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Review

Effective fish health management strategy in Nigeria: A review

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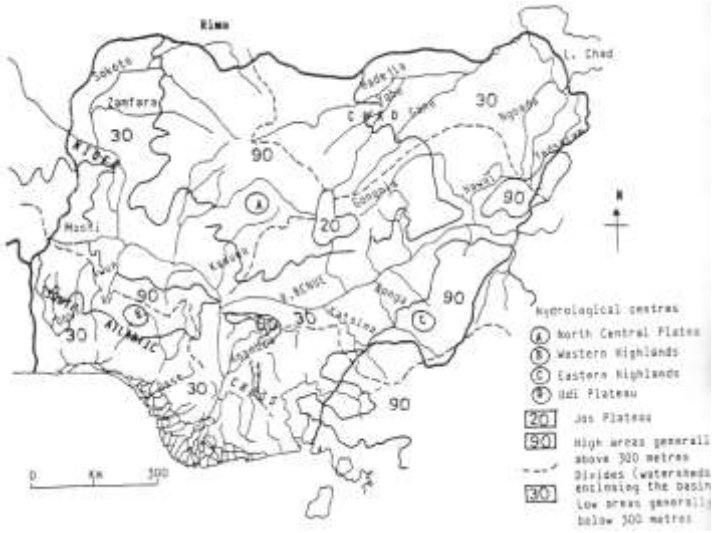
The paper reviewed issues of increased aquaculture production in the country and the need to address the health of fish for consumer's safety. Nigeria has moved rapidly from aquaculture production level of 25,720 metric tonnes in 2000 to 85,087 metric tonnes in 2007 as reported by the federal Department of Fisheries while the estimated aquaculture potential is actually 2.5 million metric tonnes. The aquaculture sector has recently been characterised by high capital investment, intense material and labour inputs, more over one of the policy objectives of the national aquaculture strategy is to achieve an effective National safety and quality assurance system that can protect consumer's health. The consumer can only be protected through production of healthy fish. Fish health care is an aspect of aquaculture design and management; hence the need to put in place all points of hazard critical control programme that will meet the required international standards at the farm level. Meanwhile, the Fish Disease unit at the Federal level should mandate all departments of Fisheries at the State level to set up Fish Disease unit and appoint focal officers for fish health management. Training institutions must endeavour to review their curriculum on fish diseases in the various aquaculture programmes to pay adequate attention to emerging fish health issues.

Key words: Fish health, policy, public health, aquaculture.

INTRODUCTION

Globally, fish provides more than 1.5 billion people with almost their entire average per capita intake of animal protein and 3.0 billion people with at least 15 per cent of such protein (SOWFA, 2010). Also, Mohan (2009) stated that the global annual growth rate for aquaculture is 8-10 per cent compared to 3 per cent for livestock and 1.6 per cent for capture fisheries. Nigeria has a growing aquaculture industry with an area of 923,768km^2 out of this land mass, 112,085 km^2 has sufficient water for fish farming and 696,314km^2 making 75 per cent has moderately sufficient water for fish production(Abdullah, 2007). The country has moved rapidly from aquaculture production level of 25,720metric tonnes in 2000 to 85,087 metric tonnes in 2007 (FDF, 2007). Nigeria has a vast hydrological centres with several networks of rivers, streams and creeks that are linked to each other as shown in figure 1 (Satia, 1990). This extensive network of rivers, inland waters, lakes and lagoons is estimated at more than 5 million hectares (Eyo, 2003). Okaeme (1996) estimated that 2000 earthen ponds of various sizes, 3000 concrete tanks and 63 hectares commercial fish farms exist in Nigeria and many more are added annually. More than half of all the Universities in the country offer courses in Fisheries either in the agricultural or science based faculties along two main fisheries colleges-Federal College of Fresh water Fisheries Technology located in the Northern part of the country and the Federal College of Fisheries and Marine technology in the Southern part of the country (UMTE, 2010). This is coupled with other polytechnics offering Fisheries and aquaculture diplomas. Institutional support available had been pointed out in the National Aquaculture Strategy for Nigeria (2008) where it is stated in section 4:6 that the development of human and material capacities is essential to enforce standards of fish products through the Standard organization of Nigeria (SON), National Agency for Food and Drug Administration (NAFDAC), Nigerian Institute of Oceanography and Marine Research (NIOMR), National Institute for Fresh Water Fisheries Research (NIFFR) and the Federal Department of Fisheries in the Federal Ministry of Agriculture and Rural Development. These formed the strength of the country to be able to establish a formidable team to be in charge of fish health and public health for consumers and to take care

