

## THE FUTURE OF TILAPIA CULTURE IN NIGERIA

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### ABSTRACT

The culture of tilapia is assuming a greater importance globally. However, Nigeria's contribution to global production is insignificant. Although Egypt and Nigeria were the only African countries that had record of tilapia production in 1950, Egypt has left Nigeria far behind. The problem of prolific breeding still persists in our farm making it difficult to raise tilapia to a good market size. The paper reviews Nigeria fish production, supply and demand forces and the contributions of leading tilapia producers; namely China, Thailand, Indonesia Egypt to mention a few. It reiterates some of the credentials of tilapia that makes a good candidate for culture, the species for culture and the place of tilapia in the world fish market. The paper examines some of the limiting factor hindering the development of tilapia Industry and ways of mitigating such factors.

### INTRODUCTION

Aquaculture production is growing rapidly to provide food fish for the world's rapidly growing population and provides approximately 40% of food fish consumed by humans (FAO, 2006). Many capture fisheries are currently harvested at or above maximum sustainable levels, and are in global decline because of overfishing and habitat degradation (FAO, 2004). Wild fish genetic resources are being depleted and some are facing extinction. The total aquaculture production was 55.1 million tons/yr in 2006, and freshwater aquaculture accounted for 35.0 million tons/yr of this production (63.5%) (FAO, 2007). The current world population of 6.91 billion consumes about 118 million tons/year of fisheries products, and a population of 9.15 billion that is predicted by 2050 would need about 156 million tons/year (an additional 34 million tons/year). Because capture fisheries are not projected to increase, aquaculture must supply the entire future increase in demand for fisheries products. To meet the increasing demand for fish, aquaculture production should be increased by 50 million metric tons by 2050 ( Tarcon and Forster, 2001).

### FISH PRODUCTION AND COMSUMPTION IN NIGERIA

Nigerian is a large consumer of fish and it remains one of the main products consumed in terms of animal protein. It is cheap and highly acceptable, with little or no religious bias, which gives it an advantage over other forms of animal protein such as poultry, pork or beef (Eyo, 2001). Presently, Nigeria population is estimated at 167,000,000. However, demand for fish is put at 2.66million metric tons while domestic supply is about 680,000 metric tons, leaving a deficit of over 1.9 million metric tons. In order to meet the short fall in supply, Nigeria expends huge financial resources on importation, thus depleting our foreign reserve. Presently, Nigeria is the largest importer of frozen fish globally.

The fishery sector is estimated to contribute 3.5% of Nigeria's Gross domestic product (GDP) and provides direct and indirect employment to over six million people (FDF, 2007). The bulk of domestic fish production comes from natural population which has exceeded its maximum sustainable yield. It therefore implies that the surest means of boosting our domestic fish supply is through aquaculture. Many species of fish have high potential for culture in Nigeria. They include *Clarias gariepinus*, *Heterobranchus species*, *Heterotis niloticus* and tilapia among others. The culturable tilapia in Nigeria includes *Sarotherodon galileaus*, *Tilapia zilli*, *T.guineensis*, *Sarotherodon melanotheron* and *Oreochromis niloticus*. These tilapias classified based on reproduction, development, feeding structural characteristics and biogeography, are among the important fish species for freshwater aquaculture in tropical and subtropical areas.

### TILAPIA PRODUCTION: A GLOBAL VIEW

Tilapias are important freshwater fish species for aquaculture in different regions of the world. They are currently referred to as 'aquatic chicken' due to their fast growth, adaptability to a wide range of environmental conditions, disease resistance, high flesh quality, ability to reproduce in captivity and converting food low plant protein to high quality flesh (El-Sayed, 2006). It is currently cultured in 100 countries of the world. Global landing of tilapia from capture fisheries increased progressively during the 1950s to 1980s. During the 1990s and early 2000s, the landings were almost stable, fluctuating around 585,000-600,000 metric tons (Nguyen, 2008).

In the early days of the 20<sup>th</sup> century, tilapias were wild fish in the great lakes and rivers of Africa. In the central African countries, farming of tilapias in ponds was introduced after Second World War. After that, the tilapia species were spread over most of the tropical and sub-tropical countries of the world. In recent years, commercial farming of several species of tilapia has become a common practice in aquaculture throughout several regions of the world such as China, South East Asia, Africa, USA and Latin America/Caribbean (Vannuccini, 1998).

