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Improving the Quality and Safety of Processed Fish Products: Building Capacity Approach

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Photographer credit if needed



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INTRODUCTION

- Malnutrition continues to be a public health problem in Nigeria. Recent figures show that 33.3%, 11.6% and 25.3% of children 6 -59 months are stunted, wasted and underweight; 62% are anaemic, while 55% of women of reproductive age are anaemic (NFCMS, 2022).
- High rate of stunting is linked with poor cognitive development, lower educational performance, and low productivity in adulthood, consequently contributing to poverty and poor economic development.
- Many factors contribute to malnutrition in Nigeria, namely, poverty, inadequate dietary intake, infections, food insecurity, ignorance, cultural beliefs, poor governance to mention a few.



IMPORTANCE OF FISH IN HUMAN NUTRITION

- Fish can contribute to solving the nutritional problems if adequately harnessed and utilized.
- Important source of essential nutrients: long-chain Omega -3 polyunsaturated fatty acids, high quality and digestible protein, vitamins (A, B, & D) and mineral (iron, calcium, phosphorus, selenium, iodine, and zinc),
- Relatively affordable and accessible animal-source food (ASF) & important for poor and marginalized women, men, and youth (Belton and Thilsted, 2014; World Fish, 2017).
- Most consumed ASF in Nigeria (Byrd et al. 2019)
- Annual per capita consumption in Nigeria, Africa and globally is 13.5kg, 9.9kg and 20.3kg (WorldFish, 2017; FAO, 2018).
- Nigeria also relies on fish and fisheries for nutrition and livelihoods because of its many water bodies and access to the sea (FAO, 2018; Selig et al., 2018).



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CHALLENGES

- Highly perishable
- Contamination:
 - Biological pathogens (bacteria, viruses, molds & parasites)
 - Chemicals(biotoxins, pesticides, etc.)
 - Environmental hazards (heavy metals)
- Poor handling in processing and preparation



