries resources, including rivers, flood plains and lakes. The water bodies within the different counties have been mentioned above but the major contributors of fish production are Tonj River, Payei River, Panhom, Yirrol, Shambe and Makwach. Sources on this study could not provide reliable estimates of the surface areas of these water bodies.

There are no significant aquaculture in the region due to the presence of floods in some areas and scarcity of water in the semi-arid areas.

Gender issues

Women are reported to participate in the production, processing and marketing of some of the main species, namely *Clarias*, *Heterotis*, tilapia, *Mormyrus*, and *Polypterus* and for the Nile perch, which they usually only trade. Their involvement with the *Hydrocynus* is forbidden.

Product Information

Importance of products

A wide range of fishery products are produced and marketed in the Bahr El Ghazal Region but the main species are important for both subsistence and domestic trading as given in Table 7 below:

Table 7: Subsistence and Domestically Traded Fishery Products from Bahr El Ghazal Region

Subsistence/local market products	Production from Region (t)	Domestically traded products	Production from Region (t)
<i>Heterotis</i>	n.a.	<i>Heterotis</i>	n.a.
Tilapia	n.a.	Nile perch	n.a.
Nile perch	n.a.	Tilapia	n.a.
<i>Mormyrus</i>	n.a.	<i>Mormyrus</i>	n.a.
<i>Polypterus</i>	n.a.	<i>Polypterus</i>	n.a.

Source: MOI Survey

Constraints to production

The identified constraints to fish production in the Region are water availability, availability of fishing gears and their high prices. Water availability affects production of *Heterotis* and *Mormyrus* in that the catches are poor during the dry season, namely between January to April. Tilapia and Nile perch, on the other hand are less

available during the floods, from July to November and the catches are said to be better during the dry season. No seasonal impacts were reported for *Polypterus*.

Gillnets are the main type of gear used for fishing these species, supplemented by hooks. However, there are no shops stocking them, so their supply is a constraint. As a result, they have to be hand-made from twines, which are also hard to find and their costs are said to be high. Fishers also expressed the need for wider and safer canoes than they presently operate with.

In an attempt to alleviate the problem of fishing gears, FAO has established a compound at Madior, Yirol County since 2002, from where they supply nets, ropes and hooks to producers at Shambe and the near-by landing sites, on a cost recovery basis. This is intended to improve the food situation, contribute to reducing malnutrition and make the communities less depended on food aid.

An underlying problem with the fishery production here also is the lack of sustainability concerns, as there is no fisheries management regime in operation on these water bodies. The rampant use of destructive fishing gears and methods threatens the sustainability of future fish supply from the Region and, therefore, needs to be addressed through appropriate regulations and management institutions. In the short-run, communities could be sensitized, mobilized and trained to look after their resources through participatory resource management.

Fishers also expressed concern over lack of suitable equipment to process their products. Both the smoked and sun-dried products were of low quality and of short shelf-life, thus limiting their ability to market over long distances. The need for improved smoking technology, use of salt in processing and training in fish processing was expressed.

Marketing Issues

Marketing patterns

As elsewhere in Southern Sudan, the marketing points for the fishery products identified were the landing sites and markets. Previously, however, it was reported that fish used to be sent to Rumbek, from where it was sent north to Wau and south to Juba. Some fish still passes through Rumbek but the trade is very much diminished.

The marketing partners were identified as wholesalers, retailers as well as direct consumers. However, the respondents clarified that the wholesale function was now limited as the quantities of fish handled was little and much of the marketing was carried out by the fishers themselves, who caught the fish, processed it and took it to the market on foot or by bicycle. Other forms of business organization, namely co-operatives or limited companies with agents at various marketing points were not encountered.

Marketing constraints

The problems affecting domestic fish marketing were identified as price volatility, lack of storage, quality maintenance and poor infrastructure.

Traders and fishers are affected by fluctuating prices for their products. All the products are affected but particularly those with seasonal variations, namely *Heterotis* and *Mormyrus*. This is attributed to variations in production, which makes the supply on the market unstable. Furthermore, price volatility is caused by the unstable demand on the market. This arises because the population sizes of the market areas are often changing and income sources have not yet stabilized, following the war.

Lack of storage facilities for fish along the distribution chain has been another problem. The destruction that took place during the war left a shortage of buildings that could be used for such purposes as stores for fish. As a result, traders can only handle little quantities that they can safely look after without the storage facilities.

