

Aquaculture Strategy Brief

National Fish Sector Overview

The Nigerian fisheries sector is an important sector from both an economic and social standpoint. In 2009, the sector contributed approximately US\$1 billion to the country's GDP. In coastal communities the sector is an important contributor to employment, livelihoods, and household food security.

The supply of fish to the Nigerian market is met by both domestic and imported sources. The total supply of fish in the country is approximately 1.5 million metric tonnes with a wholesale value of approximately \$1 billion. The domestic supply consists of wild captured and farmed fish. In 2010 the domestic supply was approximately 851,420 metric tonnes disaggregated into 619,375 metric tonnes of captured fish, 200,535 metric tonnes of farmed fish and 31,510 tonnes from industrial trawling¹. Although domestic supply is currently dominated by wild captured fish, pollution and unsustainable fishing practices are gradually eroding the dominance of this channel.² Conversely, the supply of farmed fish is gradually increasing from 20% of domestic fish supply in 2009 to 24% in 2010³. The imported supply consists of frozen fish and smoked fish. Approximately, 648,580 metric tonnes of frozen and smoked fish is imported into the country.

The national demand for fish is currently estimated at 2.7⁴ million metric tonnes. A figure which is anticipated to grow due to the rising awareness of the health benefits of consuming fish, steady population growth⁵, and rising incomes. Domestically, fish reaches the end market consumer in a smoked, fresh, or iced form. The smoked fish channel is comprised of either imported smoked fish or domestic wild captured and farmed fish processed by "smokers" before retailing. The unprocessed fish channel is comprised of imported frozen fish and fresh wild captured and farmed fish.

Given the complexity of the Nigerian fisheries sector, this brief will focus on the domestic fresh fish segment of the sector (an overview of which is provided in the following section). The domestic fresh fish market is dominated by farmed fish (representing 80%⁶ of supply) with the remaining supply met by wild captured fish. As such, the brief will further focus on the domestic aquaculture value chain.

Niger Delta Fisheries Sector

Overview

The fisheries sector—comprised of both the farmed and wild capture fish—is an important sector in the Niger Delta in terms of its contribution to employment, livelihoods, and food security. This is particularly true in the riverine communities where communities rely almost exclusively on the fisheries sector as a source of income and food. Participants in the sector include small-scale pond fish farmers and fishermen (who capture both fin fish and shell fish) as well as pond fish farmers, distributors, marketers, transporters, credit service providers, and boat, engine, and net repairers.

¹Federal Ministry of Agriculture and Rural Development, Fisheries Department (2010)

²For example, in 2009, (excluding the less than 5% contribution from industrial trawling activities), Nigeria's domestic fish production reached approximately 751,007 metric tons, of which 80% was capture fisheries, and largely artisanal. In 2010, capture fisheries consisted 76% of the country's domestic fish production.

³Farmed or cultured fish have contributed 20% to the domestic fish supply in 2009 at 152,796 metric tonnes increasing to 24% in 2010 at 200,535 metric tonnes

⁴National Bureau Of Statistics/ Federal Ministry Of Agriculture And Rural Development Collaborative Survey On National Agriculture Sample Survey (Nass), 2010/2011

⁵Nigerian population is 140,003,142 with an annual growth rate of +3%.

⁶Figure based on fieldwork by MADE analyst and opinions of industry experts.

The fresh fish segment of the sector is worth approximately N41,563 billion supplying a total of 58,247 metric tonnes⁷ into the market. The bulk of supply—approximately 41,711 metric tonnes of fresh fish worth approximately N25,027 billion—comes from farmed fish. In contrast the wild capture channel supplies approximately 16,536 metric tonnes⁸ of fresh fish valued at N16,536 billion.

In terms of demand, it is estimated that the potential demand for fresh fish in the Niger Delta stands at approximately 376,200 metric tonnes⁹. End market demand for fresh fish products comes from households, formal institutions such as hotels, caterers, and restaurants, and informal institutions such as pepper soup joints, fish barbecue spots (also known as point and kill) and local eateries (also known as bukas). In terms of demand patterns, there is a slight preference for fresh fish consumption over smoked fish.

In terms of employment, the sector directly supports an estimated 12,066¹⁰ pond fish farmers of which 3,016 (30%) are female. While approximately 1,100 artisanal fisher-folk are engaged in the capture of fin fish and shell fish for the live fish market¹¹. The majority of wild capture fishermen are based in the coastal communities of Delta, Akwa Ibom, Bayelsa, Cross River and Rivers States. In those coastal communities an estimated 80% of residents are engaged in fishing activities. In addition, some 18,000 people of whom 98% are women are involved in the wholesale and retail of fish products in the region.

The key elements of the Fresh Fish Sector are summarised in the table below.

	Supply Volume	Supply volume Value	Producers(#)	Fisherfolk(#)
Aquaculture	41,711MT	N25,027bn	12066	-
Artisanal	16,536MT	N16.536bn	-	1100
Total	58,247MT	N41,563bn	12066	1100

Table 1: Summary of the Fresh Fish Sector in the Niger Delta Region

Aquaculture Value Chain

The Aquaculture value chain is an important and growing value chain in the Niger Delta. The sector is important to the regional economy representing some N25 billion in value. Importantly the sector is growing, as illustrated by an increase in production from 16,619 tonnes in 1995 to 200,535 tonnes in 2010 representing 1106% growth.