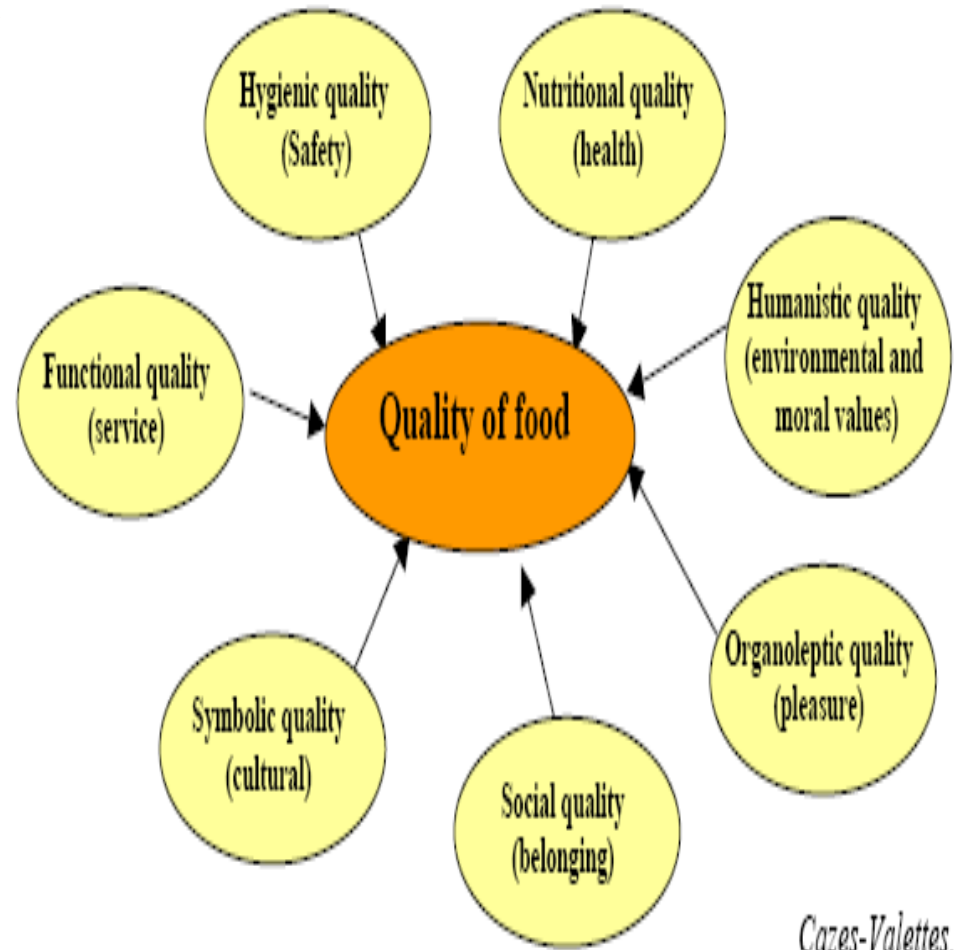
Photo by Joseph Nunta





FOOD QUALITY

Food (fish) quality is a combination of several factors, including the sensory attributes (appearance, colour, taste, odour), nutritive value, adulterants, contaminants (microbiological, physical, chemical) and hygiene (conformity to sanitary norms).



Cazes-Valettes, 2001.





THE ROLE OF FISH PROCESSORS

1

Prevent spoilage

2

Prevent contamination

3

Improve processing methods

4

Promote fish consumption



Photo by Joseph Nuntah





CAPACITY BUILDING

- The FAO/UN also defines capacity building as the process of unshling, strengthening and maintaining the ability of people, organizations, and society as a whole to manage their affairs successfully.



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- It is, therefore, necessary to build the capacity of fish handlers and processor so that nutritious, good tasting and safe fish products can be produced and sold to consumers for their well-being.



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OBJECTIVES OF THE STUDY

The objectives of this study are to:

- i) Develop cost-per-nutrient guides by analyzing the nutrient and contaminant profile of select processed fish products and their respective prices in comparison to other ASFs available in Delta State, Nigeria;
- ii) Build capacity among women and youth fish processors in Delta State to produce high quality, safe, and nutritious processed fish products for local consumption;
- Educate women and youths fish processors in Delta State about the benefit of fish in human diet and develop low-literacy tools to help them better market their product.



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METHOD

Area of study: Delta State: 3 Senatorial zones and 25 Local Government Areas (LGAs)

- USAID Zone of Influence.
- Selected to leverage the knowledge WorldFish gained from a 2019 scoping study on the fish value chain.
- Delta State is blessed with abundant inland and coastal waters with rich and diverse fish species. The inhabitants also engage in fishing, fish processing & marketing activities.



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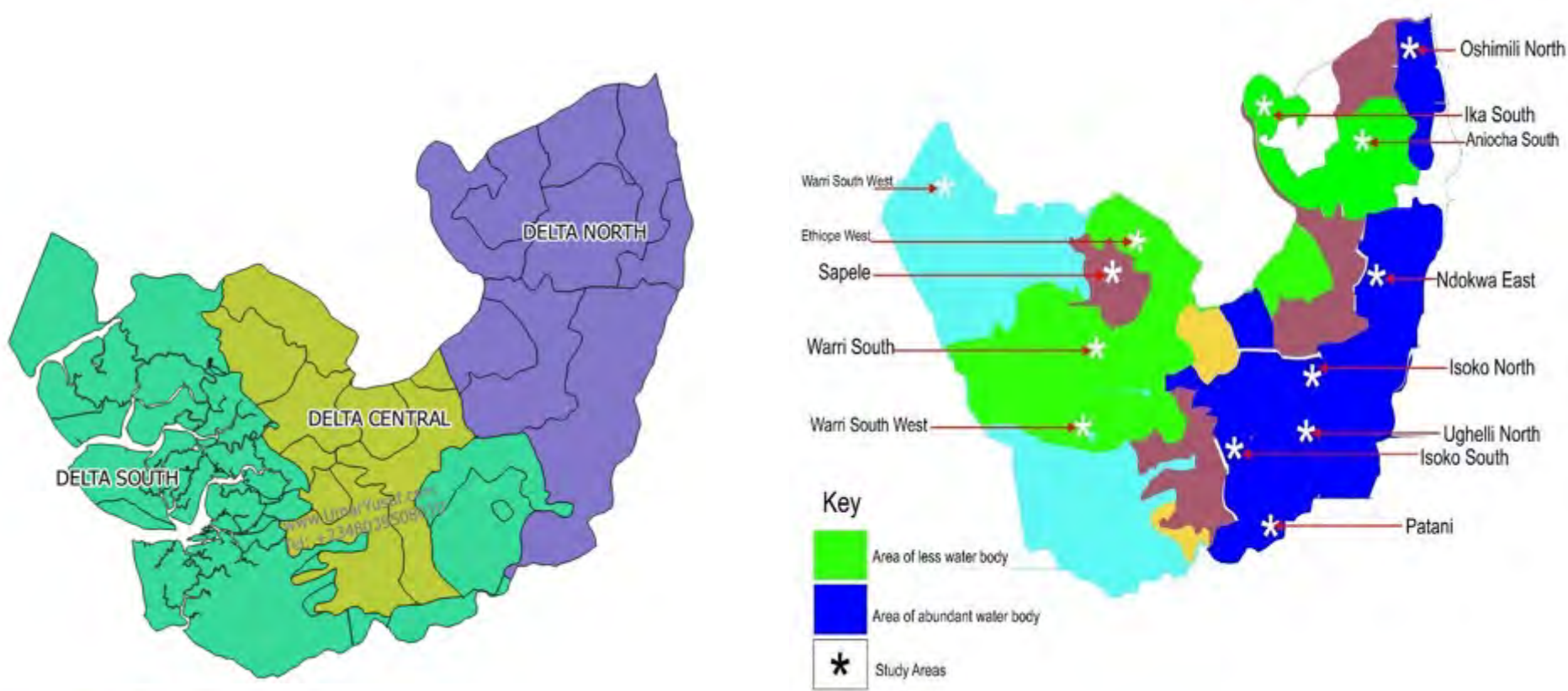
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FIG. 1: MAP OF DELTA STATE & AREAS OF STUDY



