Aquaculture In Kenya;
Status, Challenges And Opportunities
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Mbugua H. Mwangi.
Directorate of aquaculture development, Kenya
e-mail; mnakaronga@gmail.com
INTRODUCTION

Fisheries Sub sector contribution to National Economy.
The Kenya’s fisheries sector plays an important role in the national economy. The sub sector contributed 0.5% to GDP in the year 2006. This figure may be higher if value addition at the various stages of the supply chain are considered and post harvest losses minimized. The sub sector growth was estimated at 4.1% in 2005 (National Economic Survey, 2006).

As an economic activity earning people a living, the industry is very important to fishing communities, fish traders, fish processors and fish farmers. The sector supports about 80,000 Kenyans directly and about 800,000 others indirectly, assuming a dependency ratio of 1:10. In 2006 a total of 159,776 MTons metric tons of fish valued at KShs 8.7 billion to fishers was produced in the country. In the same ear, fish exports earned the country approximately KShs 5 billion.

AQUACULTURE DEVELOPMENT

Aquaculture in Kenya
Aquaculture entails growing (farming) of fish and other aquatic organisms in control environment. The farmed fish or organisms are deemed to be of commercial value. Aquaculture is the only viable alternative source of fish especially at this time when the natural stocks of fish are declining. Kenya has great potentials for aquaculture growth because it is endowed with climatic diversity, natural features and other resources that favour the culture of a wide variety of aquaculture species. However, though not yet quantified, only a small portion of these resources are utilized.

Aquaculture in Kenya can be categorized into three broad divisions. These are;
- Warm fresh water aquaculture dominated by the production of various species of tilapia and the African catfish (Clarias gariepinus) mainly under semi intensive systems using earthen ponds.
- Cold fresh water aquaculture involving the production of rainbow trout (Oncorynchus mykiss) under intensive systems using raceways and tanks.
- Marine water aquaculture (mariculture) which is underdeveloped

The Tilapine species constitute about 90% of aquaculture production in Kenya. Polyculture of the Tilapines with the African catfish is under mixed sex culture systems. The production of the Tilapines and the African catfish is characterized by low pond productivity mainly due to poor seeds and employment of low pond management practices. The result has been stagnation of National aquaculture production over the past decades. Because of the poor perception of aquaculture as an economic activity, it has been
difficult to promote its commercialization, as most potential investors are not convinced that aquaculture can be a profitable enterprise.

**Aquaculture Production**

Aquaculture contributes about 1% of the total national fish production. Approximately 1,000 m. tons are harvested from 7,477 small ponds owned by about 4,742 fish farmers. The current mean yield from fish farming is approximately 5.84Mt/ha/year. It is important to note here that this figure could be much higher if fish produced and consumed by farmers, bait and ornamental fish produced are accounted for.

**Government policy interventions**

The Government recognizes the constraints hindering aquaculture growth and development and realizes that the sub-sector can play an important role in poverty alleviation of rural populations. It could also play a key role in provision of protein food and reduction of fishing pressure in capture fisheries. During the preparation of the Poverty Reduction Strategy Paper, aquaculture development was identified as a core activity for funding through the Medium Term Expenditure Framework (MTEF) budgeting system. Following this development in addition to the reorganization of the government functions, aquaculture has been prioritized and is now one of the four core functions of the Department of Fisheries. Given the fisheries potential, GoK has taken a keen interest and given aquaculture and fisheries in general the priority it deserves.

**Government initiatives**

1. Over the years, the government has constructed several aquaculture facilities in various parts of the country. These facilities serve as research centers, training facilities for fisheries personnel and fish farmers, aquaculture demonstration centers and sources for fingerling to farmers. Some of the important ones are:
   1) Sagana Fish Farm -Kirinyaga
   2) Kiganjo Trout Hatchery - Nyeri
   3) Ndaragua Trout Farm - Nyandarua
   4) Chwele Fish Farm -Bungoma
   5) Chwele Fish Farm (Lake Basin Development Authority)-Bungoma
   6) Wakhungu fish farm-Busia
   7) Sangoro Research Station (Kenya Marine and Fisheries Research Institute)- Rachuonyo
   8) Kibos Fish Hatchery (Lake Basin Development Authority)-Kisumu

2. Capacity building through training and deployment of technical staff to work in the aquaculture sector. The training range from short certificate courses to post graduate training.