Recognising the importance of the sector to the economy the Federal Government of Nigeria launched the Agricultural Transformation Action Plan for Aquaculture. The plan is nation-wide, with state-specific activities aimed at improving functions across the entire aquaculture value chain. Illustrative activities include the rehabilitation of hatcheries, training on fish value addition, and the establishment of model fish markets.

Where do we focus

⁷Federal Ministry of Agriculture and Rural Department, Fisheries Department (2010) National figures are estimated as 200,535MT and using the extrapolated ratios from NASS/FMWARD collaborative survey draft report 2011/2012

⁸From fieldwork 5% of the wild captured fish is sold in the fresh fish sector

⁹Based on figures from Projected Population and Fish Demand by Federal Ministry of Agriculture and Water Resources Fisheries Department/ Fisheries statistics of Nigeria (2007) for 140 million population. The entire Niger Delta Region fish demand is projected at 585,000 metric tonnes with approximately half that demand as fresh fish demand

¹⁰ From fieldwork estimates

¹¹ The majority of the 241, 147 fishfolk engaged are in capture of fish for the smoked fish market. This market will be covered in separate brief.

MADE will initially focus on Rivers followed by Abia, Bayelsa, and Akwa Ibom which as illustrated by the table 2 (below) have some of the highest concentrations of pond farmers in the Niger Delta. The decision to focus on Rivers initially is driven by the enabling environment in the state. In particular, the stated aim of the RSSDA to make Rivers State the “Fish Basket of Nigeria” and its on-going efforts to achieve said goal. The focus on Abia state is driven by the wish to build on a recently completed (2011) World Bank MSME programme which sought to foster growth in homestead farming activities. Although Delta state has the highest concentration of pond farmers, PIND’s presence in Delta state entails that MADE should focus elsewhere.

LOCATION	POND FARMERS
RIVERS	3,000
DELTA (clusters in Warri, Asaba, Isoko LGA)	3,784
BAYELSA	800
EDO	600
AKWA IBOM	255
IMO	200
ABIA	3,321
ONDO	6
CROSS RIVER	100
TOTAL	12,066

Table 2: Location of Pond Farmers in the Niger Delta

Why do we focus?

The key interrelated reasons why MADE choose to focus on the aquaculture value chain are outlined below.

a) Strong market demand

The increased awareness of consuming fish over other forms of protein as well as population growth¹² has created a strong market demand for fresh fish. The unmet demand for fish products is currently estimated at 1.16million metric tonnes. With the appropriate support, the Niger Delta aquaculture industry has the potential to meet that demand.

b) Poverty Reduction Potential

The strong market demand in the sector is driving sector growth with accompanied job creation and improved incomes for sector participants in particular fish farmers who are dependent on fisheries for their livelihoods. Growth in the sector is also being supported through federal government incentives, subsidies and creation of enabling environment.

c) Improved technologies

The sector has benefitted from several technological advances which have increased the efficiency and profitability of the sector. Technological advances include the introduction and improved availability of the genetically improved strain of the African Mud Catfish (*Clarias Gariepinus*).The genetically modified strain is both hardy and tasty. Other improved technologies include improved pond construction technologies that have made catfish farming possible in a diverse range of sites. In addition, fish feed production for catfish has improved in terms of quality and quantity. These technological advancements have led to the possibility of intensive, small-scale commercial farming in the region.

¹² Nigerian population is 140,003,142 with an annual growth rate of +3%.

Value Chain Profile

End Markets

There are three primary end markets for fresh fish:

1. Household consumers
2. Informal Eateries
3. Formal Institutions

Approximately 90% of the fresh fish supply goes to household consumers and informal eateries (e.g. bukas and point and kill barbecues), while the remaining 10% goes to formal institutions such as hotels, catering companies, and restaurants. The primary differentiator between the formal markets vs. informal and household market is the size of the fish; formal markets prefer larger fish of 1.5kg and above.

Potential Growth

The growth of the sector is being driven by population growth, rising awareness of health benefits of consuming fresh fish over other forms of protein and technological advances in production. It is projected that by 2015 the potential demand for fish nationally will be 3.53million metric tonnes¹³. In the Niger Delta the projected demand is estimated to be 776,600metric tonnes, which pond fish farmers in the Niger Delta have the potential to meet.

Competitiveness

The price competitiveness of the farmed fish vis-à-vis wild capture fish and ice fish is illustrated in table 2 (below). As illustrated a kilogram of imported ice fish retails at between N1000 and N1100, while farmed fish retails at between N1000 and N1200, and wild capture at between N2500 and N3000. However, the price of imported iced fish has been on the increase. If this trend continues, domestic farmed fish will become increasing price competitive in comparison to both wild capture and iced imported fish.

In regard to actors within the sector, there is negative competition between producers and marketers on the level of profit sharing, with farmers desiring to make more profits from their products. In Delta state, the cooperative famers have successfully colluded to maintain profit margins by controlling the supply of fish into the market (thereby avoiding incidences of fish glut). However, farmers in other Niger Delta states have been unable to effectively organise to control the supply of farmed fish into the market.