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Capacity building approach





STAKEHOLDER MEETING

- Contacts established with key stakeholders in the State.
- Key finding: Project priority in the State always targeted at fish production (aquaculture); less emphasis on processors.



Photos by Ikenna Okere





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FAMILIARIZATION TOUR OF MAJOR FISH MARKETS IN DELTA STATE.



Photos by Joseph Nunta



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FAMILIARIZATION TOUR: OBSERVATIONS

- Fish processors function privately/family business
- The industry is predominated by women
- Use of traditional methods (traditional kiln and firewood) & lack of the basic infrastructure
- Inadequate packaging & storage: use of utilize baskets/jute sacks in the kitchens or smokehouses.
- Poor environmental and personal hygiene





PRE-SURVEY: BASELINE INFORMATION

- Knowledge, attitude and practice (KAP) of the fish processors.
- Hundred (99) fish processors from the three senatorial zones of the State were interviewed using structured validated questionnaire





KEY FINDINGS

- **Age:** 93% between 19 and 49 years old
- **Gender:** Female 74%, Male 26%
- **Education:** 36% had secondary education, 24% college or higher education, 26% less than secondary education
- 92% had no formal training on fish processing and about 78% reported lack of knowledge of the problems associated with smoked or sundried fish.
- 55% had received nutrition & food safety information from TV/radio(15%) and social media (16%).
- **Duration in fish business:** 1-5years (52.4%), >5yrs (42%)
- Only 31% have fish processing as sole business





FISH, SOURCE & HYGIENE BEHAVIOUR

- **Source of fish:** Cultured fish (29.3%; Capture fish (58.6%)
- **Transport of fish:** woven baskets, plastic bowls, carton (64.6%), Ice container (28%).
- **Access to water & hand washing with soap:** 82% have access to water at business site, but 86.9% do not practice correct hand washing, while 52.5% do not use gloves





TABLE 1: FISH PROCESSING AND PRESERVATION PRACTICES

VARIABLES	N = 99
Fish Processing Methods	
Smoking	84 (84.9%)
Drying	03 (3.0%)
Barbecuing	12 (12.1%)
Processing Kiln Type	
Cut out drums	78 (78.8)
Chorkor oven	09 (9.1)
Brick Oven	04 (4.0)
Smoke house	08 (8.1)
Smoke Energy Sources	
Fire wood	63 (63.6)
Charcoal	35(35.4)
Cooking Gas	01 (1.0)
Rubbish/ Waste	00 (0.0)
Preservation of processed fish	
Cold Storage	05 (5.0)
Basket placed on racks in kitchens	19 (19.2)
Cover on drying racks placed over smoking kilns	68 (68.7)
No answer	07 (7.1)
Use of chemicals	00 (0.0)



