Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.9, No.3, 2018

Challenges and Socio-Economic Importance of Fish Production in Ethiopia:Review

Selamu Abraham* Lelise Mitiku
College of Agriculture and Forestry, Mettu University, P.O. Box 318, Bedele, Ethiopia

Abstract
Fish is one of the most traded agricultural commodities and a major export for many developing countries, offering an opportunity for trade agreements which contribute to the development of poor countries. Development in fish production would have great economy contribution to the country, Ethiopia. This is because fisheries provide employment, food and income. Fish provide fatty acids critical for brain development, as well as protein and minerals. Good fisheries governance can contribute to sustainable aquatic resource management. Fish production potential of Ethiopia is estimated to be 51,400 tones per annum. Lake Tana, Ashenge, Hayk, Koka, Ziway, Langano, Awassa, Abaya and Chamo are among the potential fish rich lakes found in the country. The main commercial species contributing to the total landing are *Oreochromis niloticus, Labeohori, Clarias gariepinus, Barbus species* and *Latesniloticus*. Overfishing, improper management, weak institutional capacity, lack of a reliable data collection system, the remoteness of fishing areas, the lack of basic infrastructure and equipments, the degradation of natural resources and the limited funds to implement the country's strategies, plans and legislations are among important challenges of fish production in Ethiopia. By solving the challenges it is possible to improve fish production in the country. Therefore, all concerned bodies should be involved in solving the addressed production challenges to achieve future projected goal of the sector.
Keywords: Challenges, Economic Contribution, Fish Production

1. Introduction

Ethiopia is the largest for livestock population in Africa. The livestock sector accounts for over 49 percent of agricultural GDP and 80 percent of total employment and can produce over 51,500 tones of fish's per annum. However, their exploitation and consequently their contribution to food security and growth in the country are minimal despite the technologies capable of resolving the problem of livestock and fisheries production (FAO, 2014).

Aquatic animals in general do contain a high level of protein (17-29%) with good amino-acid profile, similar to that of the meat of land animals. The flesh of a fish is also readily digestible and immediately utilizable by the human body, which makes it suitable for complementing the high carbohydrate diets. Compared with land animals (with some exceptions, such as shellfish), aquatic animals have a high percentage of edible flesh, and there is little wastage. The fatty acid content of fish is highly polyunsaturated and particularly those which are attributed to reduce blood cholesterol. Aquatic animals are also source of minerals such as calcium, iron and phosphorus as well as trace elements and vitamins. There are also some indications that certain fatty acids in fish may provide protection against renal disease. Increasing the per capita consumption of fish and shellfish in any country has benefits of health (EEL, 2012). Daw, *et al*., 2008 also noted that fish is highly nutritious, so even small quantities can improve people's diet. It provides about 20 percent of animal protein intake in developing country and this can reach 90 percent in Small Island Developing State (SIDS) or coastal areas. Fisheries can also contribute in directly to feed security by providing revenue for food efficient countries to purchase food.

Ethiopia's fisheries are entirely fresh water, in its many lakes, rivers and reservoirs, as it has no marine coastline. The total area of the lakes and reservoirs stands at about 7000 to 8000 km^2 and the important rivers stretch over 7000 km in the country. In addition, minor water bodies such as crater lakes and reservoirs make up about 400 km^2 (Assefa, 2014).

Fish production in Ethiopia is not lined with her production potential. Several reasons attributed to the low production; among them lack of fishing tradition and low fish consumption habit of most people is frequently quoted. Traditionally, small-scale or artisanal fisheries are used to characterize those fisheries that were mainly non-mechanized with low level of production due to constraints faced by the fishermen (Adewwumi *et al.,* 2012). According to FAO (2015) report, the sector is also constrained by weak institutional capacity, poorly organized fishermen's associations, the lack of a reliable data collection system, the remoteness of fishing areas, the lack of basic infrastructure and equipment, the degradation of natural resources and the limited funds to implement the country's strategies, plans and legislations. Assefa (2014) and Gebremariam *et al*., (2002) also stated that insufficient institutional and management capacity, limited resource allocation and investment, poor policy and regulatory framework, and insufficient value chain and fish marketing infrastructure are some of the cross-sectoral challenges affecting fisheries in Ethiopia.

