

Artisanal Fishers and the Adoption of Fishing Technologies in Bayelsa State, Nigeria.

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Abstract

Capture fishery is a major subsector of Agriculture and major contributor to the Nigerian national economy. Numerous threats to the environment such as pollution, floods, destruction of mangroves, irresponsible infrastructural development, oil exploration, destructive fishing, affect the lives and working conditions of fishing communities and their productivity. Bayelsa State is a major coastal state and occupies a large expanse of the Niger delta with the main occupation of the people being artisanal fishing and farming characterized the use of simple fishing gear and techniques. This paper looks at how the adoption of technology has imparted on the livelihood of the artisanal fisher communities.

Introduction

Fish supply in Nigeria is either through capture fisheries, fish farming or fish importation (Dasuki et.al, 2014) with artisaal fisheries supplying about 90% of total domestic fish needs in Nigeria (Akankali and Jamabo, 2011). Artisanal capture fisheries and aquaculture play leading roles in domestic fish production in Nigeria (CBN, 1994) producing over 82% of the domestic fish supply (Faturoti, 2010).

The major participants are the rural dwellers (Ogbe and Odiba 1996) who carry out these activities in streams, rivers, lakes, man-made reservoirs, creeks brackish waters and coastal waters up to 12 nautical miles from shore. Capture fishery is a major subsector of Agriculture exploiting water resources (Gaffar, 1996) and is labour intensive (Regier, 1982). Le Sann (1998) reported the estimate of between 12 and 13 million registered fishermen directly involved in the business of capture fisheries as an underestimation. Nigeria is a coastal state with a lot of fishery resources both in marine and inland waters (Gaffar, 1996) capable of producing over 980,000 metric tons of fish annually (FDF, 2007). Nigerians depend on fish as the main source of animal protein and fish has become a major substitute to beef (Ogbe and Odiba, 1996). In Nigeria artisanal fisheries employ over 500,000 people who are engaged in direct fish production (Mabawonku, 1985). Artisanal fishery is a major contributor to the national economy through the generation of foreign exchange, licensing fees (Satia, 1995), employment (FAO, 1993), health improvement through hobby relaxation for some people and provide a valuable supply of animal protein to the increasing population. The economic importance of artisanal fisheries is invaluable; jobs that result from associated activities such as boat building, engine maintenance, ice production and manufacture of fishing gear (Ugenyi, 2004) is massive.

The technology of fish exploitation under small scale fisheries in Nigeria inland fisheries is mainly characterized or known by the use of simple fishing gear and techniques (Ahmed and Tagogo, 2014), lack of modern equipment and low funds for expansion (Adaka et. al; 2014).

Large population of artisanal fishermen relying on the predominant use of small fishing gears are found around the coastal line (Farida et.al; 2012). Bayelsa State is a major coastal state and plays host to the expansive delta of the River Niger. Bayelsa State dissected centrally by longitude 6° 0 00" E and Latitude 4° 30" N is located in the heart of the Niger Delta of Nigeria. Oyadongha (2004) noted that the main occupation of the people of Bayelsa State is fishing and farming. However some are engaged in jobs they receive salary at the end of every month as their main occupation.

According to IFAD (2001) Technology is the physical infrastructure, machinery and equipment, and the associated knowledge and skills, and the capacity to organise and use all of these. It is a vital contribution to people's livelihood. Technology is also crucial to avoiding the environmental damage and waste caused by certain fishing practices.

Contributions of Improved Fishing Technology to Livelihood.

Numerous threats to the environment affect the lives and working conditions of fishing communities. These include pollution, destruction of mangroves, irresponsible infrastructural development, oil exploration, destructive fishing techniques, ecological disasters such as flood, privatisation of fisheries resources and deforestation. Most of the above has been suffered by artisanal fisher communities in Bayelsa State Nigeria. These, in one way or another, may displace or affect fishing communities directly or indirectly. And may affect their access to resources and/or damage the resources themselves. They also eliminate jobs, security, income and livelihood (ICSF, 1994).

In comparing the income of fishermen in Bayelsa State before and after the adoption of improved fishing technologies, (Ugenyi, 2004) observed a significant different between those that adopted fishing net, outboard engine and smoking technique and non-technology adoptees. This implies that adoption of improved fishing technologies increased the fishermen income.

Technology is a vital contribution to people's livelihood and also crucial to avoiding the environmental damage and waste caused by certain fishing practices such as unnecessary by-catch (Christopher *et al*, 2003). Motorized fishing boats has increased access to more turbulent sections of coastal waters which were otherwise not very well accessed by traditional canoes and boats. It has also cut down travel time and energy wasted it boat propulsion by use of man-powered paddles.

Technology has impacted the lives of artisanal fishers in Bayelsa State in different sectors. These can be classed into fishing gear use, fishing craft, post-harvest management of catch and marketing and distribution. The average income of fisherman that adopted synthetic fishing net in the freshwater and brackish water, improved smoking technique and outboard engines has improved catch and income.