Concern was also expressed about maintenance of the quality of fish. This is attributed to lack of awareness among fishers and fish traders about proper fish handling techniques. Furthermore, basic handling facilities such as slabs, clean water and suitable packaging materials are not available. In the markets, fish display racks were observed but their hygienic status was not good and the fish was displayed for sale uncovered, open to access by flies.

Poor infrastructure, a general problem to the economy of Southern Sudan, was another major marketing problem. Roads have not been maintained since the beginning of the war some twenty years ago. Bridges have either been washed away or bombed. A few roads are also still feared to be infested with mines. Only big trucks can use these roads. However, the trucks are too few, they are often overloaded and they break down frequently because there are no garage facilities for maintaining them properly. The result is that only little fish can be moved and it takes long to do so for distant market centres.

Export of Products

In the past, fish from Bahr El Ghazal Region used to be exported to Egypt via Northern Sudan, to CAR, Zaire and Uganda. However, all this collapsed during the war and none of it has been able to resume. However, the region is important for supplying fish to the southern regions of Western Equatoria and Eastern Equatoria. Important towns where the fish is sent include Yei, Yambio and Tambura. The main species traded regionally are *Heterotis*, Nile perch and tilapia.

Imported Products

There are no reports of any fish import activities into Bahr El Ghazal Region either from other regions or from other countries.

6.4 UPPER NILE REGION

The Upper Nile Region was not visited due to change in travel schedule, so the report was put together based on information of the Sudanese members on the study team. The Region lies north of the Eastern Equatoria Region and is considered a region of great potentialities. Oil reserves, fisheries from the sudds and the Nile and livestock are the potential sources of wealth here. The Region is made up of three counties as summarized below:

Bor County derives its fisheries production from River Nile but has no aquaculture activities. Its local demand comes from the consumption by the Dinka people who are the main tribe. Bor is the market centre for the area. The County used to send fish to Juba for onward distribution. However, this trade has not resumed, following the end of war. The common species from the Nile, namely *Mormyrus*, *Clarias*, Nile perch and tilapia are the main products from the County. Bor also benefits from the FAO support from Madior, Yoril County in Bar el ghazal.

Ayod County also depends on the Nile for its fisheries production. There is no fish farming but there is potential for its development offered by the water supply in the County. Ayod Town is not only a local market but could resume its role as a gathering point from where fish is sent to Juba for onward distribution to Yei, Yambio and to DRC.

Bentiu County is the third county of the Upper Nile. Its fisheries production are from River Sobat. The local consumers are the Dinka, Nuer and Shulluk. Cash incomes here accrue from oil, livestock and wildlife activities.

As the region was not visited, detailed information using the questionnaire could not be compiled.

6.5 BLUE NILE REGION

The Blue Nile Region was also not visited, as the planned visit to Kurmuk was cancelled due to scheduling difficulties. Part of this region is not under the SPLM authorities, except for Kurmuk County.

Kurmuk County is endowed with fisheries resources on the Blue Nile. There are no aquaculture activities. Historically, fish from the County used to go to the Damazin hydropower station and to Khartoum. Local demand comes from the consumption of the Angasna people. Livestock and gold activities are sources of cash incomes and Kurmuk Town used to be the gathering point, now serving as a local market centre.

7. ANALYSIS

In this section, information gathered from the different regions are synthesized and summarized.

Capture fisheries and aquaculture resources by region

The main aquatic resources of the regions are given in Table 8 below:

Table 8: Distribution of Fisheries and Aquaculture Resources by Region

E. Equatoria	W. Equatoria	Bahr El Ghazal	Upper Nile	Blue Nile
Fisheries resources				
River Nile	Siwe River	Tonj River	River Nile	Blue Nile

Kohr English River	Ibba River	Payei River	The Sudd	
Tore River	Yei River	Panhom	River Sobat	
Bandame River	Tapari River	Yirol, and		
Kaya River	Yubu River	Shambe		
Yei River		Makwach		
Kembe River				
Kobo River				
Yembe River				
Modu				
Balamuke				
Aquaculture				
40 Fish ponds	10 Fish ponds	Potential	Potential	

Source: MOI Survey

Table 8 identifies the sources of fisheries resources and aquaculture activities by region.

Bahr El Ghazal is the most important fisheries region but other regions also contribute to production.

Aquaculture production potential is highest in the Eastern and Western Equatoria Regions. However, potential also exist within Bahr El Ghazal and Upper Nile Regions.

The most important fishery products:

The most important fishery products are given in Table 9.