3. Development and provision of aquaculture information through:
   - Internet; In the former Ministry of Livestock and Fisheries development web site
   - Periodical publications like the departmental Samaki News magazine
• Aquaculture brochures (two already in circulation)
• Aquaculture production manuals (Two already developed)

4. Development of tilapia feed with 30% protein content at the Sagana Aquaculture centre which is currently available to tilapia producers
5. Development of links and collaborations with local and international institutions of higher learning, research institutions and international organisations.

**Opportunities to enhance aquaculture contribution to National development**

Aquaculture as a potential contributor to national development is presented with a lot of opportunities in Kenya. Some of these are:

1. Recognition by the government in its various strategic development papers as a priority area especially for the rural development and the government has created conducive climate in which aquaculture can flourish.
2. Aquaculture can easily be integrated into conventional farming including small scale crop and animal production in the rural areas and maximize resource use
3. Aquaculture management involve issues conventional farmers deal with e.g. stocking, harvesting feeding etc
4. Aquaculture is a legitimate user of land and water; consequently, industry has equitable access to the aquatic resource base.
5. Aquaculture is considered in the development of fisheries management policies.
6. Aquaculture development is focused and implemented, in a manner consistent with national objectives, and standards.
7. The government is harmonizing policies and regulations essential to aquaculture development.
8. The government has put in a lot of effort in research and development and technology transfer which are prerequisites for industry development.
9. An appropriately trained workforce essential to aquaculture development is in place.

**Major Challenges to Aquaculture Growth in Kenya**

There are a host of challenges facing the growth of Kenya’s aquaculture industry. These challenges are surmountable if deliberate efforts are directed to addressing specific areas of problems. Some of the most important challenges include:

1. Uncoordinated promotion of aquaculture through many institutions, which include Government, research institutions, Universities, NGOs, and Regional Authorities, among others. This has not facilitated
1. Aquaculture growth because the farmer is left confused by many different extension officers who visit and give varying information.

2. There is no comprehensive policy on aquaculture, including legislation and this is an indicator of the low priority the policy makers have accorded aquaculture as an economic activity.

3. Lack of certified quality seeds (fingerlings) and commercially produced feeds.

4. Weak research programmes that are not demand-driven

5. Inadequate training programs for farmers and extension workers.

6. Inadequate outreach programs and inefficiency in dissemination of technology transfer to farmers. Many farmers with good land that can be put into profitable aquaculture are not even aware of this potential.

7. Poor record keeping by farmers and inefficient statistical data collection has impeded information dissemination on viability of aquaculture.

8. Low funding of the sub-sector activities by the Government and low investments by the private sector.

9. Inadequate entrepreneurship skills by farmers and lack of credit.

Areas To Focus To Revitalize Aquaculture Growth

In order to expedite aquaculture development in Kenya, there is a great need for a paradigm shift. There is need to change the extension approach to aquaculture development for meaningful development in to be realised. For this to take effect, aquaculture must be treated and operated as a personal enterprise with the sole aim of making economic gains to the investors. Therefore, the following strategic issues are seen as critical areas of intervention in the process of revitalising aquaculture development in Kenya;

I. **Weak policy and legal framework in aquaculture sub-sector.**

The Kenyan aquaculture sector has operated without a comprehensive aquaculture policy and legislation. This has reduced management and research effectiveness, discouraged investment in aquaculture, and constrained production and growth. To address this issue, the Ministry will undertake to:

i). **Create an enabling environment through**
   a). Develop an aquaculture policy and legislation
   b). Develop an aquaculture master plan and strategic plan
   c). Develop aquaculture standard operating procedures

II. **Poor access to markets**

The development and access to markets of aquaculture products is constrained by poor state of roads, and inadequate market information and infrastructure, fish diseases and pests, lack of sanitary and phyto-sanitary standards for
aquaculture products. Also, aquaculture products diversification and value addition are not yet fully developed.