## THE PLACE OF AFRICA IN TILAPIA PRODUCTION

Africa is by far the most important tilapia producer from capture fisheries, where it contributed about 70% of global landing in 2002, followed by Asia (18%), North America (9%) and South America (3%). Therefore, it is no surprise that, among the world's top ten tilapia producers from capture fisheries, six are African countries. In addition, Egypt and Uganda, the first and second largest world tilapia producers (capture fisheries), landed over 138,000 and 98,000 Mt in 2002, representing 20% and 14% of global landings. The top ten producers included three Asian countries (Thailand, the Philippines and Sri Lanka) and one North American country (Mexico). Among all tilapia species, Nile tilapia (*Oreochromis niloticus*) is the most important identified species in capture fisheries. In 2002, the production of that species approached 253,871 Mt, representing 37% of total production. Other identified species include Mozambique tilapia (*Oreochromis mossambicus*), blue tilapia (*Oreochromis aureus*), jaguar guapote (*Parachromis managuensis*) and mango (Galilee) tilapia (*Sarotherodon galilaeus*). However, most tilapia catches are not identified. For example, 59% of the catch in 2002 was reported under 'unidentified' cichlids, 'mouth brooding' cichlids and 'unidentified' tilapias.

There is a considerable potential for achieving Nigeria's objective of increasing fish protein production by farming tilapia in diverse receptacles.

## TILAPIA PRODUCTION IN NIGERIA

In 1960, only two countries in Africa had record of tilapia production. They were Egypt (2,100 MT) and Nigeria (1,299MT) (El-sayed, 2006). It is however sad that today, tilapia production in Egypt exceed 500,000MT (Megbowon and Bombatta, 2011) while Nigeria produces about 50,000 MT (FDF, 2007). The bulk of this production from Nigeria is mainly from capture fisheries. The success of tilapia production in Egypt stemmed from the drive in monosex production through sex reversal using 17 $\alpha$  methyl testosterone.

In Nigeria, tilapia culture production is predominantly an extensive land-based (earthen ponds) system practiced at subsistence levels (Fagbenro, 2002) while commercial tilapia culture is yet to become popular and widespread (Afolabi *et al.*, 2000). With an estimated one million hectares of coastal zone, which offer considerable potential for commercial aquaculture, the activity is a developing venture. Tilapia aquaculture industry produced 14,388 tonnes in 2000 and increased to 19,546 tons in 2005; and was based mainly on *O. niloticus* (Fagbenro and Adebayo, 2005). Tilapia culture is capable of contributing to food security, poverty alleviation, employment and income generation in Nigeria.

Tilapia culture in Nigeria has remained largely a subsistence level activity until 2000, when it began to expand rapidly following the successful commercial farming of catfishes during the last decade (Alfred and Fagbenro, 2006; Afolabi *et al.*, 2007).

The starting point for tilapia development should be family selection of natural populations of *O. niloticus* from our rivers and lakes. This selection should be to the 5<sup>th</sup> generation. This will provide base population for genetic development. As a follow-up, the use of androgen for sex reversal should be explored. After hatching of *O. niloticus*, the gonadal cells have not differentiated to ovarian or testicular tissues. The introduction of appropriate androgen helps to skew the sex, thus producing 85-95% male. Furthermore, many lakes, rivers and lagoons provide opportunity for installation of cages which will reduce the cost expended on energy for aeration and water supply.

The future of tilapia culture in Nigeria is not clear. Problem in fish management still arise in tilapia production because of its prolific breeding (Jayasankar *et al.*, 2012). The shortage of culture inputs such as feed, power, labour, poor extension services more importantly in remote areas and technical experience are other main handicaps for tilapia culture development in Nigeria. These factors may limit the future expansion of tilapia culture in the country. However, tilapia culture may still play a significant role in rural development in Africa if it is integrated with other plant/animal farming systems. Considering Nigeria population growth, the gap between demand and supply for fish and tilapia credentials as a good candidate for aquaculture, it is imperative for Nigeria to invest in the development of tilapia culture (Megbowon *et al.*, 2009).

## CONCLUSION

Nigeria has an enormous potential to develop its tilapia industry. The future of tilapia farming remains bright, despite the somewhat disappointing recent statistics if appropriate action is taken to ameliorate the current challenges. In Nigeria, wherever inland aquaculture flourishes, tilapias are likely to be a major farmed fish commodity. This can be true if research is better directed towards meeting farmers' needs; if better breeds and farming systems are improved altogether, if our large bodies of water are adequately utilized for cage culture and if tilapia farming becomes a more sustainable and environmentally compatible enterprise.

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