FRESH FISH PRODUCT	Wild Capture Fish	Farmed Fish	Ice Fish
WHOLESALE PRICE/Kg (primary source to retailer)	700-1000	550-800	350-531
RETAIL PRICE/Kg (Retailer to end consumer)	2500-3000	1000-1200	1000-1100

Table 2: Comparative Prices in Fresh Fish Sector
Value Chain Structure

Participants

¹³ Federal Ministry of Agriculture and Rural Department, Fisheries Department (2007)

Participants in the value chain are input providers, producers, regional traders, wholesalers and retailers. Relationships between some value chain actors are weak. In particular the relationship between producers and marketers which has resulted in collusion.

Inputs Providers

In the fresh fish sector, the key input suppliers are fish feed and fish seed companies.

Fish Feed

Fish Feed constitutes 60-65% of the pond operation cost; inefficient management of the fish feeding regime greatly impacts on the cost of growing out the fish. There are several types of fish feed available in the local market, broadly categorised into: foreign floating extruded feed, local floating extruded feed, local sinking pelleted feed and homemade sinking feed.

Foreign Floating Feed

In the local market, foreign extruded floating feed is considered premium feed as a consequence of its efficient feed conversion ratio of 1:1 (1Kg feed grows out 1Kg), length of time at which it stays afloat, and high crude protein content. Foreign extruded feed is the most expensive feed available on the market costing between N5,300-N6,000 per 15Kg bag. The major foreign feed available on the market is: Coppens (imported from Holland), Sharp (imported from China), Multifeed (Imported from Israel) and Ziegler (imported from USA).

Local extruded floating

Local extruded floating feed is gaining popularity among the Niger Deltan farmers due to improved floatability characteristics, crude protein content, and its appeal to the fish. The price of local floating feed begins at about N3,600. Companies involved in the production of local extruded floating feed are: Top Feeds in Sapele, Calabar and Ibadan, Obasanjo Feeds, CHI Feeds, Nikseg and Vital Feeds in Jos.

In general, farmers prefer floating feed because it forces fish up to the surface to feed; enabling farmers to observe the fishes' eating patterns and general state of health.

Local Sinking Pelleted Feed

Local sinking pelleted feed is produced by several local feed companies including: Durante Feeds, Makakoti Feeds in Ibadan, and Jomas Feeds in Warri. Local pelleted feed is cheaper than extruding feed, beginning at a price of approximately N150/kg. Unlike extruded feed which is pre-blended, the composition of pelleted feed can be determined by the client. The client can also buy the feed components and pay the company to pelletize the feed components.

Homemade Sinking Feeds

Homemade sinking feeds are formulated by individual fish farmers in accordance to their needs. The components are then compounded by the farmer or by a feed company at a fee. The price per kilogram varies according to the components but averages at N120/kg.

In recent years, the number of fish feed distributors has increased. As such, the variation in the price of feed in Ibadan (South West Region) versus the price in Warri (Delta State) is negligible. However, the productivity of the farmers from the Niger Delta Region remains lower than their South Western counterparts due to feed wastage. In addition, the cost of feed in the Niger Delta still remains high.

Fish Seed

The second most important input in the sector is fish seed. Fish seed is produced by hatcheries which are responsible for the production and sale of hatchlings. As of 2011, there were approximately 50 hatcheries in the Niger Delta. The majority of which are located in Rivers State where in 2013 there were 15 standalone fish seed breeders and 30 small-scale breeders. Hatcheries retail fingerlings at a cost of N10-12 each and juveniles at N25-N30 each. The fingerlings or juveniles are either transported by the hatchery or the farmer to the pond.

The hatcheries industry is relatively unregulated. This lack of regulation in part allows unscrupulous hatchery operators to deceive farmers into buying defective fish seeds or 'runts'. The consequence of which has been business failures for some farmers.

As a result, a number of fish farmers are expanding their operations to include fish seed production for their own use as well as sale to fellow producers. This behaviour has also been driven by hatcheries' poor breeding practices leading to scarcities of fingerlings in markets like Rivers and Imo States.¹⁴ As well as the desire of fish farmers to lower their production costs.

Producers

The producers in the aquaculture value chain are the fish farmers. Fish farmers in the Niger Delta can be broadly categorised according to their fish seed stocking density. Fish seed stocking density is defined as the amount of fish seed in a pond. According to this definition, fish farmers in the Niger Delta can be differentiated as follows:

- Homestead: 500-10,000 fish seed stocking density
- Medium: 10,000-50,000 fish seed stocking density
- Large: 50,000-120,000 fish feed stocking density

Homestead farmers and medium farmers are MADE's target population.

Homestead farmers are farmers who mainly buy fingerlings or juveniles and grow them until they are ready for sale. They have no brooders nor do they grow their own fingerlings. Most of them have one to three ponds (usually within their residential compounds) and produce at small scale for personal consumption; selling the excess. Increasingly many of these farmers are breeding their fingerlings for stocking due to issues of bad quality fingerling supply and increased technical knowhow. In rural communities it is common to practice integrated farming methods.

This type of small-scale farmer makes up about 80% of the total number of producers. They usually produce about 100 kgs (0.1 tonnes) per month.