Fishing Gear Type in use in Bayelsa State: The fishing gears used are mainly passive methods of fish capture. Gear used include hook and lines, cast nets, gill nets, trap and entangle nets. Active gear, like trawls, cast nets and some other gears are also used in the area. Their success depends more or less upon man's skill or perseverance. The fishermen influence the success of an active gear by leading the gear into the path of the fish or by driving them into it. Catches per unit of effort is very low, at marginal level. FDF 1996 reported about 10% artisanal fleet were mechanized, however this has changed. Most of the fishing activities are done within 12 miles of land from their home village. Modernised

fishing gears, incorporating synthetic materials in replacement of natural twines e.g. polyamides, polyesters and others with properties in accordance with the needs of the different fishing has taken over the use of natural materials. Synthetic gear increases the strength and durability of fishing nets. Rafts and rowing boats have been modernised to motor vessel with increasing power hence, increasing the efficiency of fishing crafts and opening up near fishing grounds. 88.6% of fishers in the state adopted improved fishing net and about 70% adopted smoking technique but because of the cost of smoking kiln some resolve to the traditional way of smoking with wood on raised platform (Ugenyi, 2004).

Post-harvest management of catch: Fresh fish is one of the most perishable food (Eyo 2001) the high ambient temperature in the tropic hastens fish spoilage by accelerating the activities of bacteria, enzymes and chemical oxidation of fat in fish flesh. Le Sann (1998) estimated post-harvest losses to be as high as 50% in Africa. This is because spoilage sets in once the fish is caught. In Nigeria, estimated fish loss due to poor preservation to be between 35% to 40% of the landed weight of fish from the artisanal fishery sector (Tobor, 1990). Technologies relating to post-harvest handling adopted in Bayesa State include use of improved fish drying/smoking kilns, use of ice in preservation of fish and freezing. Use of traditional platforms of mud, metal or bricks drums as smoking oven are rapidly being replaced by modern more hygienic kilns. Ugenyi (2004) enumerated the disadvantages of smoking by traditional methods to include:

- very small batch of fish can be processed per time and this increases the processing time.
- needs for regular turning of fish at intervals to prevent or reduce burning the fish.
- control of the amount of heat produced is difficult and charring of fish is common.

Most of these has been addressed by adopted improved smoking technology like the Kainji gas kiln.

Marketing and distribution: One prominent application of technology to artisanal fisheries is the use of GSM phones. Almost all artisanal fishers in Bayelsa State use mobile phones to communicate with family, suppliers of fishing gears and middle-men fish marketers. This is one technology that has been greatly accepted amongst fishers. In Bayelsa State, most women are very active in artisanal fisheries, especially processing and marketing of fish (Alfred-Ockiya, 2000; Kingdom *et al.*, 2008) and have adopted the use of mobile phones in communication and even for bank transactions.

Factors that Influence the Adoption of Fishing Technology.

However effective a particular fishing technique appears at first, it will always ultimately reveal some drawbacks. The development of fishing technology has been influenced by many different factors such as the kind of fishing ground, physical aspects of the river or the sea, availability of resources, and different levels of demographic pressure. And these affect the adoption of such technology. Appropriate fishing techniques according to Le Sann, (1998) should meet the following criteria: result in increased productivity; is accepted and used by fishermen; is cost is accessible to the majority; is ecologically sound, threatening neither the environment nor the fish stocks; and does not create new dependencies.

About 48% of the fishermen in Bayelsa State are married and in the middle-age years of 31-40 years (Ugenyi, 2004). The proportion of youth is few and this affirms the need to encourage young people to be engaged in fishing, as this will help boost production. There are more males in the profession. According to the Le Sann (1998) in western Africa and in

Asia, women market 70-80% of marine produce. Fishing is generally considered to be a man's job, even though women may play an important role. Adoption of technology could be affected by level of education. Most artisanal fishers in Bayelsa are educated up to secondary school level. Ugenyi, 2004 reported 89% education amongst artisanal fishers in Bayelsa State. This attribute of artisanal fishermen in Bayelsa State could have helped their innovativeness and ensure quick and proper understanding of modern technology helping in adoption.

Tawari and Davis, (2009) reported a higher innovation or technologies rate among fishers having the largest number of wives, children and other dependents.

Problems militating against technology adoption by artisanal fishers in Bayelsa State

The major problems affecting the fishing activities of the fishing communities, non-availability of fund (Ahmed and Adamu, 2014), high cost of fishing inputs, high rate of post-harvest losses, pollution of water bodies by the oil companies and high cost of transportation. The power to purchase new implements and extend facilities for improved and higher productivity was dictated by individual financial capability (Tawari and Davies, 2009). The Micro Finance Policy of Federal Government of Nigeria (CBN, 2005), which is meant to contribute to rural transformation, reduce unemployment and enhance the implementation of the National Economic Empowerment and Development Strategy (NEEDS) is yet to be fully implemented in the state (Kingdom and Alfred-Ockiya, 2009).

Conclusion

As demand for fisheries products grows in the coming decades, technology must play a crucial role in helping supplies keep pace with demand in a sustainable way. Technologies that improve information and management of fisheries are needed.

New and improved technologies will be needed to expand and improve livelihood options; and increase productivity and incomes.

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