INTERNATIONAL JOURNAL OF CONTEMPORARY AFRICA RESEARCH NETWORK
Publication of Contemporary Africa Research Network (CARN)
Volume 1 (1), 2024
Available online: https://journals.iapaar.com/index.php/ijcarn/issue
DOI: 10.5281/zenodo.10594421

AQUATIC PRODUCTS PRESERVATION AND MARKETING SKILLS REQUIRED IN FARM ENTERPRISE FOR FOOD SECURITY

Etop Nkereuwem Essien
Department of Agricultural Education
University of Uyo, Uyo, Akwa Ibom State, Nigeria

Effiwatt Bassey Iwatt
Department of Agricultural Education
University of Uyo, Uyo, Akwa Ibom State, Nigeria

Udeme Ime James
Department of Agricultural Education
University of Uyo, Uyo, Akwa Ibom State, Nigeria

Abstract
The purpose of this study was to determine the aquatic products preservation and marketing skills required in farm enterprise for food security. The study had two specific objectives, two research questions and tested two hypotheses at 0.05 level of significance. The study adopted survey design. The population of the study was 921 from which 184 through purposive sampling technique was used in sampling 20% of the entire population. A 34-item researcher - made questionnaire was used for data collection. It was face validated by 2 experts in the Department of Agricultural Education at the University of Uyo, Uyo and 2 fish farmers. A reliability co-efficient of 0.80 was obtained using Cronbach alpha technique. The data obtained were coded and manipulated using mean and standard deviation to answer the research questions while the two hypotheses were tested using One-way ANOVA at 0.05 level of significance. The findings revealed that skill in aquatic products preservation and marketing, where required by Akwa Ibom state youths in farm enterprise for food security. Based on the findings it was recommended that the identified skills should be package into a training and retraining programme for Akwa Ibom State youths, to encourage them to become successful in fish farming enterprise for food security.

Introduction

The first essential requirement for social and economic justice is adequate food production. A nation should be able to feed her population to occupy a place of pride in the community of nations. Nigeria is a country richly blessed with abundant natural and human resources that if properly harnessed can feed its people and export the surpluses to other countries to generate more revenue. Yet, she is experiencing persistent food crisis both in terms of quantity and quality (Amao et al., 2016). Cases of malnutrition and under nutrition are growing by the day. The energy food intake requirements of majority of Nigerians have fallen far below the international standard. According to FAO/WHO/UNU (2004) the minimum international energy requirement per person

for children and adolescents is obtained by multiplying the reference body weight for attained-heights, by the recommended energy requirement per kilogram of body weight for each sex and age population group, using the total energy expenditure equations. According to Foluke (2017), as a coastal nation, Nigeria has a coast line of 853 km and the Nigerian continental shelf area is 37,934 km^2. Nigeria declared 200 nautical miles Exclusive Economic Zone (EEZ) and thus has the sovereign rights for the purpose of exploiting, conserving and managing its aquaculture within the EEZ.

Aquatic products are living organisms that are harvested or derived from aquatic environments such as oceans, seas, rivers, lakes, and ponds. They include a diverse range of species, including fish, shellfish, crustaceans, aquatic plants, and algae. Aquatic products are an important source of food, income, and livelihood for communities around the world.

According to FAO (2009), Fish and other aquatic organisms are rich in proteins, omega-3 fatty acids, minerals, and vitamins, making them an essential part of a healthy diet. They are a valuable source of high-quality animal protein, particularly for populations living in coastal regions and countries with access to abundant water bodies. Aquatic products also contribute to food security and nutrition, especially in areas where terrestrial agriculture is limited.

The most direct contribution of fishing activity to food security at the household level is through consumption of the household's catch. Certainly, for many poor households engaged in full-time, seasonal or occasional small-scale fishing activities, such contributions are crucial to individual / household food security. The percentage of total household catch that is consumed by the household varies greatly. However, it may depend on both the level of commercialization in the fishery and the level of poverty in the household (Edwards, 2019). The role that fish can play in improving diets is undisputed, and this can be particularly important in regard to children's diets and child nutrition.

Food security refers to the availability of food and access to it. A household is considered food secure when its occupants do not live in hunger or fear of starvation (FAO, 2015). Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Idachaba, 2016). Food security for a household means access by all members at all times to enough food for an active, healthy life, while food insecurity exists when people do not have adequate physical, social or economic access to food as defined above.