Even though, fish is a vital source of food, employment, recreation, trade and economic wellbeing for people throughout the world; numerous issues such as over fishing, illegal fishermen, irrigation and shore

cultivation, deforestation, improper management, poor feed quality and feeding habit, outbreak of diseases and utilization of illegal mesh size affect fish production and welfare predominantly. Hence, this paper is initiated to review and compress different literatures in areas of challenges and socio-economic importance of fish production in the country. Therefore; principal objectives of the review are:-

- To review major challenges of fish production in Ethiopia
- To review socio-economic importance of fishery sector in Ethiopia

2. Fish Production in Ethiopia

Ethiopia being a land locked country its fisheries is entirely based on inland water bodies, lakes, reservoirs and rivers. Fish production potential of the country is estimated to be 51,400 tones per annum. Fresh fish is consumed in the vicinity of the Great Rift Valley lakes. Besides, outside of these areas, the domestic market for fish is small (Alazar, 2016). Most lakes are situated in the East African Rift Valley system though the biggest one, accounting for 50% of the total water area, Lake Tana. The rivers all radiate out of the central highlands which act as a giant water catchment area. Most Rift Valley lakes and the river Awash are poor in fish species. Their fauna is dominated by the Nile tilapia (*Oreochromis niloticus*), the African catfish (*Clarias gariepinus*) and a few cyprinids mostly *Barbus* species. The two southern most lakes (Abaya and Chamo) and the major rivers, such as the Blue Nile and the Omo, have a much more diversified fauna reminiscent of that found in the Nile and the rivers and lakes of East Africa (FAO, 2014).

Table 1. Ethiopian water bodies and their fisheries.

Water bodies type	Extent	Fishery potential (tone/year)	Catch (tone/year)
Major lakes	6,477km^2	23,342	10,598
Major reservoir and dams	857km^2	4,399	1,366
Small water bodies	275km^2	1,952	303
Rivers	7,185km^2	21,788	3,121
Total	14,794 km^2	51,481	15,389

Source: Assefa, 2014

Since fishery production is over exploited due to inappropriate fishing practice, the potential of fish was underdeveloped and the management rule and regulation at Federal level and State levels was also very poor. Moreover, the country's fish consumption and production system differs from place to place. Towns and road side vicinity of the nation are most frequent fish consumers. But, an estimated 99,504 tones of fish can be produced from its lakes, dams, rivers and small water bodies nationally. However, in Ethiopia there are several rivers and lakes in different parts of the country that can be fish farming potential and contributing for the development. Currently, the country is engaged in constructing several hydro-power dams for its power consumption needs. Apart from generating electric power, these dams will be great potential for fish harvesting and ensure economic development to the nation by far. But according to some conducted surveys, the country's naturally fish harvesting potential is about 95 thousand tones. However, Ethiopia can raise its fish potential using aquaculture and modern technologies and by facilitating the necessary infrastructure for fish harvesting (Alazar, 2016).

3. Challenges of Fish Production in Ethiopia

Like for most of Africa, Ethiopia is riddled with poverty, economic stagnation and environmentally unsustainable practices, all of which pose serious constraints to fisheries development. However, ample opportunities exist for the sector to help reverse national development challenges by making a significant contribution to poverty alleviation, economic growth, better nutrition and ecological improvement. Dual problems of food security and poverty are major and immediate challenges for Ethiopia where about 45 percent of the people live below the poverty line, with the level of impoverishment being worse in rural areas where 85 percent of the population live (FAD, 2015).

Several studies have shown that the growth of fisheries catches worldwide has slowed down since the 1970s, and indeed reversed since the late 1980s (FAO, 2002; Pauly *et al.* 2002). The decline is due to several factors; overfishing, ecosystem changes due to destructive fishing practices, discarding of by-catch, and pollution of coastal waters. The reality is, however, quite the opposite. Many nations choose to become competitive in the race for the last fish, through expansion and modernization of fishing fleets that go fishing farther, deeper, and stay longer at sea (Pauly and Maclean, 2003).