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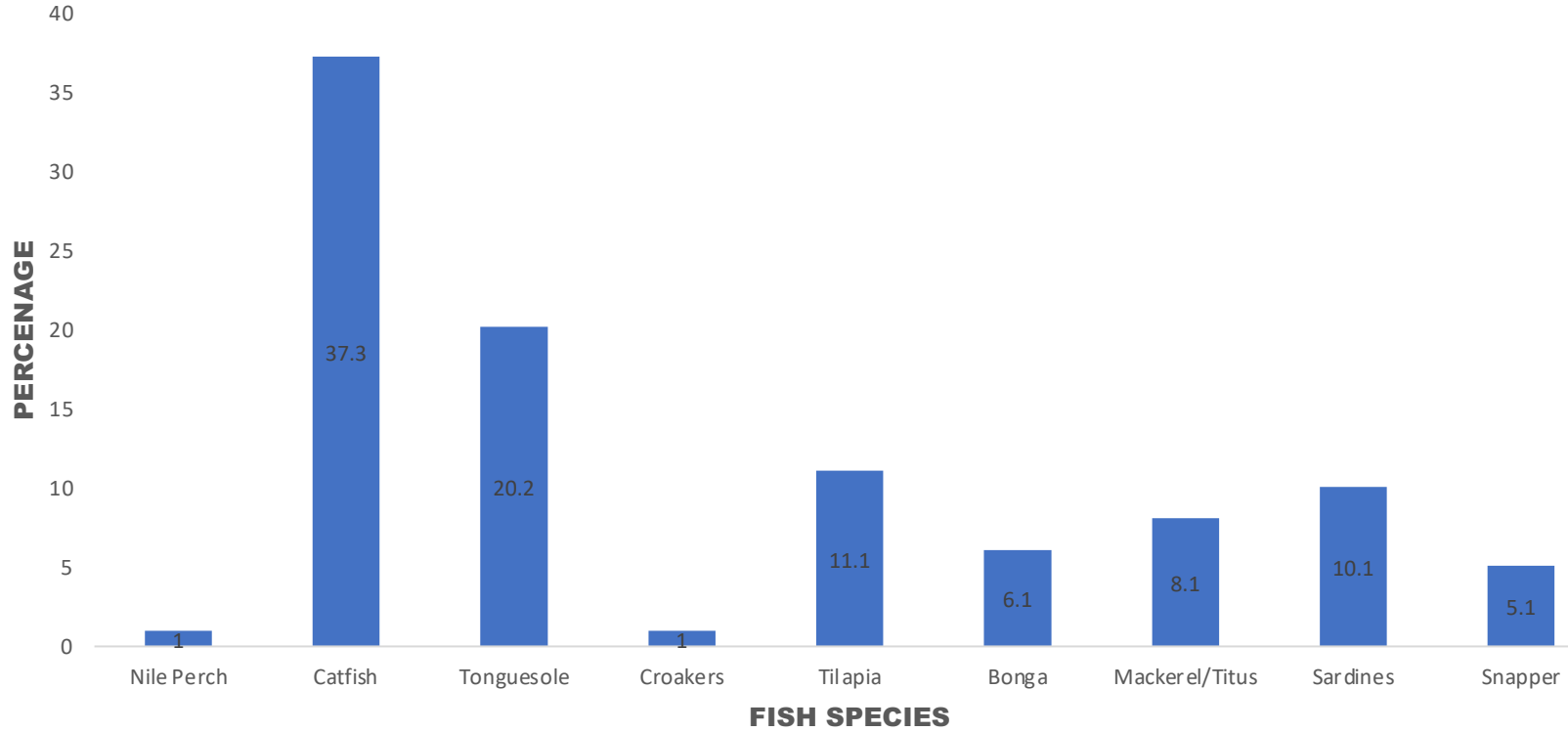