Aquaculture can contribute to improved food security and nutrition through various channels: Local food supplies can be improved through the increased availability of low-cost fish; employment opportunities and incomes can be raised; and consumption of fish can be increased directly. While increasing the quantity and variety of fish and other foods consumed by the poor will reduce under-nutrition, such dietary improvements are not automatic benefits of aquaculture development. Thus the competency need in aquatic products preservation and marketing for food security is eminent.

Aquatic product such as Fish is highly susceptible to deterioration without any preservative or processing measures (Okonta and Ekelemu, 2015). Emokpae (2019) reported that immediately the fish dies, a number of physiological and microbial deterioration set in and thereby degrade the

fish. The preservation of fresh aquatic products are of utmost importance since fish is highly susceptible to deterioration immediately after harvest and to prevent economic losses (Okonta and Ekelemu, 2015). If fish is not sold fresh, preservation methods should be applied to extend shelf-life. These include freezing, smoking, drying and heat treatment (Sterilization, pasteurization, etc).

Competency in preservation of aquatic products is important when top quality, maximum yield and highest possible profits are to be achieved. According to one of the valuable research conducted by Eyo (2021), harvested fish should be preserved immediately in order to prevent spoilage and subsequent loss of fish. He described rigor mortis (stiffening of fish muscle) caused by post mortem biochemical processes as very important characteristics that determines shelf life and quality of fish, this can be affected by the manner of death, therefore suggested stunning piercing of fish brain with a pen knife or cutting off the fish head after being harvested as a remedy to spoilage before preservation and marketing.

Marketing of the aquatic product involves offering aquatic product in proper form, time and place desired by the consumers. The product marketing of production system is a core activity upon which the future of the industry depends considerably and in the case of fish, marketing assumes greater importance because of the perishable nature of the products (kumar, 2022). With the demand for aquatic increasing due to the awareness of the value of aquatic product protein above other protein source, marketing of aquatic product has been given priority. Oluah (2017) opined that fish marketing is an integral part of post-harvest activities in the fisheries sub-section, the author added that fish marketing appears to be the most lucrative as it brings the fish and the fish products to the final consumer. Due to the attention aquatic preservation and marketing is attracting, there is a need therefore to acquire the relevant skills in order to make profit.

Skill as defined by Osinem and Nwoji (2015) is the ability to perform an activity expertly, they further stated that skill is a well-established habit of doing things and involves the acquisition of performance capability through repetitive performance of an operation. The most youth of the Akwa Ibom state of Nigeria in the coastal areas are engaged in one form of fish preservation and marketing activity and their marginal entrepreneurship skill could not make them successful and break even. Entrepreneurship is defined by Adetokunbo (2017) as the willingness and ability of individuals to seek out investment opportunities and to establish and run an enterprise successfully based on identified opportunities. The enterprise in question is presentation and marketing farm enterprise.

A farm enterprise, according to Enome (2013) is any farm activity (or identifiable sector of the farm business) for which there are specific returns. The running of farm enterprise successfully for returns on investment will not only encourage the young people to take up the enterprise, but will help them to become more productive and reduce restiveness in the area. There have been a lot of waste in aquatic product due to poor preservation and marketing of these products. The young people equally have been underemployed in this area because they have not acquired appropriate skill and therefore could not take advantage of the value chain in this aquatic product enterprise. If the skill in aquatic product preservation and marketing are properly harnessed and packaged for the youth, it will make them more productive and increase the returns on investment in aquatic farming.

Statement of the problem

Adequate skills in aquatic products preservation and marketing is an important requirement for social and economic justice. The ability of a nation to sufficiently feed its population gives such nation a place of pride amongst other nations. Nigeria and Akwa Ibom state in particular is abundantly blessed with vast resources that can adequately feed its population and still be exported for revenue. However, the country is consistently besieged by food crisis and issues of malnutrition (Oyase & Jemerigbe, 2016). Thus, the issue of food insecurity which is brought about by poverty minimizes a nation's ability to effectively develop their agricultural markets and secure access to food. In Nigeria, a large percentage of the people are involved in the production of food and aquatic products but this does not ensure that everyone, particularly the underprivileged, will be able to access the minimum food requirement due to economic, social and regional disparities that exist. Also the researcher observed that the one of the major reason for food insecurity is the lack of skills in preservation and marketing of agriculture produce. In view of the foregoing, this study investigates skills required for a successful aquatic products preservation and marketing enterprise.