According to (FAO 2015) sewage of factories and agriculture are the sources of major pollutants affecting Ethiopian water bodies and their fishes. This poses serious constraints fisheries. The extraction of minerals from Lake Abijata could have negative effect on fish stocks, just as the effluents from the tannery at Koka Reservoir and the textile industries at Awassa and Arba Minch can affect the fisheries. Also, the increasing rate of deforestation could result in increased drying up of water bodies and increase in water turbidity. Further, the dam on River Omo has negatively affected the *anadromous* fish which migrate from Lake Turkana to spawn in the

river. Inadequate legal and policy frameworks have largely given rise to poor fishery resource exploitation resulting, in some cases, in the overfishing of some important species, such as the Nile perch in Lake Chamo, and tilapia in Lakes Awassa and Ziway. Though there are fishery laws and regulations currently in place, these legislations are inadequately implemented.

Ethiopia's fishery sector also suffers from limited human resource availability, with an acute shortage of trained personnel. This constraints on fishery management, technical and extension support services. Public and private investment in fishery and aquaculture is also low and the infrastructures are inadequate (FAO, 2015). Increase in subsistence agricultural growth, deforestation, municipal and industrial effluents and human encroachment on the shoreline has given rise to historically unprecedented nutrient loadings into the lake (Verschuren *et al.,* 2002). The constraints and vulnerability of fisheries communities are mainly due to resource depletion increasing competition on open access resources inequitable use of resources, natural disasters like storms and over-reliance on one type of asset and lack of options. Moreover, lack of government support, remote locations and poor services, low literacy and innumeracy and weak organization capacity are other factors that expose fishing communities to poverty (FAO, 2001). Relevant current and future global climatic change include an increase in mean air temperature, shifting precipitation pattern and an increase in extreme weather event. The impact of climate change and variability on inland fisheries and aquaculture production will be deferent (FAO, 2010).

Fish in Ethiopia is also constrained by diseases and poor quality and quantity feeds. The physical attributes of the feed determine the degree to which the feed affects water quality and consumption rates by the fish. The ingredients used in the feed should be finely ground. The pellets must have uniform color and size, not be able to distinguish (Schmittou *et al.,* 1998).

4. Opportunities of Fish Production in Ethiopia

Attractive fish prices at local market for better profit; the presence of diversified fish species; and inhabitants' traditional knowledge for fisheries and good consumption habit are considered as occasion for the sector escalation. In addition, availability of gotera/kefo a locally made fishing gear which has a hive like structure is the best practice for fish catch. Because fishers let small fishes out to the water body while they are collecting their catches. This system enables fishers to be selective or non- selective which depends on the size and preference of the fishers. Fishers have a good practice in the post-harvest processing, which is either fresh or gutted when there is demand for fish or sun-dried form during surplus of production (FAO 2015).

In addition, the future fishing villages' offers homogeneous and less dispersed pastoral communities which are ideal for social mobilization for poverty alleviation programs. Reservoir fisheries require minimal initial investment and provides quick returns compared to other economic activities. Access to microfinance facilities, which have received strong internal and external support, will therefore promote rapid development of fisheries, especially for the benefit of women and youth. It does not also require sophisticated skills and knowledge for the entry and coping up with operation at small scale level. The regional pastoral extension program can rigorously conduct an extension service and provide training to the communities not only this while the supply from capture fisheries is lagging behind, the demand for fish is growing in Ethiopia, this offers opportunities for Aquaculture businesses to play a role in improving fish production and expanding the fish markets opportunities much land is suitable for aquaculture in Ethiopia and for most system (earthen pond, concrete pond, cage in lake and more). Absence of social and culture taboo in fish consumption is also another asset for fish production in Ethiopia (Erkie, *et al*., 2016).

5. Socio-Economic Importance of Fish Production in Ethiopia

Sustainable fisheries management is crucial to food security, poverty alleviation and economic growth. Fisheries are thus acknowledged as an important strategy in the drive for poverty reduction. It helps to promote greater economic development in Ethiopia. In 2010 Ethiopia realized about USD 14,000,000 from its capture fishery while a total of 40,000 livelihoods were positively impacted upon by the fishery sector in the same year (Assefa, 2014).