Small-scale homestead farmers occasionally graduate into small-scale commercial farmers. Small-scale commercial farmers supply between 0.4 – 10 tons/month and have about 3,000 – 10,000 fish under management.

Medium producers typically have 10,000-20,000 fish under their management; equating to an output of 10-20 tonnes per month. They often have a farm manager and farm employees. In addition

¹⁴Ansa(2014),Challenges and Production of fish hatcheries in Niger Delta region of Nigeria Draft Report submitted to MADE

medium producers often have their own hatcheries, brooding stock, and facilities for artificial insemination. They typically sell to consumers via wholesalers.

Regional Traders

Regional traders buy fresh fish in bulk from farm gates and aggregate before exporting the fish across state lines. The hard work and entrepreneurship of these traders has allowed farmed fish to be traded within and outside the Niger Delta Region. Notable inter-state trade flows include the flow of live fish products from Delta State to Bayelsa to supply the Mbiama and Zarama markets on their respective ethnic market days which are Tuesdays and Fridays weekly. As well as the importation of fresh fish from the South West region into Delta State. The importation of fish from the South West region is particularly prevalent as a result of the greater efficiency of fish production by farmers from South West thereby causing lower production costs and competitively priced live fish products.

Wholesalers

These are traders who buy fish at the farm gate in large quantities, resell to retailers such as market women, retail outlets (such as restaurants, bukas, fast food retail shops, etc) and other smaller distributors. The wholesalers or market mummies buy about 100– 200kg weekly at a farm-gate price of about N500/kg 1kg size and N650–N700/kg for about 1.5kg size of catfish.

Retailers/Market women

The market women play a very crucial role in the entire value chain. They buy from the wholesalers and sell at the local markets. However the relationship between the retailers and the producers (farmers) needs greater facilitation and strengthening to allow for greater profit sharing between the two groups. Presently the retailers make more than the farmers per kilogram fish (approximately 100% more).

Support Organizations

Rivers State Sustainable Development Agency (RSSDA)

The Rivers State Sustainable Development Agency (RSSDA) is an agency established by the Rivers State Government to run strategic programmes that target poverty alleviation, rural development and youth empowerment. It functions under the office of the Executive Governor of Rivers State.

The agency's aim is to stimulate rural socio-economic growth through the creation of viable and sustainable agricultural and agro-processing programmes targeted at integrating the rural poor into agricultural supply chains; making them active contributors to the mainstream economy of Rivers State, the Niger Delta and Nigeria as a whole. The specific aims of the programme are the:

- The development of a demand driven market strategy that will stimulate agric and agro allied development,
- creation of a robust and versatile platform that will enable all actors in the sector to effectively link, capture synergies hence avoid fragmented efforts and enhance the overall impact. Towards this end an e-platform which would allow for e-commerce activities by various actors in the chain especially the producers and input suppliers is to be launched in January 2014,
- creation of support institutions and mechanisms that will strengthen the capacities of the rural farmers for a more efficient, lower cost and an expanded business operations.

NGOs, CBOs and Religious Organisations

There are a myriad of NGOs, CBOs, and Religious Organisations which operate as influencers in their communities and an organisational platform with which to engage with potential partners and beneficiaries.

Support Services

Financial Services

Banks

It is difficult to access loans from the formal financial system. Banks generally do not understand the fish farming business and this is a constraint. This constraint should be in part addressed by low interest loans guaranteed by the Federal Government of Nigeria and disbursed through the Agricultural Development Bank, but these loans also remain difficult to access by farmers.

Other Credit Access Options

Many owners of small to medium farm holdings derive their start-up capital from savings made working in other jobs. Loans are also granted by family members and friends.

Private Consultants

There are a number of service providers who support the sector to fill a void in needs by the private participants in the value chain with respect to productivity, access to technology, husbandry, pond construction and farm management. Some examples include:

- MomohFish Farm Ltd, Port-Harcourt (consultancy, training and extension service provider)
- AquatonKonsults Nig. Company (Consultancy, training and extension service provider) Asaba (Delta State)
- Florishing Aquaculture Company (Consultancy, training and extension service provider),
- Wealth Agro (Marketers of fish feed, medications and supplements)

Producer Associations

Producer Associations advocate on behalf of members for policy and institutional change and provide services including: helping set standards and disseminate knowledge; creating networks to strengthen business linkages and improve distribution channels (for example by developing mechanisms for large buyers and end users e.g. assisting fast food chains to contact farmers directly or through the associations), and providing information on input and output prices and trends in major markets. Policy advocacy may be specific to the industry, including issues such as formalising standards and accreditation systems or addressing wider investment climate issues such as access to finance, infrastructure, addressing administrative barriers and so on.

Associations such as the Rivers State Aquaculture Society (RISAQUAN), the Grassroot Farmers and the United Ufuoma Farmers Association (UUFFA) exist only at a state level. Whilst other associations, such as the Catfish Farmers Association of Nigeria (CAFAN) and the Fishing Society of Nigeria (FISON) exist on a national level and have branches nationwide. Associations are prevalent across the Delta.