Table 9: The Main Fishery Products by Region

	E. Equatoria	W. Equatoria	Bahr El Ghazal	Upper Nile	Blue Nile
Subsistence	<i>Clarias</i>	<i>Clarias</i>	<i>Heterotis</i>	<i>Mormyrus</i>	<i>Mormyrus</i>
	Tilapia	<i>Heterotis</i>	Tilapia	<i>Clarias</i>	<i>Clarias</i>
	<i>Alestes baremose</i>	<i>Citharinus</i>	Nile perch	Nile perch	Nile perch
	<i>Mormyrus kannume</i>	Nile perch	<i>Mormyrus</i>	Tilapia	Tilapia
	<i>Citharinus citharus</i>	<i>Mormyrus kannume</i>	<i>Polypterus</i>		
Domestically Traded	<i>Clarias</i>	Nile perch	<i>Heterotis</i>	Nile perch	Nile perch

	Tilapia	<i>Clarias</i>	Nile perch	Tilapia	Tilapia
	<i>Alestes baremose</i>	<i>Heterotis</i>	Tilapia	<i>Clarias</i>	<i>Clarias</i>
	<i>Mormyrus kannume</i>	<i>Citharinus</i>	<i>Mormyrus</i>	<i>Mormyrus</i>	<i>Mormyrus</i>
	<i>Citharinus citharus</i>	<i>Mormyrus kannume</i>	<i>Polypterus</i>		
Regionally traded	Nil	Nil	Nile perch	Tilapia	Tilapia
			<i>Heterotis</i>	Nile perch	Nile perch
			Tilapia		
Internationally traded					
	Nil	Nil	Nil	Nil	Nil
Imports	<i>Rastrineobola argentea</i>	<i>Rastrineobola argentea</i>	Nil	Nil	Nil
	<i>Alestes baremose</i>	<i>Alestes nurse</i>			
	<i>Alestes nurse</i>				
	<i>Bagrus bayad</i>				

Source: MOI Source

The main products for subsistence or local consumption are *Clarias*, Tilapia, *Alestes Mormyrus* and *Citharinus*

The main products for domestic trade are Tilapia, *Clarias*, *Heterotis*, Nile perch and *Mormyrus*.

The main products for regional trade are *Heterotis*, Nile perch and Tilapia.

The main imported products are *Rastrineobola argentea*, *Alestes baremose*, *Alestes nurse* and *Bagrus bayad*.

Constraints to production and marketing

A summary of the main constraints to marketing, marketing for the different regions is presented in Table 10.

Table 10: Major Production and Marketing Constraints by Region

	E. Equatoria	W. Equatoria	Bahr El Ghazal	Upper Nile	Blue Nile
Fisheries Production					
Lack of fishing gears			X		

High prices of gears			X		
Lack of facilities for handling, smoking and sun-drying fish			X		
High cost of labour					
Floods					
Aquaculture Production					
Lack of water availability					
Lack of equipment for pond construction					
Lack of fry supply					
Lack of feed supplies					
Lack of knowledge of pond management					
Lack of seine nets for pond harvesting					
Government ownership policy					
Marketing					
Price volatility					
High taxes					
Lack of storage facilities					
Inadequate preservation of quality					
Lack of market information					
Cheating of fishers by traders					
Poor infrastructure					
Insecurity, by armed highway robbers					

Source: MOI Survey

The main constraints to production from capture fisheries are lack of fishing gears, high prices of gears, lack of facilities for handling, smoking and sun-drying fish, floods and high cost of labour.

The main constraints to aquaculture production are lack of water availability, lack of equipment for pond construction and lack of feed supplies. Other constraints include lack of fry supply, lack of knowledge of pond management, lack of seine nets for pond harvesting and Government ownership of pond policy.

The main constraints to fish marketing are poor infrastructure, price volatility, lack of storage facilities and inadequate preservation of quality. Other constraints include cheating of fishers by traders, insecurity by armed highway robbers and lack of market information.

8. FUTURE DEVELOPMENT OF MARKETS

It is envisaged that the market for the different fish products locally, regionally and externally will increase as a result of a number of expected developments in the short, medium and long term.

