

**TAAT AQUACULTURE COMPACT TRAINING
ON
VALUE ADDITION
PRODUCT PROCESSING AND PACKAGING
TRAINING REPORT**



**PRODUCTION AND DISSEMINATION OF EXTENSION OUTREACH
MATERIALS FOR ADOPTION OF CATFISH AND TILAPIA
TECHNOLOGIES ACROSS THE AQUACULTURE VALUE CHAIN IN
NIGERIA**

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Introduction

Nutritionally, fish is an important part of most Nigerians' daily diet. It is relatively cheaper than other types of animal protein and is readily available to Nigerians in fresh, smoked, dried or frozen forms with no religious taboos attached like beef or pork.

Fish therefore has become the most readily accessible source of animal protein but this trend is threatened by poor post-harvest techniques in Nigeria and other African countries, which have resulted in massive losses. The losses can be physical loss, quality loss, economical or nutritional loss, and also the most important cause of loss is spoilage. In general post-harvest fish loss results in low income of the society, low quality (unhygienic) fish and available fish products are very low.

Post-harvest fish losses are a major concern and occur in most fish distribution chains throughout the world. Not only do these losses contribute to fishers, processors and traders, they also contribute to food insecurity a loss of fish means less available for the consumer.

It is against this backdrop that TAAT Aquaculture compact organized the just concluded training on post-harvest value addition for fish farmers and processors.

The participants who attended the training were selected from 14 states representing the major aquaculture zones of the country. The participants are therefore expected to upon return to their states, organize a step down training for other fish farmers and fish processors.

Training objectives

The goal of TAAT Aquaculture Compact is to create an enabling environment for technology adoption by facilitating effective deployment of appropriate technologies to aquaculture value chain actors in order to raise fish production, productivity and value addition for increased consumption of fish with competitive domestic and export market.

The specific objectives to be achieved in Nigeria are for value addition:

- 1- Hands-on training on improved technologies for fish post-harvest handling and value addition for varieties of products for domestic and export markets

- 2- Intensive up-scaling of appropriate technologies through extension outreaches to enable higher domestic fish production, increased adoption rate and consumption of more fish protein by the populace

Training Methodology

The training was conducted using the following pragmatic approaches. These included:

- (i) Class room lectures (Theoretical) and group discussions
- (ii) Hands-on practical pre and post production handling techniques (product processing and packaging procedures)
- (iii) Provision of linkages to market and technologies. Access to new proven and adoptable technologies.

Training expectations:

- Reduce 50,000MT post-harvest losses
- New knowledge to add value
- Improving household nutrition
- 20% reduction of malnourished children 0-5.

Target Groups of existing project

- Youth (40%)
- Women (30%)
- Fish Farmers' groups (Men 30%)
- Input companies
- Fabricators
- Aquaculture Consultants

Priority Technologies for Up-Scaling

- Post-Harvest and Value addition
 - Improved Smoking Kiln;
 - Plastic/Aluminum Fish Insulating Boxes
 - Solar Tent Dryer

Expected Impact

- Increased income for actors in the aquaculture value chain
- Increased employment in the aquaculture value chain

SECTION 1

GENERAL FISH PROCESSING STEPS, PRINCIPLES AND HYGIENE

A. FISH PROCESSING AND BRANDING

1. Freezing processed fish in wet state-not popular due to power challenges.
2. On top kitchens or use of home ovens.
3. Drying fish with or without being partially doused with liquid smoke.
4. Smoking and drying through the use of smoking/drying kilns or heat exchanger for several dryers in series.
5. Common firing materials in use are wood, bricked, loose sawdust, charcoal, kerosene, etc.

B. FISH PROCESSING STEPS

DETERMINE PROCESS GOALS:

1. Market-Local-Supermarkets/General market-Exports.
2. Smoking level (moisture level)-
 - I. Soft tissue/refrigeration (short life span)
 - II Hard/dry-1 year.
3. Types of fish (needed)-Whole, Chunks, Fillets, Powder/Granules, Bone meal.
4. Operational level (capacity)-Market driven, Capital driven, Certification desired-sizes/packaging.

ii. Plan Process:

- a. Structure-Housing, Equipment (Wet state, smoking/drying state, packaging, storage, protectors, cleaning, measurement etc.)
- b. Management/Staff.
- c. Fish type.

iii. RECORDS:

-Weight of stock before degutting, -Dry weight, -work in progress, -Dispatch records within/market.