Despite the benefit of producer associations there are documented challenges including political or portfolio farmers who do not own farms being part of an association's membership just to receive

hand-outs. This dynamic in turn has bred lack of trust among members thereby weakening the fabric of the associations.

Extension Services

Extension officers of the State Ministry of Agriculture and Agriculture Development Projects provide support to fish farmers. However the numbers of officers to attend to farmers are 1:80. The officers are faced with constraints such as lack of funding to go out to the farm stations and also in some cases lack technical capacity to carry out the work.

The RSSDA has also provided some extension services via select programs. In areas where the RSSDA has provided extension services the contrast between pond farmer's operational management and production skills is notable when compared to areas where the intervention has not yet been rolled out. However, even impacted farmers remain relatively poor record keepers and do not fully adopt all they were taught in their day-to-day activities.

Research Organisations

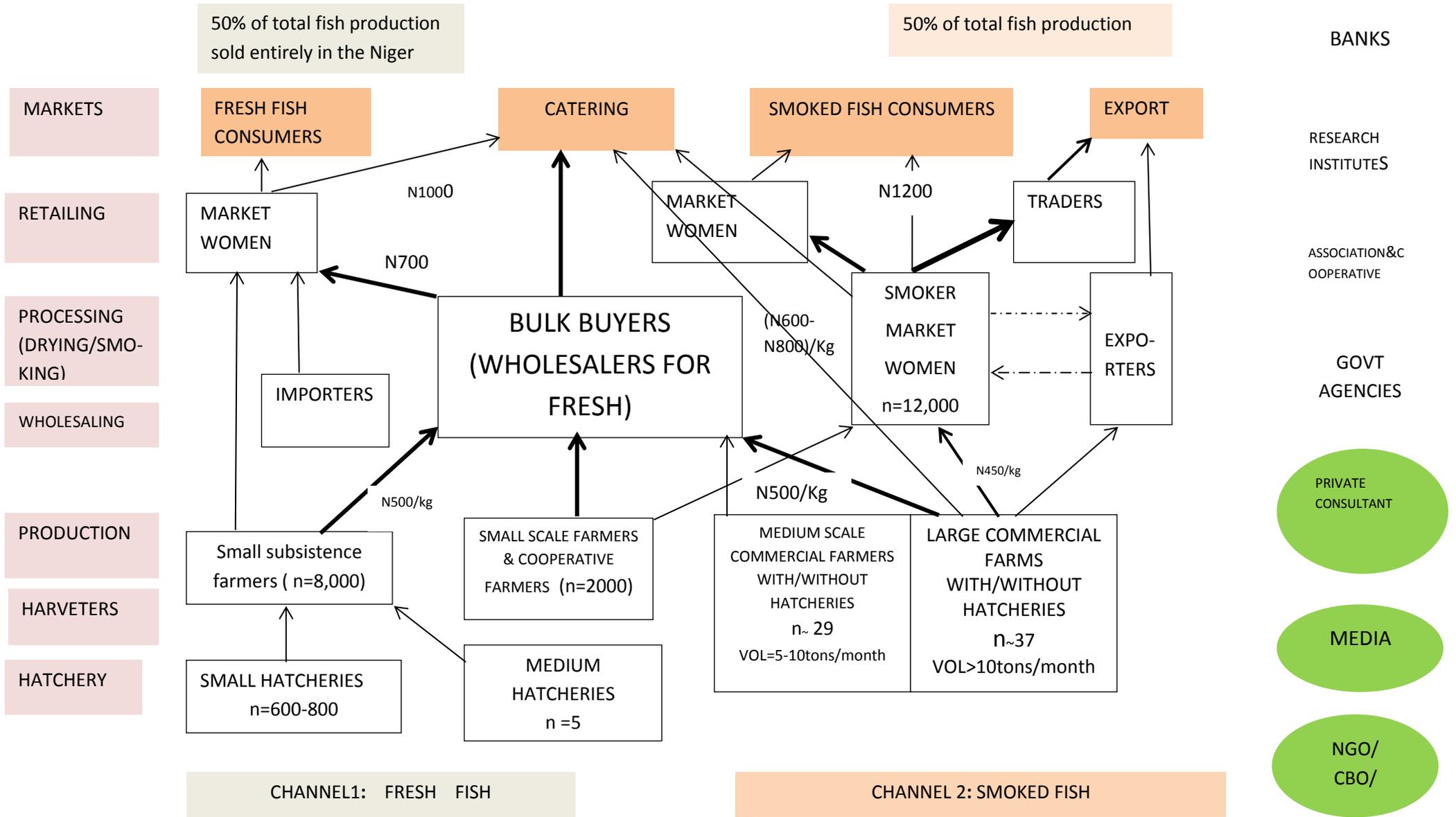
NIOMR/ARAC

National Institute of Oceanography and marine research (NIOMR) is situated in Lagos and has two outlying stations in Sapele (Delta State) and at the African Regional Aquaculture Centre (Port Harcourt, Rivers State). Broadly, it is charged with the mandate of research, development and management of the fisheries and marine resources in Nigeria's territorial waters and the high seas beyond. They also provide training services and consultancies to fish farmers.