- i) A very thin population remained in place in most areas of Southern Sudan during the war period. With the return of IDPs and those from exile, there will be increase in population, leading to increased demand for fish locally and regionally.
- ii) Increase in purchasing power of consumers will occur with the establishment of administration and the growth of salaried jobs within the towns. Institutional consumers, namely schools, hospitals, barracks and prisons will also emerge. Rumbek, the new capital of the south, as well as the regional headquarters Yei, Yambio, Ayod and Kurmuk, and county headquarters are expected to grow into bigger markets for fish. A wide range of products, namely *Clarias*, *Heterotis*, Tilapia and Nile perch could benefit from this market development.
- iii) Similarly, growth in commercial activities at these urban centres would increase cash availability in the hands of the population and improve the market demand for fish.
- iv) It was noted that a large section of actual and potential fish consumers live in the rural areas and depend on crops and livestock for their cash incomes. As the marketing of these products improve, more cash will be generated in their hands, expanding the market for fish. These local consumers have high preference for *Clarias*, *Heterotis* and *Mormyrus*.
- v) Rehabilitation of the trunk as well as the feeder roads, expected to be among the top development priorities for the south, would stimulate investment in motor vehicle carriers and open access to wider market for fish, as well as lowering the transportation costs. Salted sun-dried tilapia and Nile perch are the more appropriate products for the long distance trade, due to their higher shelf life.
- vi) Resumption of rail services from Wau will re-open a major trade route to Northern Sudan and Egypt, expanding the market for salted sun-dried tilapia and Nile perch.
- vii) Similarly, power supply to the urban areas is expected to be restored as an essential factor in development. This would facilitate ice production and establishment of storage facilities, leading to improved marketing of fresh fish for which there are higher prices.
- viii) Return of peace to Southern Sudan will provide conducive environment for trade with neighbouring countries, leading to resumption of fish export to CAR and DRC, particularly for salted sun-dried tilapia and Nile perch.

However, realisation of the opportunities will be hindered by a number of factors. On the supply side, the on-going destructive fishing practices by resource users threaten the sustainability of the resource and will limit production and supply to the market. Production will be constrained by problems relating to fishing gears and skills as identified earlier. There are also constraints limiting aquaculture production which have been identified. Marketing will continue to be constrained by lack of business

skills and poor business organisation. A cross cutting constraint will be lack of resources for production, processing and marketing.

9. RECOMMENDATIONS

In order to take advantage of the market opportunities that would be created as a result of return to normality in Southern Sudan, the following interventions are recommended:

- i) Strengthen institutional support to fisheries development by creating capacity for fisheries management, extension and training.
- ii) Promote resource mobilisation by enacting enabling policies to attract private investment in fisheries.
- iii) Increase resources for fisheries development through savings and credit schemes.
- iv) Improve marketing organisation through marketing groups, co-operative societies and companies.
- v) Provide training in the different areas as identified below:

a) Training needs for fisheries management

- Fisheries regulations and sustainable fishing practices
- Resource user group organisation and leadership skills for participatory resource management
- Co-management principles and practice

b) Training needs for production in capture fisheries

- Improved fishing skills, to make the best use of the limited and high cost fishing gears.
- Boat making and gear technology.
- Effects of seasonality on production of the different fish species

c) Training needs for aquaculture production

- Pond management skills
- Feed formulation and stocking techniques for *Clarias* and tilapia
- Harvesting techniques

d) Training needs for fish handling and processing

- Sanitation, hygiene for post harvest fish quality control.
- Improved fish processing techniques for maximum utilisation of the limited facilities.

- Environmental concerns in fish processing.

e) Training needs for fish marketing

- Market analysis
- Fish export trade formalities
- Trade organisation and leadership skills

f) Training in management of business resources

- Business organisation and management skills
- Resource identification, mobilization and utilization
- Financial management, accounts, book keeping and record keeping
- Savings and accessing loans
- Diversification of income generating activities
- Communication skills
- Co-operative principles and management
- Leadership and management skills
- Roles of executives and various group members

g) Training needs for Fisheries Managers

- Policy formulation and analysis
- All technical aspects of fisheries management
- Data collection and analysis
- Extension planning and delivery skills
- Market surveys
- Project planning including priority setting, preparation of workplans, budgeting and report writing.
- Monitoring and evaluation

10. VALUE ADDED PRODUCTS

Southern Sudan has never had a history of value addition for their fishery products, because the industry was based on primary production. Such products would include fish cakes, fish fingers, fish oils, animal feeds and tanned fish skins, involving various degrees of industrial processing. These products are usually expensive and demand for them within Southern Sudan or neighbouring countries is poor. It is also unlikely that in the short run, capacity to produce them could be established, given limitations in quality assurance, cold chain, utilities, infrastructure and communication facilities.