Figure 1. Network of Rivers in Nigeria.



SOURCE: Satia (1990)

of fish farmers losses through fish diseases. Economic losses through fish diseases may not have been given much attention in Nigeria due to weak human capacity, poorly equipped and non-accredited laboratories, and lack of disease reporting linkages and fish farmers' inability to recognise disease conditions. Meanwhile, in other parts of the world estimated loss were presented due to fish diseases, for instance Faruk et al., (2004) reported a 15% estimated economic loss by farmers due to fish diseases in Bangladesh, while Bondad-Reantaso and Subasinghe (2010) gave reports of $15 million estimated losses due to Koi herpes virus in Indonesia, while in South Wales Australia a production loss of $30 million was reported for white spot and yellow head diseases of shrimp. As stated by Bondad-Reantaso et al*., (*2009) fish disease control are viewed from different angles, which include environmental protection, population control, human health epidemiology, site selection, culture techniques monitoring and sanitation of aquaculture facilities, diagnosis and treatment of diseases of cultured species, avoidance of nutritional diseases, prevention of epidemics or mortalities in cultured facilities, formulation and implementation of regulatory measures to control National and International spread of diseases, development of disease resistant strains through genetic selection and hybridization and individual and mass immunization of cultured species. Adequate consideration of all these disease control measures in the country is therefore advocated for in this paper.

Emerging fish health issues

Diseases rarely affect fish under ideal circumstances but when something in the environment is not right the stress weakens the fish thus become susceptible to illness. These stress factors can be living and nonliving. Living sources of stress of fish include parasites, bacteria, fungus and the least common which is virus. Some normal and obligate bacterial pathogens may cause diseases under stressful environmental conditions (Sarig, 1976; Ogbondeminu, *et al*, 1991). In Ogbia and Yenagoa Local Government Area of Bayelsa State it was reported that 89.39% of fish farmers observed fish disease symptoms of which haemorrhagic lesions was highest (Adeyemo, 2011). Diseases that are gradually emerging in catfish production in Nigeria as reported by Agbede (2012) are Furunculosis a bacterial disease, other bacteria infections are ascites, necrosis syndrome caused by Aeromonas sp, haemolytic syndrome caused by Enterobacter sp, Staphylloccoccus sp or Vibro sp. White spot disease caused by a parasitic protozoan *Ichthyophthirius multifiliis* and other non infectious diseases that can be categorized as environmental, nutritional and genetic for example Ameloblastic odontoma. The Nation should however be at alert for other diseases that may emerge as listed by OIE (2011).

Farm level hazard critical control programme

Intensive culture practices with poorly controlled feed use and waste production adversely affect local environment, there is therefore the need to develop, sustain and publicize better husbandry practices, for instance, reducing the use of antibiotic for fish disease treatment. This brought about the introduction of HACCP which is the Hazard critical control programme in use especially for food products. This involves seven principles specific to any facility where food is produced,

the principles are namely- hazard analysis, critical control point, critical limits, monitoring, corrective action, record keeping and verification.(CDC,2012) All these seven principles must be employed in every farm whether small or large scale, to ensure production of healthy fish for human consumption. Therefore, a plan must be put in place to identify hazards associated with fish production and determine how to prevent, eliminate, or reduce to acceptable levels. A team must be commissioned to carry out these principles the team will consist of every staff involved in production and it must be multidisplinary in nature (Almond Board of California, 2010). In an integrated farm, a critical control point is the time of application of organic fertilizer which must be closely monitored to prevent zoonotic diseases. In intensive production, feed storage should be critical point to watch out for to prevent application of mouldy foods. It is necessary in any preventive / protection programme to identify the disease and reservoirs to have adequate knowledge of the transmission mechanism, to develop an effective method of preventing the access of pathogens and their reservoirs into culture facilities and providing environmental conditions conducive to the maintenance of healthy conditions among cultured species (Okaeme and Olufemi, 1988; Okaeme et al, 1988; Ogbondeminu et al 1991; Agbede, 1998).