Regulatory Framework

The regulation of standards in the fish production industry is generally weak especially in relation to the production of fingerlings/juveniles. There is need to register hatcheries and monitor their production activities. Most of the hatcheries in the Delta operate below minimum required standards and their products are mainly "runts," which can lead to poor fish yields. Government could also reduce taxes on imported fish meal to make quality fish-feed more affordable to grow-out farmers.

Aquaculture Value Chain map



Description by Channel

The aquaculture value chain on the preceding page identifies the two primary channels in the value chain: fresh fish and smoked. However, for the purposes of this brief, only the domestic fresh fish channel will be discussed.

Pond Farms

The domestic fresh fish channel is mainly dominated by Catfish, however there is a market for other cultured or farmed fishes, especially Tilapia.

The key market actors in this channel are:

- the hatcheries, both integrated and standalone that provide fingerlings/juveniles to the grow-out farmers,
- The small scale, medium scale and large scale farmers who sell bulk buyers or fresh fish wholesalers.
- The market women and catering houses (restaurant, hotels, bukas, etc), who sell to consumers.

SECTOR DYNAMICS AND DRIVING FORCES

Sector Dynamics

The key dynamics in the fresh fish value were identified as follows:

- The supply of farmed fish is increasing from 56,355 metric tonnes in 2005 to 200,535 in 2010 indicating a 255% increase in the last 5 years, but,
- Demand for fresh fish is still outstripping supply both in the Niger Delta and Nigeria as a whole.
- The number of fish farmers in the Niger Delta is increasing, with the fastest rate of increase being experienced in the homestead and medium category, at approximately 20% annually.
- Small-holders are increasing moving into fingerling production for their own grow-out ponds and selling off excess.
- The number of hatcheries in the region is increasing,
- Fish farmers are attempting to add value to their products through smoking using modern kilns. However, reaching the end consumer directly has remained a challenge.
- There has been the introduction of tilapia into the farmed fish market. However, few farmers cultivate tilapia because they assert that: 1. Demand is not as high in comparison to catfish 2. It is not a hardy fish 3. It does not grow very big.
- There is an increase in the level of inter-state trade.

Driving Forces

The following key forces have been driving changes in the sector:

- Nigeria’s annual population growth rate of over 3 percent, increased awareness of health benefits of fish consumption, and rising average household income is leading to a natural increase in demand.
- The relative lower cost of cultured fish is also an added advantage. Farmed fish fetch a lower price than captured fish(i.e. a similar sized cultured vs. wild fish would cost N1000 vs. N2,500 respectively).Given the price difference, cultured fish is more affordable as well as more available to the average consumer.
- The increase in the numbers of eateries in the Niger Delta like restaurants and hotels, fast foods and fish barbeque spots also known locally as Point &Kill have greatly increased the demand for cultured fresh fish.
- Some people prefer cultured fish because they believe it is free from pollution and chemicals.
- The destruction of aquatic eco-systems by oil exploration and other industrial activities, has led to the high cost and scarcity of captured fresh fish, driving demand in the farmed fish channel.
- Fish farmers say that they were and still are profitable (from 50% in the past to about 30% profit presently when farms are properly managed).
- Low barrier to entry at the small scale level has increased the number of farms.
- Increased regional trade is being driven by:
 - Seasonal gluts in different locations, differences in fish quality, and differences in fish price.
 - High demand for fish products in Rivers State has created room for the fish exports from surrounding states such as Delta, Akwa Ibom, and Abia states.
 - Delta State has experienced the increased importation of live fish products from the South West due to their cheaper and better quality fish.
 - A growing tourist industry in Cross Rivers State is driving demand for smoked and fresh fish, particularly at fish barbecue (*point and kill*) spots. Fish production in Cross River State cannot meet this supply creating an opportunity for importation of livefish products into Cross River State from neighbouring Akwa Ibom and Abia states.

Points of Leverage

Producer Associations: Provide a structure through which to reach and teach unknowledgeable farmers the most efficient ways to produce the fish, better pond operations management, better business practices and fund utilization.

Feed Companies Associations: Supporting efforts by feed companies in locating a local fish meal substitute with the required crude protein level.

Government policies: Can introduce policies that create an enabling environment for the aquaculture sector.

Government Agencies: Are the implementation vehicles of many government policies and can provide a supportive environment for programme like MADE that seek to further the aims of government’s policies.

CONSTRAINTS ANALYSIS

The following were identified as constraints to growth:

1. Poor production knowledge by farmers leading to large wastage of feed and resulting in high production cost of catfish farming.
2. Poor business management knowledge.
3. Quality parent/brood stock in short supply and high prevalence of low quality parent/brood stock.
4. Poor quality fingerlings.
5. Low market penetration by hatcheries.
6. Low market penetration by some feed companies.
7. Weak relationship between the value chain actors at different functional levels (producers to wholesalers).
8. Poor coordination between the value chain actors resulting in a lose-lose situation between the producers and the end consumers.
9. Poor market access.
10. Saturated markets in some places linked to weak knowledge of end markets.
11. Difficult access to credit.
12. Weak membership organisations.
13. High cost of feed.
14. Poor infrastructural facilities within hatcheries and grow-out farms.

Vision and Strategy

Vision

Increase the income of 12,000 smallholder pond farmers by 20 to 30 percent through the adoption of better pond management practices while increasing the supply of fresh fish in the Niger Delta Region by 60% over the next five years.