To facilitate access to markets, the ministry will undertake to;

a). Develop marketing infrastructure
b). Build capacity support for communities and farmers’ organizations (Common Interest Groups) in marketing
c). Organize promotions through trade fairs/stakeholder forums
d). Develop market information systems
e). Promote and mainstream sanitary and phyto-sanitary standards in aquaculture
f). Promote investment in aquaculture through Public Private Partnerships (PPP).
g). Promote and facilitate value addition for aquaculture products
h). Promote and facilitate recruitment of new aquaculture species
i). Develop aquaculture extension guidelines and standard operating procedures (SOPs).

III. Low Productivity and output

To take advantage of available domestic and international market, the aquaculture sub-sector must improve its competitiveness. This calls for strategies that entail sustainable increase and improved efficiency in the production systems. This will be achieved by encouraging:

a). Breeding programmes to expand access to improved aquaculture genetic material
b). Promoting environmental protection and conservation by developing an aquaculture checklist programme,
c). Promoting integrated aquaculture production systems,
d). Production of certified fish seeds and feeds
e). Developing standards for fish feeds and establishing fish Seed Certification Units (FSCUs).
g). Undertake effective dissemination of effective aquaculture technologies including on-farm trials
h). Enhancing collaboration and linkages with relevant research institutions/stakeholders and undertaking pluralistic demand-driven research (in line with the National Agriculture Research System policy)
i). Developing business oriented aquaculture extension packages
j). Facilitating access to affordable credit to investors in aquaculture

IV. Weak institutional capacity

Policy implementation depends on existence of strong and appropriate institutions. The changed role of government in a liberalized market economy
requires that public institutions to facilitate and support the private sector and other stakeholders to implement policy. This requires clarity in the role of different institutions and a service delivery system that empowers people at the grassroots to own the development process.

This will be achieved through

a). Reforming and restructuring the aquaculture sub-sector (by development of two functional lines in aquaculture i.e. aquaculture production and aquaculture extension)
b). Developing a service charter

V. Weak Monitoring and Evaluation framework

The department of fisheries currently has no Project Monitoring and Evaluation unit and the ministry will therefore undertake to address this weakness by;

a). Developing a comprehensive baseline information database for aquaculture development
b). Creating a monitoring and evaluation strategy for aquaculture development
c). Developing framework for aquaculture development Monitoring and Evaluation
d). Mainstreaming M an E within the functions of aquaculture division

VI. Inadequate information technology

This will be addressed by mainstreaming and enhancing ICT in aquaculture through development and implementation of an integrated information management system.

OPPORTUNITIES IN AQUACULTURE FOR EMPLOYMENT AND SUSTAINABLE LIVELIHOODS.

With an overall growth rate of 11% a year since 1984, aquaculture has been the world's fastest growing food-producing sectors for nearly 20 years. Approximately 90% of the total aquaculture production comes from developing countries, and a large proportion of this is produced by small-scale producers in Low Income Food Deficit Countries (LIFDCs). According to FAO, aquaculture can make an important contribution to poverty alleviation, food security and social well-being, and already does so in many developing countries. However, although potential abound in Kenya, it has not yet been fully realized.
Aquaculture provides food of high nutritional value for households, and when small-scale farmers combine agriculture and aquaculture they improve their food supply, increase their income and become better able to withstand shocks. It decreases the risk to production, increases farm sustainability and in general boosts rural development.

