Review on potential and challenges of aquaculture practice in Ethiopia

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Abstract
The purpose of this review is to assess Ethiopia’s fish stocks, capacities, challenges and aquaculture practices. Although Ethiopia has many rivers and lakes used for fish production, there are still problems related to fish production and productivity to increase private interests and the country’s gross domestic product. In the country, it is fact that the main challenge contributed to low production and aquaculture practice including site and species selection, environmental impact, lack of awareness, inefficient fishing gears, poor transportation access, poor postharvest handling, low price at the landing site, improper market place and lack of infrastructure and technologies. Also traditional means of fish preservation and transportation contributed much to the low quality of preserved fish and short lifespan of fish products. All fishing activities are carried out in the natural environment and aquaculture has not yet been established in the country. In order to develop effective aquaculture in Ethiopia, it is first necessary to assess its true potential and thereby develop effective strategies. Practical introduction and training of business owners and filling of all necessary aquaculture systems are the pillars.

Keywords Agricultural activity · Aquaculture potential · Fish adoption · Freshwater

Introduction
Aquaculture has been proposed by the government of Ethiopia as an option to boost fish production and as an alternative means to food security and poverty alleviation, and is now considered an integral part of rural and agricultural development policies and strategies. Fish farming has been practiced in certainly considered one among type factors of the world, especially East Asia, China, Europe, Canada, Africa, and growing international locations like Nigeria (FAO 2009). It has been exercising for the cause of the historic civilization of Egypt and China. The fisheries zone remains an important deliver of food, nutrition, income, and livelihoods for masses of hundreds of thousands of humans throughout the world (FAO 2016).

Ethiopia is a rustic with inside the horn of Africa endowed with several aquatic resources, which include over 20 natural lakes, 12 huge river basins, over 75 wetlands, and 15 reservoirs and is wealthy in numerous fish resources, water and environmental resources; however, it's far placed at the bottom of the aquaculture producers list (Abebe 2016). An observe thru manner of approach of Gordon et al. (2007) has predicted aggregated demand boom for fish in Ethiopia to be 44% over 10 years. As stated in Hussein et al. (2012), the early documents of FAO (1990) indicated that the country wide in keeping with capita fish consumption is prepared 0.21 kg/person/year. However, in fish producing areas of Ethiopia this determines adjustments and is predicted to be about 8.5 kg/person/year. To carry sustainable aquaculture improvement in the second boom and transformation plan (from 2016 to 2020), the point of interest region of the Ethiopian authorities is irrigation and aquaculture-primarily based totally development.

Literature review

Potential of aquaculture in Ethiopia

Aquaculture is one of the oldest food manufacturing activities in the records of mankind (FAO 2002). It is the quickest developing meals generating region in the world (FAO 2006; AFD, COM and GIZ 2017). It is developing, expanding and intensifying in nearly all areas of the world, besides
in Sub-Saharan Africa, as the worldwide populace demand for aquatic food products is anticipated to increase (FAO 2012). Ethiopia has big freshwater and fish resources, conducive climatic conditions, big hard work and unsatisfied neighborhood demand for fish, aquaculture improvement in the country is lagging in the back of in comparison to different agricultural activities (Zewdie 2016). It is fact that in Ethiopia Aquaculture exercise turned into formally began out after establishment of the previous Sebeta Fish Culture Station (the contemporary National Fishery and Aquatic Life Research Center) in 1977 via way of means of then Ministry of Agriculture via monetary guide obtained from the Government of Japan, Japan International Cooperation Agency. Actually, In Ethiopia, current fish manufacturing is specially primarily based totally on capture fisheries from natural lakes and rivers; artificial reservoirs additionally make contributions a few amount. However, the biomass and capacity yield of the natural waters cannot entertain tremendous boom in fishing efforts, with natural fish stocks depleting from time to time. The quality choice to make sure conservation of genetic and species variety of fishes in Ethiopia seems to be transformation of Ethiopian fisheries into a specially aquaculture-based manufacturing system. Generally, Aquaculture as a current kind of fishery triggers the involvement of experts and enterprise men; it additionally has a capability to create value chain and job for thousands. This modern fishery can be practiced with the aid of using youth, elderly, girls or even bodily disabled persons. Thus, it could be concluded from this fact that aquaculture may be taken as a manner out to attain nutritionally enriched food security, job opportunity and to stimulate the world economic system as an entire and the nation’s economic system in particular. It is a fact that even if a capacity for aquaculture manufacturing in Ethiopia exists, however it is not yet fully realized. Aquaculture in Ethiopia continues to be in its infancy despite favorable bodily situations to be had in the country and fish species documented.