Strategy

The broad strategy to achieve this vision will include:

- Reducing the cost of growing out fish
- Increasing access to inputs (Fingerlings and Fish Seed)
- Increasing the efficiency of the relationships between the actors
- Improving access to and quality of parent/breed stock
- Addressing the high cost of feed
- Improving market access

SYNERGIES WITH OTHER PROGRAMS

Other programs operational in the Niger Delta with which MADE can collaborate include:

The Rivers State Sustainable Development Agency's (RSSDA) Rural Aquaculture Centre Initiative

RSSDA aims to make Rivers State the 'fish basket' of the nation. In pursuit of that aim, it has established the Rural Aquaculture Centre initiative, which has commissioned six Rural Aquaculture Centres with full training and boarding facilities where training will be deployed on the following areas:

- In-situ site training on aquaculture and livestock production
- Book and record keeping
- Marketing strategy
- Value addition- processing

To date, only one training centre (located in the Tai LGA: Ogoni axis, Rivers State) is ready and available for training. In addition to capacity building, part of the RSSDA's overall strategy is to make available subsidized extruded feed to beneficiaries of its program. There is also a plan to establish a fish market and to deploy a web portal in January 2014. Presently there is an on-going registration of all farmers.

Rivers State Agro City Project Initiative

This is an initiative by the Rivers State Government to build an all inclusive farm settlement with farms, housing units, schools, markets and possibly banks. Potential for collaboration between MADE and this initiative is still be explored.

MARKETS II

USAID's MARKETS II is presently designing a program to upgrade hatcheries. Two of the potential hatcheries are Brafina and Old Soldier Memorial Farm, Delta State. Given the identified constraints surrounding quality brood stock, there is potential to engage with Markets II on the specifics of the intervention and opportunities for collaboration.

Partnership Initiative in the Niger Delta (PIND)

PIND has successfully piloted a demonstration pond in Ekpan, Delta State. Participants in the demonstration pond were given practical training daily for six months on earthen pond and water management. They were also given the NAEC book and record keeping training. At the end of the six months, participants recorded on average an increase from 5% to 22% gross profit margin. In addition the feed partner (Vital feeds) reported an increase in sales. In terms of practice adoption rates, follow-on PIND surveys found that eight of the nine key fish farming practices taught through the demonstration pond curriculum were adopted by over 50% of the participants. Given the success of the PIND intervention, MADE has the opportunity to leverage and replicate the PIND intervention.

Nigerian Institute for Oceanography and Marine Research (NIOMR)

The FGN under the office of the Minister of Agriculture and through its research centre, the Nigerian Institute for Oceanography and Marine Research (NIOMR) has an initiative to make fish meal available to local feed mills. This is in collaboration with fish farmers groups across some chosen states. At the pilot phase this would involve the production of low grade tilapia that could be processed into fish meal to supply local feed mills.