5.1. Trade

Fish plays a vital role in domestic trade as well as in import and export market. The Ethiopian cross-border fish trade is currently not properly documented. The country imports significant amounts of fish from neighboring countries though some of these imports end up being exported to Sudan through the porous border with neighboring South Sudan. The per capita fish supply is around 200 g, significantly below the mean 2.6 kg per capita per year for the East African sub region (FAO, 2015). Although most fish traders do not have access to basic cold chains with ice and insulated containers, a few basic fish handling and preservation institutions which are equipped with electricity and freshwater supplies are available in the Ethiopian fisheries. By such a ways many people are engaged in this sector as source income. As a result of the general shortage of basic cold chains,

fresh fish storage usually lasts only up to two days. Consequently, fish marketers concentrate their trade during religious fasting periods when there is more demand (Ann *et al.,* 2013).

5.2. Food security

Consumption of fish has several health, nutritional, environmental and social advantages over other terrestrial animal meat. Even when consumed in small quantities, fish often comprises a nutritionally important part of many people's diets in developing countries. It is a vital source of protein and micronutrients, and improves the quality of protein in largely vegetable and starch-based diets by providing essential amino acids. Fish provides nutrients and micronutrients that are essential to cognitive and physical development, especially in children, and are an important part of a healthy diet. As an affordable animal source of protein in some of the poorest countries, fish is the primary source of nutrition, creating growing demand for this staple. Therefore, fisheries are regarded as an important sector in the effort to increase animal protein consumption and achieve food security for the growing population (FAO, 2014).

National fish demand is somewhat seasonal, as religious observances exert strong influence on fish consumption patterns. During Lent, for example, Christians, especially of the Coptic Orthodox Church, who are required to refrain from eating meat, milk and eggs, resort to fish as a substitute. The domestic fish demand is significantly robust during two short periods of the year when the Orthodox Church encourages fish consumption. These periods are the fasting seasons in February to April, and two weeks in August, totaling about 80 days. Large quantities of fish are consumed at periods of religious fasting in the cities, around major fish production areas such as the Great Rift Valley lakes, and major towns, particularly in Zeway, Arba Minch, Bahir Dar and the capital Addis Ababa (FAO, 2015).

5.3. Create Employment opportunities

Employment in the fisheries sector has grown more rapidly than both world population and employment in agriculture. A considerable workforce is employed, both directly and indirectly, by Ethiopia's capture fisheries which also help in sustaining local communities. Whereas 4052 persons were employed directly by the sector in 2010, a total of 9148 others benefited from indirect employment offered by the sector. Therefore, sector is a good means to create job opportunities for rural, pre-urban and urban unemployed and under employed people. This is especially so around the Great Rift Valley and areas surrounding the lakes, reservoirs, rivers and other small water bodies with major fishing activities (Alazar, 2016).

The rural areas of Ethiopia where substantial fishing takes place benefit from the economic activities of the fishers and their related operations. In those areas, much more than in the urban and per-urban centers, fisheries are increasingly recognized as an alternative means of addressing the problems of food security and poverty, consistently with the rural development objectives of the sector. There is a national awareness that rural areas and the agricultural sector, which support more than 80 percent of the total population, are the basis for bringing about rapid and equitable economic growth and development in the country (FAO, 2014).

5.4. Fish meal as animal feed source

Fishmeal is an excellent source of protein for animals. The offal of fish can be processed and used for animal feed. It has high levels of essential amino acids such as methionine and lysine, and it also has a good balance of unsaturated fatty acids, certain minerals (available phosphorus), and vitamins (A, D, and B-complex) in animal feeds (Jacquie 2015). But use of fishmeal is usually restricted to 5% to 10% of the content of poultry diets. 40-60 percent of the fish body is being wasted as offal every day and year. But there is a huge amount of animal feed shortage in the country. These days, there is an increased demand of fishmeal from poultry farmers. Mr. Abawengelie at Bahir Dar has already established a fishmeal-processing unit collecting fish offal from the fishers in a very sustainable way; these have bilateral benefit, one by keeping our ecosystem from pollution, previously the fish offal threw in to the lake and highly affecting the ecosystem and the people living around the lake, and the second one is creating another income opportunity and give credential for the fishermen (Ajala, 2008).

5.5. Sport fishing as a recreational value

Recreational fishing (sport fishing) is particularly becoming common in southern part of Lake Tana. This activity has been started in the country since 1970s. In the early 1970s, one foreigner working in Bale National Park introduced two species of fish, Brown trout and Rainbow trout from Kenya to the rivers of the Bale National Park. This fish have attracted many tourists and has contributed to get a considerable foreign exchange. To catch trout fish, the tourist gets permission from the near-by Agricultural office or from the Ministry of Agriculture after paying money in advance before fishing. The fishing license given to the tourist may be on daily basis, weekly, monthly or annually depending on their request. The number of fish to catch per day per hook is limited up to five fish only and not allowed for commercial purpose (FAO, 2014).