Although it has not been scientifically quantified, Kenya has enormous potential for aquaculture production in the agricultural rural zones. Extensive water bodies provide great potential for food and incomes for rural population. However poverty and protein deficiency persists among communities living within reach of such resources. The Kenya Integrated Household Survey of 2005/06 indicated that 46% of the rural population living near perennial and seasonal water bodies fall below the poverty line. This is despite the potential these water bodies hold. Kenya’s focus has mainly been on producing more food, earning higher incomes and improving economies in these rural areas and aquaculture provides the opportunity to ensure food security, alleviate poverty, and promote social equity and prosperity in such areas. This was clearly demonstrated through the on farm trials done by the Aquaculture Collaborative Research Support Programme (ACRSP) program funded by USAID which helped change the approach to aquaculture in Kenya and contributed to the rapidly changing attitude towards commercial fish farming in Kenya. The program demonstrated that aquaculture can be a lucrative business opportunity, which can address the problems of poverty and food insecurity for the rural poor. The dramatic productivity improvement where collaborating farmers in an on-farm-trial, realized an increase of 350% in net average annualized production, raised hopes to both potential and existing farmers who have access to this information.

In some Low-Income Food-Deficit Countries (LIFDCs) where aquaculture has been taken seriously, it contributes significantly to poverty alleviation and to the enhanced supply of fish products to resource-poor people in rural and urban areas. There are many developing countries who export aquaculture products, and in some cases aquaculture has become a major source of foreign exchange which is invested to further the development of such Nations. This can also be realized in Kenya if the potential benefits of aquaculture are acknowledged.

Opportunities for aquaculture investment in Kenya exist in:

i). **Integrated aquaculture:** Aquaculture can easily be integrated with conventional crop and livestock farming. The management techniques and inputs employed are similar to those that crop and livestock farmers are familiar with. Integration has a lot of benefits for farmers in addition to the production of fish for consumption or sale. It increases efficiency in use of available production resources by allowing for recirculation of nutrients among different production units.
ii). **Cage culture:** This can be done in rivers, water reservoirs, lakes, Indian Ocean and in the many water reservoirs and pans in the country. The advantage here is that more benefits can be generated from such water bodies than currently is, and the technology and the capital input do not have to be overwhelming.

iii). **Bait culture:** There exists a very big market for bait (juvenile *Clarias gariepinus*) fish for the Nile perch capture industry in Lake Victoria. The technology for the culture of the bait fish exists locally among aquaculture experts and many farmers and a large market exists in the Lake region.

iv). **Ornamental fish culture:** There are only a handful of ornamental fish producers in Kenya. There are great opportunities in ornamental fish culture. There exists a ready market for the products locally, within the east African region and also outside the region.

v). **Declining capture fisheries and the increasing demand for fish and fisheries products** offers great opportunities to producers towards meeting both the increasing local and export demand for fisheries products.

vi). **Diversification** on crop and livestock farming which can not only put to productive use otherwise idle land during certain seasons but also other resources that could support aquaculture production.

vii). **Integration with livestock farming in ASAL** regions where fish could be stocked in water reservoirs meant for livestock watering. This would increase the benefits accrued from such water bodies by diversifying sources and increasing security for quality food and sources of income.

viii). **Culture-based fisheries.** There exist many water reservoirs in the country. These include domestic water reservoirs, livestock watering reservoirs in the ASAL areas and the hydro electric dams. Culture based fisheries involves stocking of such reservoirs with appropriate fish species of commercial value which is later harvested when mature. This can have an overall effect of increasing the fisheries resource base and therefore food security and incomes to fishers.

**CONCLUSION**

Ministry of Fisheries Development seeks to implement various programmes that shall contribute to the achievement of the Economic and Social pillars of the National Vision 2030. These are well articulated in the *Fisheries Strategic Plan*. In this regard, effort will be made to promote sustainable utilization of fishery resources in order to increase fish production.

The current low farmed fish production and inadequate aquaculture information notwithstanding, it is apparent that fish farming in Kenya could be developed into a viable enterprise, capable of supporting enormous economic activities in Kenya and increasing the fisheries resource base. Indeed aquaculture is the only viable alternative source of fish especially at this time when the natural stocks of fish are declining.
The success of development sustainable aquaculture in Kenya lies in promotion of aquaculture as a viable investment opportunity where potential investors see opportunities to make attractive economic gains. The Ministry of Fisheries Development will back this promotion by spearheading the development of higher yielding, market oriented aquaculture species and efficient aquaculture production technologies.

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