

## FISH HANDLING AND WELFARE: A SUSTAINABLE WAY OF IMPROVING FISH PRODUCTION IN AQUACULTURE

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### ABSTRACT

Fish is one of the most important aquatic animals of protein source to every household in Nigeria. Most of the fishes produced in Nigeria come from aquaculture. Behavioural and physiological status of fish handling and welfare are crucial in farmed fish. Thus, handling and welfare of fish becomes an issue of public concern. Aquaculture production practices such as movement of fish from place to place normally exposes fish to a lot of stressors, reducing rate of feeding and increasing mortality. Proper handling of fish in aquaculture practices will promote biosafety of food consumed in our environment if the source of fish and materials used in transporting fish is known. There is need for fish to be provided with proper animal management practices such as good water quality, adequate stocking density, good quality feed, protection from diseases, predation, poaching, and adequate materials for fish transportation. Therefore, the paper reviewed the effects of fish handling and welfare on varying areas of fish production and practices, and ways of ensuring effective fish handling and welfare for improved fish production.

**Keywords:** Fish handling, Welfare, aquaculture, Sustainability, Nigeria.

### INTRODUCTION

Fish serves as means and source of food security to many individuals, households and countries by providing cheapest food source of protein and high foreign earnings (Olaniyi, 2015). The global population is increasing and, in order to maintain at least the current level of per-capita consumption of aquatic foods, the world will require an additional 23 million tonnes thereof by 2030 (Mancuso, 2013). This additional supply will have to come from aquaculture (FAO, 2012). With the expansion of the fish farming industry comes growing concern for the well-being of increasing numbers of aquatic animals raised and killed for human consumption (Håstein, 2004). In aquaculture, in fact, fish are often exposed to stress conditions, due to farming practices such as manipulation, selection, high stocking density, transportation, the conditions of pre-slaughter and slaughter methods (Mancuso, 2013). The increase in fish farming has raised the question as to whether modern fish farming fulfills the welfare principles laid down in the so-called 'five freedoms' (Southgate and Wall, 2001; Huntingford *et al.* 2006). A number of

studies have indicated that there is cause for concern about fish welfare (Cawley, 1993; Braithwaite and Huntingford, 2004; Chandroo *et al.* 2004a; Broom, 2007). Fish handling and welfare are considered as issues of public health concern in aquaculture, due to poor quality fish and fisheries products transported to the market. Handling of fish has to do with the way fish is physically handled and transported from one place to another either in live or death forms. Proper handling of fish in aquaculture practices will promote biosafety of food consumed in our environment if the source or materials used in transporting fish is known. The World Organisation for Animal Health (OIE) defines animal welfare by the way in which an animal copes with the conditions in which it lives (Huntingford and Kadris, 2009). An animal is in a good state of welfare if, as indicated by scientific evidence, it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and not suffering from unpleasant states such as pain, fear, and distress. Thus, animal welfare refers to the state of the animal. The treatment that an animal receives is covered by other terms, such as animal care, animal husbandry, and humane handling (Martin, 2016).



Welfare can be defined in terms of physical functioning, behavioural nature and subjective experiences (Appleby, 1999). For some authors, it is in the dominion of the mental experiences that welfare assumes all its relevance as a concept (Dawkins, 1990; Duncan and Fraser, 1997). There is need for fish to be provided with proper animal management practices such as good water quality, adequate stocking density, good quality feed, protection from diseases, predation, poaching, and adequate materials for fish transportation. Therefore, the paper reviewed the effects of fish handling and welfare on varying areas of fish production and practices, and ways of ensuring effective fish handling and welfare for improved fish production.

#### **Effects of Fish Handling and Welfare on Varying Areas of Fish Production and Practices**

##### **Transportation of Fish**

Juvenile fish are often transported to farms or sea cages to be fattened. On reaching slaughter weight, they are in some cases transported to the slaughter plant. Loading and transport can cause extensive stress in fish (Iversen *et al.*, 1998). The capture/loading process is for most species the most stressful part of transport (EFSA, 2004a). During transport, fish can sustain injuries from physical interaction with other fish or abrasion with the tank walls (Cooke *et al.*, 2004). Poor conditions during transport, such as overcrowding and inadequate water quality, may result in irreparable damage to the fish and mortality (Rosten *et al.*, 2005). Transporting fish poses a significant risk of spreading disease. Because of this and the welfare problems involved, Compassion in World Farming is opposed to the transport of live fish over long distances. Transport must be kept to an absolute minimum.