-Accounts-Dispatch, Costing, Invoicing, Cash mgmt., Inventory etc.

iv. OPERATIONS:

- a. Day 1 (Wet stage) –De-ponding /Degutting/ Shaping (folding, cutting) -Commence smoking
- b. Day 2 (Dry stage) -Drying-Remove for cooling /Cleaning/Filleting if needed
- c. Day 3 – Packaging for storage/ marketing

v. PROCESSES IN THE VALUE CHAIN

WASHING:

Washing is the act of using solvent (preferably water) to remove dirt or debris of any size from an object. The intent is to make the product dirt/debris free. Some raw materials undergo this process to be considered as finished products e.g. fresh vegetables and fruits. The importance of washing cannot be over emphasized. Washing helps to reduce the presence of physical, chemical and biological contaminants.

SORTING:

This involves resolving size differentials or eliminating unwanted particles. The purpose for sorting varies. A raw material could also undergo just this step to be considered as “finished product” eg fish or crayfish/prawns from the wild,. This process could be mechanized depending

on the quantity a processor need to process per unit time. However, human dependent sorting is very common in small scale industries due to extra cost of going mechanical.

Although, complication such as product infection and contamination due to human activities might occur.

DRYING

This is the most important process in value addition. Drying involves the gradual removal of water from a product as a result of heat. Drying could be done naturally or artificially. Natural drying involves the use of sunlight, which is common in rural areas where cassava pallets or yam pallets and other crops are dried. This method is cheap but the end product might not be of good quality as drying in open space invites rodents, animals and also dirt causing health issues.

Artificial drying involves the use of an alternative source of heat apart from sunlight. The heat systematically extracts moisture from the product until a desired result is attained. Artificial drying is done in a controlled environment and chances of contamination by human activity is reduced and shelf life of the product increased.

C. HYGIENE ISSUES:

-HACCP, -Workers dressing, -Environmental cleaning, -Drainage, -Disposal of waste, -Factory and equipment daily, weekly and periodic cleaning, -Sourcing of the right and mixing of cleaning material. -Medicals and periodic workers health test

FISH SPOILAGE/DAMAGE

Common causes of losses are microbial decay due to bacterial, molds and insect infections expressed from

-Poor pre-drying hygiene, -Uncoordinated drying stage, -Post drying stage infections,
-Fragmentation due to poor handling/delivery.

Prevention

-Be confident of the quality and freshness of fish to be processed.
-Dry to a low moisture content-15% or less to inhibit bacterial growth and mold.

D. RECORD KEEPING/ACCOUNTS

-Inbound records:

- Goods received notes
- Quality issues records etc

-In house:

- Material issue notes
- Supplier records
- Customer records/Sales records
- Professional/Corporate/Individual /Membership certificates/details
- Goods recall records
- Assets Valuation/Maintenance records/cards/documentation
- Insurance details
- Attendance records
- Factory layout /Architectural details
- Product costing's and files
- Bank records
- Inspection and quality records
- Meetings records
- Workers routine works records
- Regulatory agencies records-NAFDAC/FDF/NISPRI/NQAS/EU/FDA etc
- Factory/Process/Product Health Certificates
- Letters files etc

-Outbound records:

-Goods dispatch notes

-Sales invoices/Receipts etc

SECTION 2

FISH PACKAGING

-To preserve the product in its original state.

-To protect the product against delivery stress.

-To advertise the product/Brand name.

-To give information on the product.

FORMS OF PACKAGING

- Polythene/Paper-cut sizes of sealable polythene (Plastic nylon) or paper sew able/food grade gum to appropriate sizes and grades.
- Cartons-same as for polythene.
- Cans-designed mostly for long storage products that may or may not require additional material to cushion. Eg canned fish, fruits, oils etc.
- Bags-To carry several of small packages to aid large deliveries sometimes in conformity with import or international regulations.
- Delivery vans-Mostly dry and cold storage vans to aid redistribution. They are constructed to meet specific needs.

Other materials at point of packaging include sealers, tapes, product stickers, scissors, etc.

All of these could require divers multiple packaging to meet required needs.

Packaging Challenges:



Packaged crayfish



Male participants displaying packaged products



Female participants displaying packaged products

Packaging of food product is an essential factor in the food industry as it serves as an attractor to consumers prior to consumption of the food product and acceptability of the product.

The challenges in determining the choice of packaging material include:

The type, integrity and durability of the packaging material.