Figure 1: Fish species commonly purchased by fish processors



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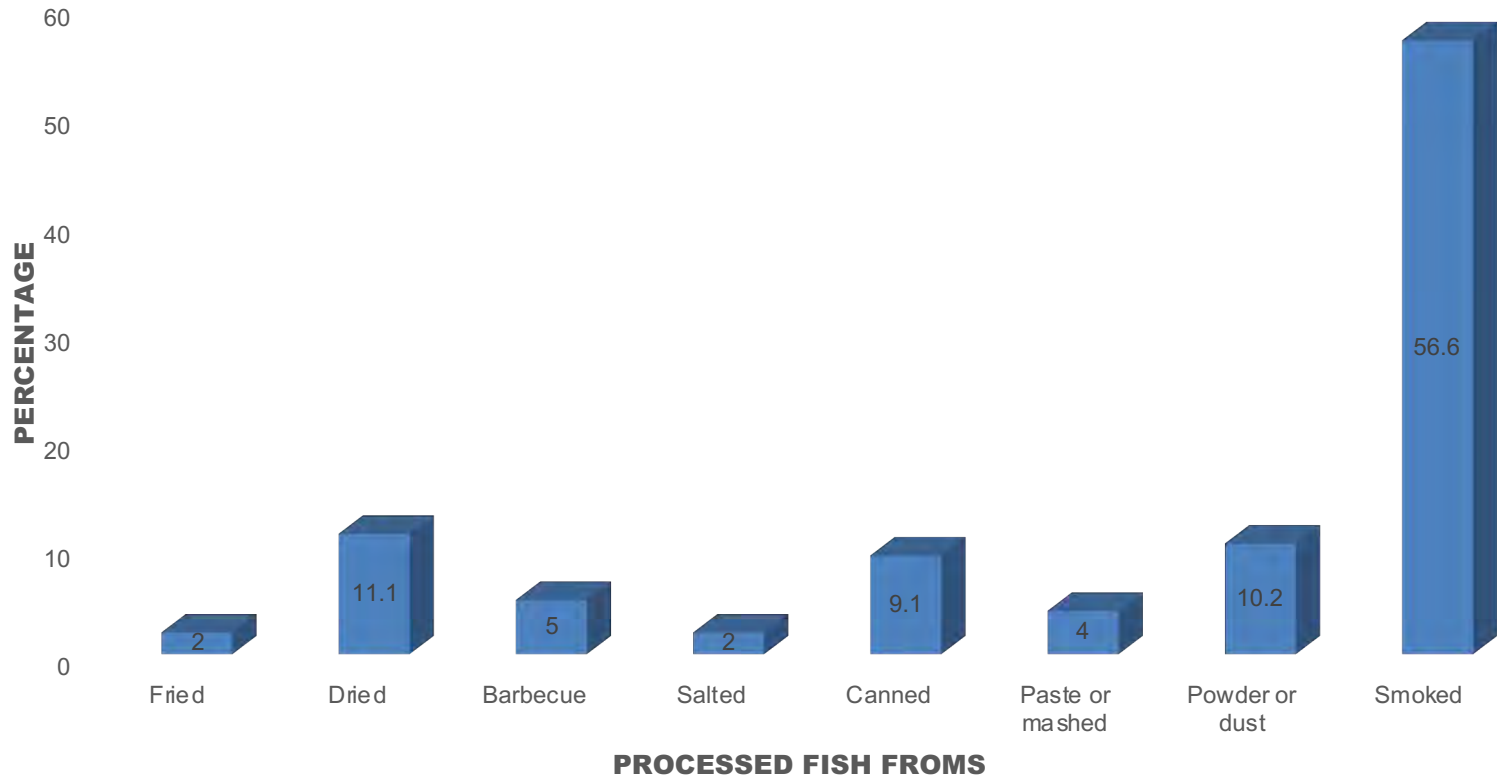