Conclusion and Recommendation

Fishes are one of the most important groups of vertebrates serving as food for human. They possess a great economic, nutritional, medicinal, industrial and aesthetic values as well as providing employment for millions of people in Ethiopia. They contribute to food security, providing a valuable supplement for diversified and nutritious diets. Although, the sector has been found to play an important role towards enhancing the socio-economic livelihood of its inhabitants it is hampered by several factors such as lack of fish farming tradition; weak institutional capacity, competition from capture fisheries; poorly organized fishermen's associations, the lack of a reliable data collection system, poor purchasing power of the citizens; the remoteness of fishing areas, poor human and institutional capacity; the lack of basic infrastructure and equipment, the degradation of natural resources and the limited funds to implement the country's strategies, plans and legislations and lack of training and extension support. Based on the above conclusion the following points are forwarded as recommendation:-

- ✓ Technology transfer to local farmers, traders and fish collectors through guidance and taught for updated habit of fish production, management and harvesting are essential toward improving the sector.
- ✓ Integration of stakeholders at different levels increase in extension service and support of farmers through financial aspect are crucial for the success of fishery improvement.
- ✓ It is urgent call for to invest in modern value chain-based fish production, processing and marketing coordination to enhance the sector potential.
- ✓ Farmers should be aware of for nutritive, medicinal, recreational and aesthetic values of fish to initiate them to be involved in the sector.

References

Adewumi, M.O., O.E. Ayinde, A.H. Adenuga and S.T. Zac-chaeus. (2012). The profitability analysis of artisanal fishing in Asa River of Kwara state, Nigeria. International Journal of Development and Sustainability.

Alazer Shifarew. (20l6). Ethiopia: Emphasis On Modern Fish Harvesting Development. allafrica.com/stories/201603100972.html

Ann Gordon, Cambria Finegold, Charles C. Crissman and Alan Pulis. (2013). Fish Production, Consumption and Trade in Sub-Saharan Africa.

Assefa, M.J. (2014). Research Journal of Agriculture and Environmental Management, **3**(9): 460-466, September, 2014.

Daw, T., W. Neil Adger, K. Brown and M. Badjeck. (2008). Climate change and capture fisheries. University of East Anglia, Norwich, World Fish Center, Penang.

EEL (Ethiopian Embassy London). (2012). Fish farming in Ethiopia *www.ethiopianembassy.org/AboutEthiopia/InvestmentProjectProfiles/FishFarming.*

FAD (Fisheries and Aquaculture Department). (2015). Fishery and Aquaculture Country Profiles; the Federal Democratic Republic of Ethiopia

FAO (Food and agricultural development). (2001). Sustainable Fisheries Livelihoods Program: Study on the Impacts of Policies Institutions and Processes on Fisheries Livelihoods

FAO (Food and Agricultural Organization). (2010). Climate fishing and trade. Change, Inland Fishery and Aquaculture in Africa

FAO (Food and Agriculture Organization). (2015). Fisheries and Aquaculture Department. **76-85**

FAO (Food and Agricultural Organization). (2014). The State of World Fisheries and Aquaculture Report.

Gebremariam, Z., E. Kebede-Westhead and Z. Desta. (2002). Long-term changes in chemical features of waters of seven Ethiopian Rift-valley lakes. Hydrobiologia, **477**: 81-91.

Pauly D, Christensen V, Dalsgaards J, Froese R, Torres Jr. (2003). Fishing down marine webs. Science 1998; 279:860- 863.

Sileshi, A., 2013. Managing water for livestock and of Masters of Science in Agricultural Economics, fisheries development. University of Alemeya, Ethiopia.

Verschuren, D., C.J. Thomas, J.K. Hedy, N.E. David, R.L. Peter, T.B. Erik, R.T. Michael and Hecky. R.E. (2002). History and timing of human impact on Lake Victoria, East Africa. Proc. R. Soc. Lond. B Biol. Sci. 269: 289-294.