Purpose of study

The main purpose of the study is to find out the Aquatic products preservation and marketing Skills required in farm enterprise for food security. Specifically, the study identify:

1. Competencies required in aquatic product preservation
2. Competencies in aquatic product marketing

Research Questions

The following research questions guided the study.

1. What are the aquatic product preservation skills required in farm enterprise for food security?
2. What are the aquatic product marketing skills required in farm enterprise for food security?

Research Hypotheses

The following research questions guided the study.

1. Farmers competencies do not significantly affect aquatic product preservation.
2. Farmers competencies do not significantly affect aquatic product marketing.

Methodology

The design of the study was descriptive survey. The respondents were surveyed on their respective location on what their opinions were in the identified skill, while the researcher tried out the skills identified and improved on them for success in the preservation and marketing enterprise to enhance food security. The population of the study was 396 farmers (no sampling). All the farmers were used. The instrument used for data collection was a 34 item structured questionnaire with 4 point rating scale, highly required (HR), Required (R), moderately required (MR) and not required

(NR). Face validation was done by giving the instrument to 3 experts in the Department of Fisheries at the University of Uyo, Uyo. Cronbach alpha was used in determining the internal consistency of the questionnaires and this yielded a reliability coefficient of 0.80. Data was collected by the researcher with the assistance of 6 research assistants that were briefed. The research assistant includes extension agents and teachers of Agricultural Science. 175 copies of the questionnaire were retrieved. The data collected were analyzed using mean and standard deviation to answer the research questions. The hypotheses were tested using chi-square test of goodness of fit analysis of the competencies required by aquatic product farmers. The respondent here is only the farmer who rated the items in terms of the level of requirement of each item. Any item whose weight mean is 2.50 or above was judged as required, while any item whose weight mean is less than 2.50 was judged as not required.

Result

Research Question 1: What are the aquatic product preservation skills required in farm enterprise for food security?

Table 1: Mean and standard deviation of responses on aquatic product preservation skills required in farm enterprise for food security

S/N	Items	X	SD	Remarks
1	Store harvested aquatic product in watertight container	3.18	0.62	Required
2	Stun harvested aquatic product to avoid rigor mortis	3.17	0.62	Required
3	Behead the aquatic product to avoid depletion	3.17	0.62	Required
4	Wash the killed aquatic product properly	3.15	0.61	Required
5	Get granulated salt ready in the bowl	3.15	0.60	Required
6	Cut and split the aquatic product	3.17	0.61	"
7	Remove the offal	3.19	0.61	"
8	Rub granulated salt evenly on the aquatic product	3.21	0.65	"
9	Add crystalline salt in the barrel of water until the saturation point is reached	3.18	0.65	"
10	Introduce the aquatic product into the brine	3.21	0.64	"
11	Leave the aquatic product in the brine for eight days	3.21	0.64	"
12	Remove aquatic product from brine	3.23	0.66	"
13	Dry aquatic product on a slab in the sun	3.23	0.64	"
14	Gut the aquatic product	3.20	0.66	Required
15	Remove the offal	3.17	0.64	"
16	Split the aquatic product to specification	3.14	0.64	"
17	Rub salt evenly on the aquatic product	3.21	0.70	"
18	Prepare the smoke house	3.11	0.68	"
19	Burn the wood to produce smoke	3.13	0.68	"
20	Place slab on the wood	3.09	0.68	"
21	Place prepared aquatic product over smoking slab	3.03	0.68	"

22	Turn the aquatic product every 2 hours based on the heat	3.12	0.67	"
23	Leave the aquatic product for 6 hours	3.15	0.66	"
24	Remove the smoked aquatic product from the slab and air to cool	3.13	0.65	"

Data in Table 1 revealed that the 24 skills in aquatic product preservation have mean value ranged from 2.96 to 3.23 which was above mean value 2.50; this indicates that all the skills are required in aquatic product preservation for food security. The items had a standard deviation range from 0.60 to 0.72, indicating that the respondents are not far from the mean and from each other in their responses. This added value to the mean.