Figure 2: Respondents' Interest in processing method



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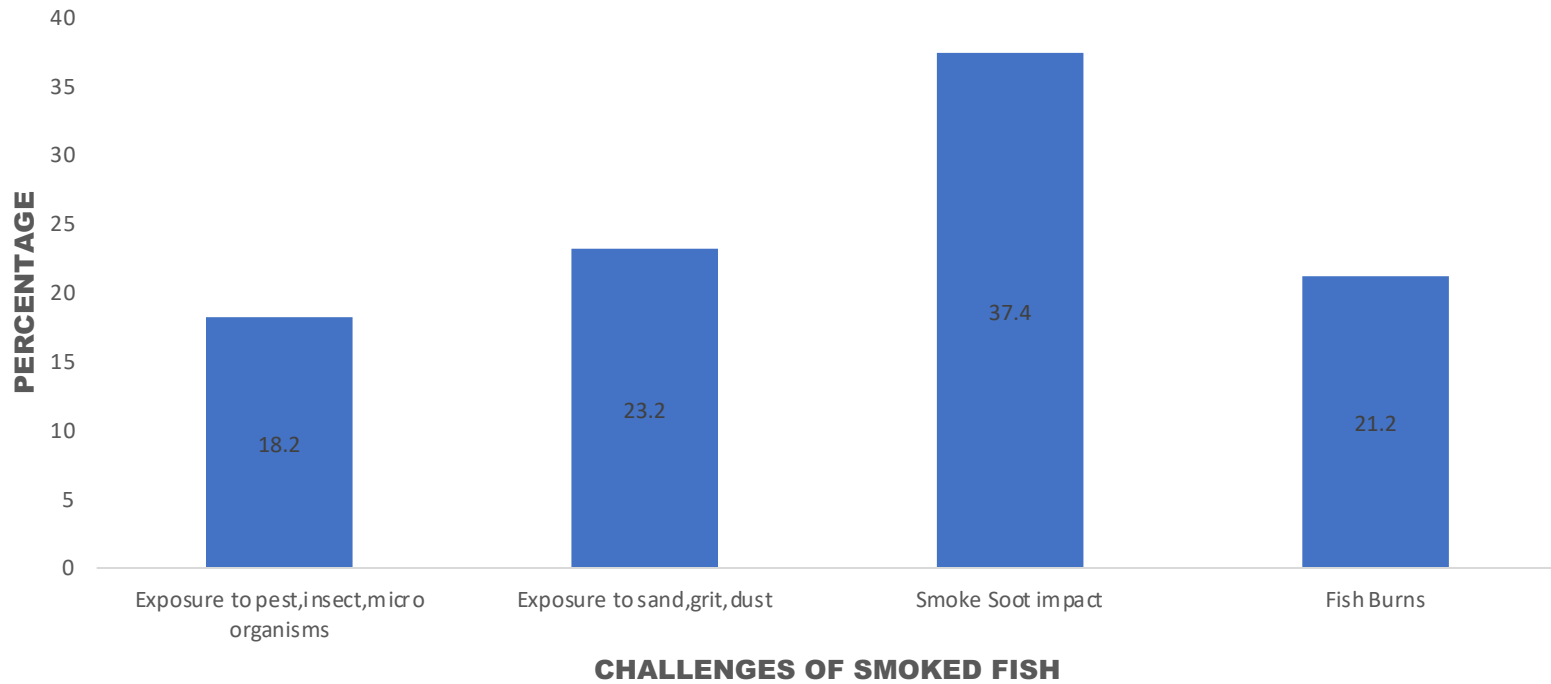