**Challenges of aquaculture practice in Ethiopia**

Even though the general potential yield of fish in Ethiopia is high, the real fishery manufacturing is far from the predicted (Lemma 2017). The real exploitation of fish manufacturing is 38,370 ton/year (Gatriay 2020). The current fish manufacturing is still far beneath the predicted potential yield (Kebede et al. 2017). This is because of the aquaculture improvement in Ethiopia become faced with some of challenges which consist of mainly; loss of regionally selected fish seeds, lack of reasonably priced and efficient locally to be had fish feeds, authorities rules in the country, over-reliance on capture fisheries, low integration of aquaculture with different farming activities, low-value aquaculture guide for rural improvement, loss of licensed fish seed multiplication facilities and shortage of institutional ability in the location of training, research and generation transfer additionally challenging situations for aquaculture improvement in Ethiopia. Natea (2019).

This is likewise in keeping with a few authors (Tilahun et al. 2016; Natea et al. 2017; Meko et al. 2017). Who suggested hard situations, shortage of educated manpower and shortage of government interest also are not easy confines for aquaculture improvement in the country. Moreover, hatchery rearing for the improvement of fish farming isn't recognized yet. As well as in case of wild fish Environmental Degradation Increases in subsistence agricultural growth, deforestation, municipal and commercial effluents and human encroachment on the shoreline has given rise to traditionally exceptional nutrient loadings into the lake (Verschuren et al. 2002). Specially in Ethiopia, there was an incredible growth in the extent of irrigation schemes in recent years which in different manner have an effect on aquatic environment and fish production (Getahun et al. 2008).

Additionally, farmers do not get adequate theoretically and nearly trainings before and after pond construction. Therefore, a few of the farmers begin fish farming while not having information from pond management to fish dish preparation and consumption. To convey sustainable and continued aquaculture improvement in the country, sensible adoption and education of farm owner in addition to filling of all important aquaculture centers are the pillar. Particularly to make aquaculture more tangible, hatchery rearing and reasonably priced fish feed can play an essential function to clear up the fingerling shortage at a time of demand and to intensifying aquaculture zone in Ethiopia (Lakew et al. 2016; Abera 2017; Natea et al. 2017; AFD, COM and GIZ 2017). The performance and modernity of the fishing substances and system decide the manufacturing popularity of a specific water body and aquaculture practice in general.

**Conclusion**

A number of aquaculture practices are used world-extensive in 3 styles of environment (freshwater, brackish water, and marine) for a fantastic form of culture organisms. In Ethiopia freshwater aquaculture exercise is done both in fish ponds and fish pens or fish cages. Country has a suitable policy environment as well as sufficient and favorable geographical areas to endorse the development of aquaculture as part of an effort to ensure food security and poverty alleviation. However, inputs required for aquaculture development,
especially technological capabilities, are immature. In fact aquaculture farms in Ethiopia are small scale, subsistence-oriented and most effective to a sure diploma commercial. To expand effective aquaculture in Ethiopia, it is first hard to determine the real capacity thereby to construct a powerful strategy. Therefore, this paper is meant to check the modern popularity and real capacity of aquaculture, and to signify a possible technique for effective aquaculture improvement in Ethiopia. To develop real aquaculture in Ethiopia, it is first desirable to assess the actual possibility thereby to build an effective strategy.

Recommendation

In light of the aforementioned conclusion, the subsequent advice forwarded are actually, a few training on sensible and theoretical aquaculture adoption for aquaculture owners and moreover accomplishing studies and guidance of a report on the feasibility of fish farming are needed. Aquaculture practice can be profitable if the farmer uses technologies of integrating fish culture with other agriculture activities. Particularly, the suitable aquaculture technologies should be applied for the country through the pilots and farming demonstration.