##### **Crowding, Handling and Grading of Fish**

Fish are sometimes crowded to aid handling, for example prior to grading, counting, transport and slaughter. Crowding is undertaken in order to make it possible to access fish; it involves gathering the fish into one section of the enclosure and leads to abnormally high stocking densities. Crowding is stressful and can lead to damage to scales, skin ulceration, eye and snout damage and bruising (Wall, 2000). Many farm

activities – stripping, vaccination, tagging and marking, grading and splitting, loading prior to transport and unloading, movement to the stunning point – involve handling the fish and/or moving them around the farm. Handling is stressful, particularly if it entails removal from the water. It can result in scale loss, injuries to eyes and fins and muscle bruising (Willoughby, 1999). Handling can also lead to injuries to the skin, which is fishes' first line of defence against disease, and to damage to the mucous coating which secretes a protective layer over the skin and is a primary protection against pathogens and parasites.

##### **Stocking Density**

The stocking density of fish if not well managed can pose great danger to the welfare of fish, for instance, EFSA has concluded that stocking density is a major factor affecting salmon welfare and that high stocking densities in salmon may lead to increased aggression levels, physical damage and decreased water quality (EFSA, 2008).

In addition to these, stocking density is said to be pivotal factor affecting fish welfare in the aquaculture industry, especially where high densities in confined environments are aimed at high productivity (Ashley, 2007).

##### **High densities can lead to:**

- i. Increased susceptibility to disease; moreover once disease enters a crowded enclosure, high densities facilitate its transmission (Håstein 2004).
- ii. Deterioration in water quality (e.g. a reduction in dissolved oxygen concentrations and an increase in the level of un-ionized ammonia) as more fish are respiring and metabolising in a particular volume of water (Ellis, *et al.*, 2002a).
- iii. Increased aggression which leads to fin injuries, scale loss, chronic stress and subordinate fish being prevented from feeding by dominant fish (Ellis, *et al.*, 2002a).

##### **Ways of Ensuring Effective Fish Handling and Welfare for Improved Fish Production**

###### **Selection and breeding**

Animal welfare can be improved by selecting for characteristics, such as good adaptation to local conditions and disease resistance. Typical



practices include: Controlling the timing of breeding and egg production by manipulating day length and through the use of hormone treatments. (Martin, 2016).

#### Water quality

Water quality is arguably one of the most critical factors affecting finfish welfare and should be closely monitored in all aquaculture systems. Some species (e.g. carp) are very tolerant of poor water quality, coping with a wide temperature range, low oxygen levels and high levels of suspended solids. Nevertheless rapid changes in water quality can cause welfare hazards. For example, algal blooms can affect pH balance and toxicity, and collapsed algal blooms can deplete oxygen levels and releases ammonia (Martin, 2016).

#### Stocking density

Stocking density is a major factor affecting fish welfare and is perhaps the easiest for fish farm managers to control. Stocking density influences fish health and welfare at all lifecycle stages and its effects interact with other aspects of fish welfare. Excessive stocking density can lead to fin damage and other injuries, increased aggression, behaviour alteration (including reduced feed intake) and increased vulnerability to infectious disease. All of these are significant welfare hazards (Martin, 2016).

#### CONCLUSION

Applying the principles of ethics and welfare to aquatic animals involves supplying the things that are necessary for sustaining life, optimizing health and minimizing visible discomfort (Hastein et al., 2005). Increasing mortalities are a clear indication that serious welfare problem exist, often from environmental effects, poor water quality, and infection. There is need for fish to be provided with proper animal management practices to reduce stress and welfare assaults that fish face. Aquatic animals should be afforded proper environment, good water quality and space to allow them full range of their natural behaviours, and be protected from stress arising from overstocking, poor quality feed, diseases, predation, poaching, transportation and inhumane slaughter (Håstein, 2007).

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