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APPENDIX 1: Trip Itinerary

Sunday 12 th Oct	Monday 13	Tuesday 14	Wednesday 15	Thursday 16	Friday 17	Saturday 18
Yei	All day Yei	Yambio	Rumbek	Yirol, Malik	Yirol, to NBO	NBO to Entebbe

APPENDIX 2: Principal Persons Met

Name	Status
Michael Amule	Director for Customs New Sudan
Mariel Jacob	Director, Roads and Buildings New Sudan
Mary Biba Philip	SPLM County Secretary Yambio County
Christopher Mamu	SRRRC Ag. Secretary Yambio County
Joseph Jaber Binyiri	FAO Fisheries Field Assistant Western Equatorial Province Yambio
Rin Tueny Mabor	SPLM County Secretary Yirol County
Juma Abdallahman	SRRRC Ag. Secretary Yirol County
David Bol Machok	Head, Dept. of Agriculture and Food security Co-ordinator Yirol County
David Ater	Administrator, Malik
Mungong Anyijong	Veterinary Supervisor, Malik
James Bar	Forestry Supervisor, Malik
Regit Anyeth	Paramount Chief, Malik Boma
Macout Dhieu	Counterpart to FAO Field Staff, Adior
Lok Thoi	Fisher, Madior
Abraham Abuk	Fisher, Madior
Mading Bok	Fish Trader, Madior

Name	Status
Kelly Wanda	Foodnet crop specialist
John Carvalho	Foodnet forestry consultant
Alan King	Foodnet livestock consultant
George Leju	CRS Yei
Joseph Mwangangi	CRS agribusiness specialist
Samuel Muriuki	CRS livestock specialist
Elias Leonard	S-SARP Programme Associate
Adriano Undo	S-SARP fisheries expert
Philip Marol	S-SARP crop expert
Martin Lohure Tobiolo	S-SARP forestry expert
John Kanisio	S-SARP livestock expert
Don Bosco Malish	S-SARP fisheries expert
Sean White	Winrock natural resource specialist

APPENDIX 3: Fisheries Professionals Deployed in Southern Sudan

Name	Qualification	Status and Institution
Mr. Adriano Undo	Higher Diploma: African Inland Aquaculture Institute, Port Hartcourt - Nigeria	Director for Fisheries, Secretariat of Agriculture and Animal Resources, Yei – New Sudan
Mr. Don Bosco Malish	BSc, Makerere University, Kampala - Uganda	Training Officer, Institute for Promotion of Civil Society, Yei – New Sudan.
Mr. Joseph Jabar Binyiri	Diploma: El Shaggara Fisheries Training Institute, Khartoum	FAO Fisheries Field Assistant Western Equatoria Province Yambio
Mr. James Majok Mopir	Diploma: El Shaggara Fisheries Training Institute, Khartoum	FAO Fisheries Field Assistant Bahr El Ghazal Province Madior
Mr. Patrick Wolyan	BSc, Makerere University, Kampala - Uganda	NGO in Yei, New Sudan

Region:

Location:

APPENDIX 4: Questionnaire

Initial MOI questionnaire: Fishery

1 Notes to the surveyors:

(1) Please give the information below for all of the regions and locations:

Region	Location
Western Ekuatoria	Yambio
	Nzara
	Yei
Upper Nile	Yirol
	Ayod
Southern Blue Nile	Kurmuk

(2) Please indicate the source of the information given below:

Source	Reference (where appropriate)
Literature	
Official statistics	
Expert interviews	
Group interviews	
Single interviews	

(3) Please indicate the year for which the information was available. All the information should be given for the same ('general') year for reasons of comparability. If some information cannot be given for the 'general' year or season, please indicate the respective year or season.

2 General information on fishery production

2.1 Water resources

Item	
Surface covered by natural water (lakes, rivers)	
Number of fish ponds	
Surface covered by fish ponds	

2.2 Gender issues

Please indicate fishery products with gender sensitivity, i.e. products that are produced, processed or traded mainly by women (name crop and tick where appropriate)

Product	Produced by women	Processed by women	Traded by women

Region:

Location:

3.3 Marketing issues

3.3.1 Marketing patterns

Please tick for each fishery product the matching marketing patterns mentioned below

Product no.	Marketing points:	Farm gate	Gathering points	Markets	Marketing partners:	Co-operative	Agents	Wholesalers	Retailers	Consumers

3.3.2 Marketing problems

Please indicate the marketing problems encountered for each fishery product

Product no.	Price volatility	Low prices	Taxes, tariffs, duties	Storage problems	Quality and grading problems	Lack of market information	Monopolies, collusion	Cheating by traders	Poor infrastructure	Insecurity	Other, specify