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Declarations

Conflict of interests No potential conflict of interest.

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Consent to participate It is a fact I will be your true member. And this review will serve all users freely.

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References

Abera L (2017) Fisheries production system scenario in Ethiopia. Int J Fish Aquat Stud 5(1):79–84
Abebe G (2016) Studies on the diversity, relative abundance and feeding habits of fish in the upper river awash basin, ethiopia. Dept Bio Ambo Univ, p 67
Asmare E (2017) Financial viability of hatchery rearing of ooreochromis niloticus at dera district, amhara region, ethiopia. J Fish Aqua Dev. FAO (1990) CIFA report of the 5th session of the sub-committee for the development and management of the fisheries of lake victoria. Mwanza, Tanzania, 430(12–14):97
FAO (2002) Global aquaculture production fishery statistical collections. FAO Fish Aquaculture Dept Rome 10
FAO (2006) State of world aquaculture 2006. FAO Fish Tech Paper Rome, pp 134. https://www.fao.org/docrep/009/a0874e/a0874e00.htm
FAO (2009) Farm pond for water, fish and livelihood. FAO, Rome
FAO (2012) The state of world fisheries and aquaculture 2012. FAO Fish Aquaculture Dept Food Agric Organ UN, Rome
FAO (Food and Agriculture Organization) (2016) The state of world fisheries and aquaculture, contributing to food security and nutrition for all. FAO, Rome
Gatriay T (2020) Review on assessment of factors affecting fish production and marketing in Gambella region, ethiopia. Sci World J 8(1):124–136. https://doi.org/10.1155/2020/5260693
Getahun A, Dejen E, Anteneh W (2008) Ethiopian Nile Irrigation and Drainage Project Coordination Office, Ministry of Water Resources. Fishery studies of Ribb River, Lake Tana Basin, Ethiopia
Gordon A, Sewmehon D, Melaku T (2007) Marketing systems for fish from lake tana, ethiopia. Opportunities mark and livelihoods, Nairobi, Kenya
Hussein A, Alayu Y, Ermias M (2012) Fish resource survey in benishangul-gumuz regional state based. The fourth annual conference of the ethiopian fisheries and aquatic sciences association (EFASA). The Role Aquat Resour Food Secur Ethiopia, pp 219–245
Kebede A, Meko T, Hussein A, Tamiru Y (2017) Review on opportunities and constraints of fishery in Ethiopia. Int J Poult Fish Sci 1(1):1–8
Lake A, Tadesse Z, Dagne A (2016) Technologies suitable for aquaculture development in Ethiopia. Ethiopia Fish and fisheries Association
Lemma A (2017) Fisheries production system scenario in ethiopia. Int J Fish Aquat 5(1):79–84
Meko T, Kebede A, Hussein A, Tamiru Y (2017) Review on opportunities and constraints of fishery in Ethiopia. Fish Sci 1(1):1–8
Natea G, Wakjira M, Negisho T, Endebu M (2017) Spawning response of african catfish (Clarias gariepinus (Burchell 1822), Claridae: Teleost) exposed to different piscine pituitary and synthetic hormone. Int J Fishe and Aquatic Stud 5(2):264–269
Natea G (2019) Aquaculture potential, status, constraints and future prospects in ethiopia: A Review. Int J Adv Res 7:336–343
Tilahun A, Alammo A, Getachew A (2016) Review on fish production constraints inethiopia. World J Fish Mar Sci. 8(3):158–163
Verschuren D, Thomas CJ, Hedy JK, David NE, Peter RL, Erik TB, Michael RT, Hecky RE (2002) History and timing of human impact on Lake Victoria, East Africa. Proc R Soc Lond B Biol Sci 269:289–294
Zewdie T (2016) Welcoming speech: proceedings of the eighth annual conference and workshop of EFASA, 12–13 Feb. 2016, Debre-Birhan, ethiopia
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