Figure 3: Challenges of Processed Smoked Fish Products



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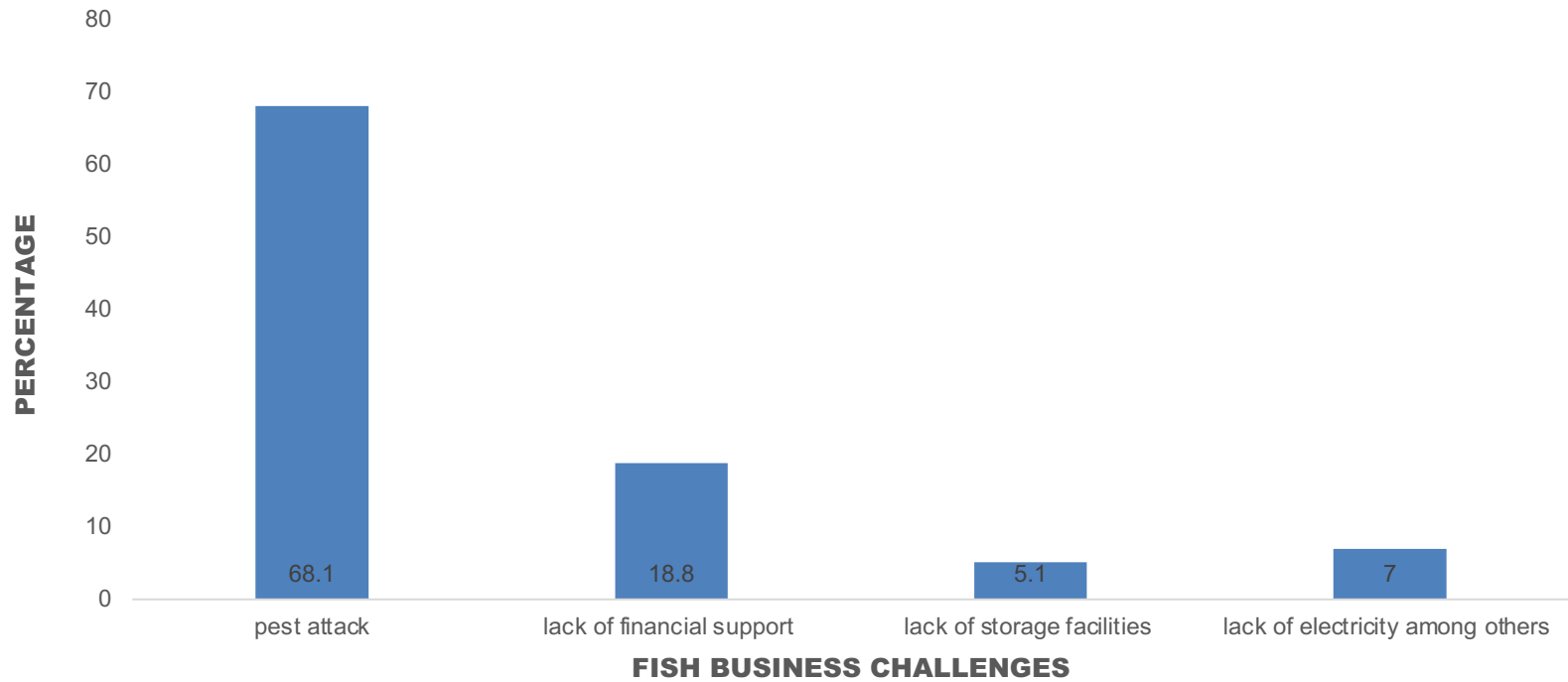


Figure 5: Fish Business Challenges



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OTHER FINDINGS

- Interest in new fish products 92.8%
- Processors most likely and likely to try new fish products were 69.7% and 25.3%, respectively (in all 93% likely to try new products).
- All the observations above informed the design of the training curriculum.





TRAINING

- Low literacy teaching tools and curriculum were developed and validated by experts
- Learning cues were also developed in form of fans, aprons, hand bands, etc.





TRAINING CONTENT

Seven training modules covering nutrition & food safety topics

- Training Modules
 - Module 1: Nutrition Education
 - Module 2: Animal Source Proteins
 - Module 3: Food Safety
 - Module 4: Fish processing Techniques
 - Module 5: Fish poisoning & Contamination
 - Module 6: Hygiene Rules & Good Practices
 - Module 7: Economic & Nutrition Benefits of Quality Fish Products

Facilitator's guide was also produced



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LEARNING CUES



Low literacy teaching tools and curriculum were developed and validated by experts. Learning cues were also developed in form of fans, aprons, hand bands, etc.

Photos by Grace Adegoke





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TRAINING



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- A 5-day each train-the-trainer workshop was organized in Asaba and Warri
- 122 fish processors
- Facilitated by the Nourishing Nations research team,
- the Program Manager and Director of fisheries, Delta State Agricultural & Rural Development Authority (DARDA);
- Director of Planning, Research and Statistics, Ministry of Agriculture and Natural Resources (MANR);
- Head, Women in Agriculture, DARDA; Delta State Nutrition Officer from the State Primary Health Care Development Agency; and
- State Director of Fisheries, MANR.