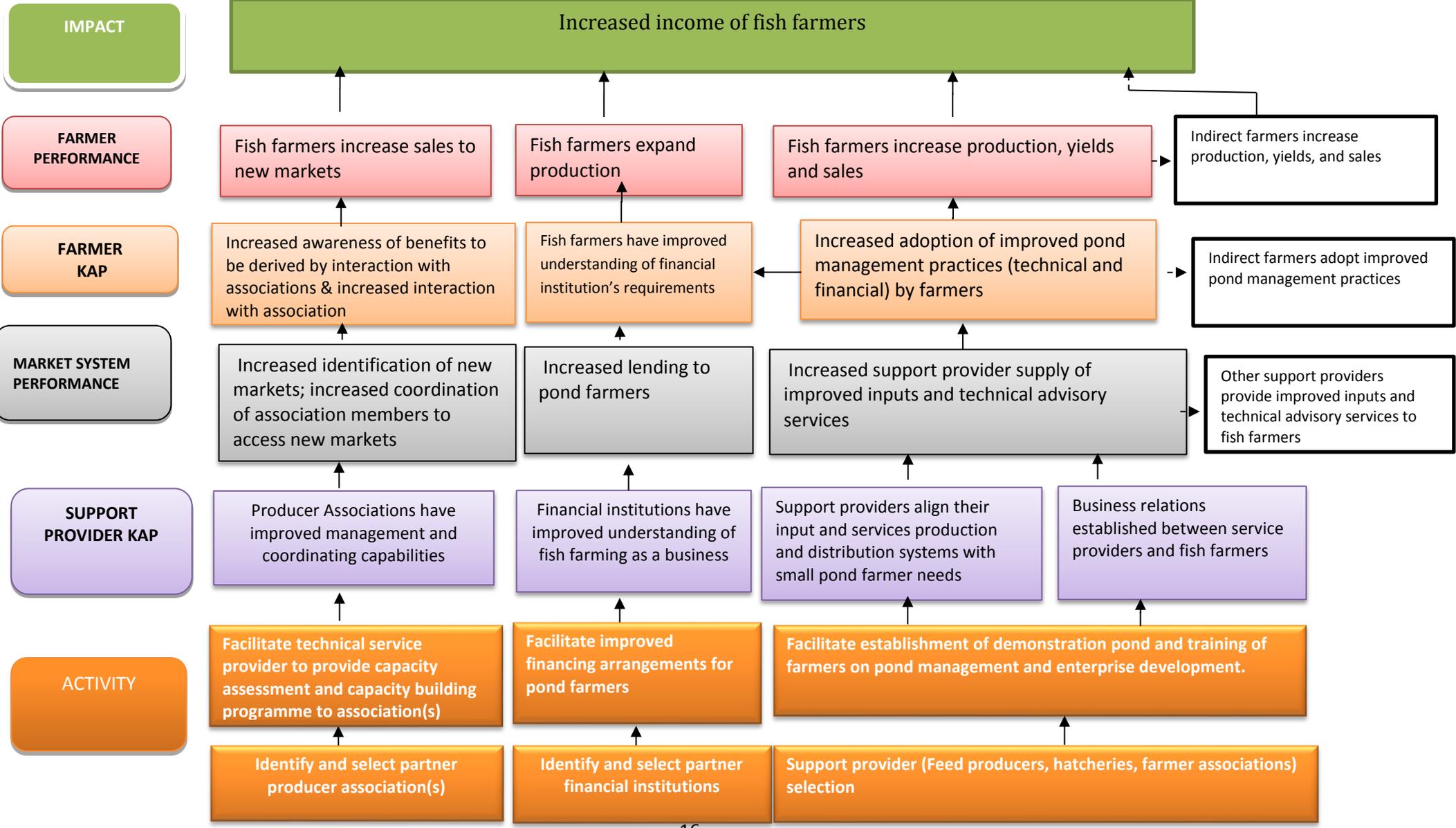
THEORY OF CHANGE

Catfish farmers and other value chain actors in the Niger Delta must increase their competitiveness in order to increase the size of the aquaculture sector and its contribution to increasing incomes for poor households in the Niger Delta. Three major thrusts will increase the competitiveness: improving farmer productivity, increasing the efficiency of the relationships between the actors (reducing the end price of fish), and increasing their access to new markets.

Training on improved production practices through demonstration ponds that regroup the key supporting actors in the value chain (feed companies, hatcheries, extension services, associations), will increase farmer productivity while enhancing their relationships with key suppliers. Leveraging feed companies to drive the training will enhance their understanding of the market for feed, leading to increased competition between feed companies to assist with upgrading the sector.

Opening up new markets will require new market linkages as well as new products. The smoked fish initiatives (separate analysis) will expand market opportunities, but the associations need to coordinate with their farmers to identify new markets and market outlets, as well as new products (such as tilapia).

Sector Logic



Potential Interventions

Demonstration Pond

It is recommended that MADE pilot several demonstration pond interventions in Rivers State to increase the competitiveness of the aquaculture sector. The pilot demonstration pond intervention would be implemented in association with the RSSDA, Top Feed fish feed company, and a to be determined pond farmers association and hatchery operator.

The demonstration pond would act as site of training, where farmers will learn new and improved skills, practices, and technologies of fish cultivation in addition to access to the Nigerian Agricultural Enterprise Curriculum (NAEC) aquaculture business management and record keeping training. Particular attention will be given to building the capacity of farmers to identify quality brood stock, identify when they are ready for breeding, and correctly conduct artificial insemination procedures.

The demonstration pond will also bring together critical actors in the value chain. Feed and hatchery companies will provide inputs to facilitate the technical training. This will enhance farmer's knowledge of feed and hatchery companies, improve feed and hatchery companies understanding of the needs of their market, and improve feed and hatchery companies' market penetration. Producer associations will be able to use the demonstration pond as site to coordinate existing members to access new markets and market outlets and identify new members. In addition, the demonstration pond would act as a physical space where other important supporting actors like extension services and financial service providers will be able to reach a critical mass of pond farmers.

Strengthening Associations

Strengthen the capability of pond farmers associations to:

- Identify new markets and products (such as tilapia),
- Coordinate their members to access new markets, and
- Facilitate loan facilities from financial institutions to provide loans to members.

Hatchery Demonstration Pond

At a later stage, MADE will run a pond demonstration that is focused on building the capacity of hatchery owners to produce quality brood stock. Improving the capacity of hatchery owners will entail:

- Improving their capacity to identify quality brood stock, identify when they are ready for breeding, and correctly conduct artificial insemination procedures.
- Improving their capacity to manage brood stock. This could be done in association with feed producers, as it will in part involve improving feeding regimes and farm management practices.

Access to Finance

At a later stage, MADE will facilitate access to finance by assisting financial institutions to understand fish farming as a business and farmers to understand what documentation is required to

demonstrate their knowledge of the business and the financial viability of their enterprises from a loaning perspective.

ANNEX I: Consumers' Preference for Fresh and Smoked Products

FISH TYPE	SMOKED	FRESH
CONSUMER		
Commercial consumers, Catering, Hotels, Institutions	1	2
Upland Areas (eg Onitsha, Aba, Owerri)	2	1
Coastland Areas (Port Harcourt, the Islands Forcados, Bonny etc)	1	2
Home consumers	1.5	1.5
<p>LEGEND:</p> <p>1: Least on the preference scale</p>		