Effective national safety and quality assurance system

Over the decades, aquaculture has expanded and diversified, based on movements of animals and animal products such as brood stock, seed and feed. Such movements are major player in the introduction and spread of pathogens and diseases into aquaculture systems. An effective health management programme must cover all levels of aquaculture activity, from the production unit till it gets to the consumer. Any suspicion or confirmation of the presence of a listed disease or an increase in mortality needs to be notified at the national level. The obligation to notify is applied to any professional that is aware of the situation (such as the owner or manager), any person to accompany the animals during transportation, veterinary practitioners or aquatic animal health professionals, official veterinarians and private laboratories. The OIE (2011) regulations stated that, in case of suspicion of a listed disease, appropriate sample collection and submission to a designated laboratory has to be carried out. While waiting for the results, the farm/area is placed under official surveillance and no aquatic animals are allowed in or out of the facilities/area. At this point, an epizootic investigation is performed with the aims of finding out the possible origin and means of contamination, the animal movement prior to notification, the health status of other farms and the establishment of a containment area appropriate to the disease in question, including a protection zone and a surveillance zone around the area. This decision clearly states that the movement of live aquatic animals can be done only between zones/farms with the same health status (approved [disease-free] zone, approved [disease free] farm, unapproved zone, unapproved farm, approved [disease free] farm in the unapproved zone disease free, buffer zone). Considering this OIE regulation a zoning programme ought to be implemented in igeria through the efforts of the various State Department of Fisheries in collaboration with the State Veterinary Offices, while the Federal Department of Fisheries remain the coordinating institution with a focal section in the Quality Assurance and Fish Disease management Division. According to Sandev and Farmer (2001) impacts of transboundary disease movements extend beyond direct mortalities and production losses, they are particularly hard felt by small –scale farmers, who represent the backbone of many rural communities in developed as well as developing countries like Nigeria. Aquaculture losses in these situations directly threaten the livelihoods of whole communities through reduction in food availability, loss of income and employment, with all the associated social consequences. As pointed out on capacity building, in order to have adequate knowledge on diagnosis, control and prevention of fish diseases in the country a serious and critical review of the fish health management content of the curriculum in the various Veterinary training institutions, Fisheries Colleges and Polytechnics and departments in the Universities with Fisheries and aquaculture programmes ought to be urgently carried out.

CONCLUSION

Diseases will continue to emerge, efforts to control them will be pursued and there will always be a range of problems to be tackled along the way (Sandev and Farmer, 2001). Capacity building especially in our various training institutions must place emphasis on International Aquatic Animal Health Requirements, Formulation of Policy and Strategy on Aquatic Animal Health, Risk Analysis for aquatic animal movement, Food safety, Surveillance and reporting of Aquatic animal diseases. Availability of Infrastructures, Funding, Information and Data will go a long way in formulating an effective fish health management programme and this must be done through the political commitment and setting of priorities by government, in which case the Federal Department of Fisheries in synergy with all the state's Department of Fisheries in the country should form a Fish health Network programme in order to develop a sustainable fish health policy for the country. This network should not only be aquaculture experts but

including experts in fish feed industry, fish marketing, environmental scientists and other relevant sectors. Mohan (2009) stated that commitment and proactive approaches by national governments can only make implementation of responsible aquatic animal health management strategies a reality. Implementation of national strategies including surveillance, disease reporting and contingency planning should be seen as national programs and not as projects of individual institutions or organizations. All stakeholders have a role to play.

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