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Evaluation of Training Programme

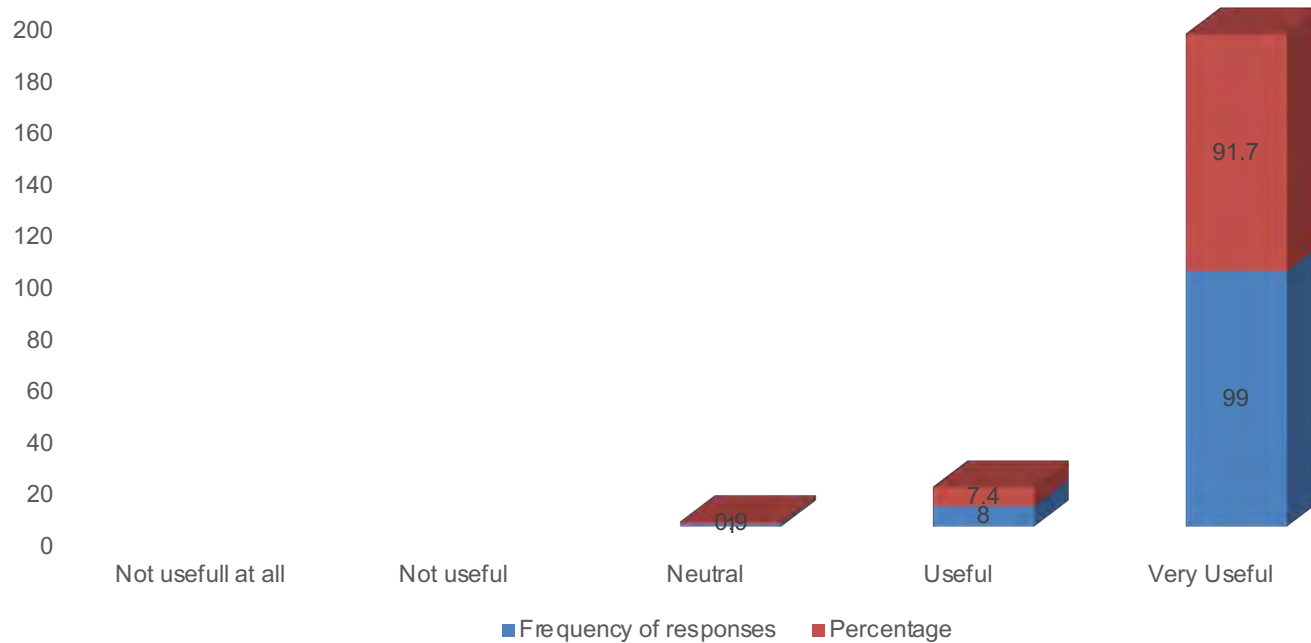


Figure 6: Percentage of participants that rated the usefulness and relevancy of the nutrition and food safety training to their businesses. N=108





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TESTIMONY/SUCCESS STORY (EXTRACTS FROM OUR SUCCESS STORY)

- Osadebay Obianuju, the director of fisheries in the Delta State Ministry of Agriculture and Natural Resources, said, “The Nourishing Nations’ training was educational and was a timely intervention that is sure to help fish processors in the state improve on the quality and safety of their processed fish products.”
- Mrs. Owei boasted of her safe and quality fish products. She said, “I now have more customers and patronage because I’m practicing safe and hygienic fish processing. People prefer to buy my product now than from anyone else. Even when my products are not ready, they are willing to wait because it’s worth waiting. My smoked fish has no smoke taste or heavy smoke covering; it comes out with a golden-brown color and nice smell that appeals to my customer’s appetite. I’m currently struggling to meet my customer’s demands”.



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TESTIMONY/SUCCESS STORY

- An additional impact from the training in Delta State is that some trained fish processors, led by Comfort Claymer, have organized themselves into a group with the collective goal of improving the quality of their processed fish products. The group is optimistic that with an adequate plan they could evolve into a fish processors' cooperative society, which was encouraged during the training sessions
- Esther Soweperegha noted that she is interested in venturing into the production of fish powder to expand her business and income. She said, “I would love to have further training from the Nourishing Nations project on fish value added products to help me get involved in the business.”





WAY FORWARD

The second training to address the issues on fish processing methods and value addition, business development and formation of cooperatives. The Nourishing Nation team will be partnering with the **“Cultivating New Frontiers in Agriculture (CNFA)”** also based in Asaba Delta State, Nigeria to carry out the training.

The team is also finalizing the cost-per-nutrient guide which is based on the market survey and nutrient analyses. This document we hope to share with the fish processor as well as the general public to guide choice of ASFs.

If possible, the team would like to follow up the processors and evaluate the progress made.

This study should be replicated in other fishing producing States of the country.





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ACKNOWLEDGEMENT

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Thank You!



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