Research Question 2: What are the aquatic product marketing skills required in farm enterprise for food security?

Table 2: Mean and standard deviation of responses on aquatic product marketing skills required in farm enterprise for food security

S/N	Items	X	SD	Remarks
1	Carry out market survey for cost of aquatic product	3.14	0.63	Required
2	Keep aquatic product production records	3.05	0.65	"
3	Obtain delivery van to distribute the aquatic product	3.15	0.65	"
4	Advertise for the sale of aquatic product	3.11	0.62	"
5	Package aquatic product in the most appealing form	3.12	0.62	"
6	Grade aquatic product for the market	3.11	0.62	"
7	Pack aquatic product according to weight	3.09	0.62	"
8	Sell aquatic product at farm gate where necessary	3.11	0.63	"
9	Cut big aquatic product into small pieces for sale	2.50	1.04	"
10	Sell aquatic product to wholesalers	3.10	0.72	"

Data in Table 2 revealed that the 10 skill items on marketing of aquatic products have mean value range from 3.05 to 3.15 which was above 2.50, this shows that all the skills were required in aquatic product marketing for food security. The items had standard deviation range from 0.04 to 0.72, this indicated that the respondents were not far from each other and from the mean in their responses.

Hypotheses 1: Farmers competencies do not significantly affect aquatic product preservation.

Table 3: Chi-square test of goodness of fit analysis of farmers competencies on aquatic product preservation (N=396)

Response options	Fo	Fe	α	df	X^2-cal	Asymp. Sig	Remark
Highly Required (HR)	131	99.0					
Required	141	99.0					
Moderately Required (MR)	88	99.0	0.05	3	69.475	0.000	Sig.
Not Required (NR)	36	99.0					
Total	**396**						

The result presented in Table 3 showed the X^2 chi-square calculated value of 69.475 with 3 degree of freedom and at 0.005 level of significance. Since the P-value of 0.000 is less than the Alpha-value (α) of 0.05, this indicates that the test statistic is significant and hence the null hypothesis was rejected. This therefore implies that farmers competencies (skills) have significant (positive) effect on aquatic product preservation. The decision rule was that wherever the p-value would be greater than the alpha-value of 0.05, the null hypothesis would be rejected and vice versa.

Hypothesis 2: Farmers competencies do not significantly affect aquatic product marketing.

Table 4: Chi-square test of goodness of fit analysis of farmers competnecies on aquatic product marketing. (N=396)

Response options	Fo	Fe	α	df	X^2-cal	Asymp. Sig	Remark
Highly Required (HR)	25	99.0					
Required	128	99.0					
Moderately Required (MR)	152	99.0	0.05	3	92.828	0.000	Sig./Reject
Not Required (NR)	91	99.0					
Total	**396**						

Key: N = Total Nos of respondents; Fo=observed Freq; Fe=Expected freq; df=degree of freedom X^2 = cal = Chi-square calculated value, Assymp. sig = Assymptotic signicance value under chi-square test of goodness of fit analysis. S=Significant (Reject Ho)

The result presented on Table 4 showed the X^2 chi-square calculate value of 92.828, with 3 as the degree of freedom at 0.05 level of significance. Since P-value of 0.000 is less than the α (alpha value) of 0.05, it indicates that the t-test statistic is significant and hence the null hypothesis was rejected which means farmers competencies affect aquatic product marketing.

Discussion of findings

The finding of the study on aquatic product preservation skills in farm enterprise required for food security which were as follows: store aquatic product in water tight container, stun harvested aquatic product to avoid rigour mortis, behead aquatic product to avoid depletion of glycogen, wash killed aquatic product properly, cut and split the aquatic product, rub granulated salt evenly on aquatic product and dry aquatic product on a slab in the sun, cut the aquatic product, place prepared aquatic product on the slab, leave aquatic product for 6 hours in smoking slab, package the aquatic product in the most appealing form, grade aquatic product for the market and sell aquatic product to wholesalers among others was in consonance with Eyo (2021) which recommended handling techniques for correcting spoilage to include: stun fish after capture, cut off head of fish after harvest and preserve treated fish immediately. the author also listed skills in salting and drying to include: cut and split fish, apply granulated salt and place fish on slab among others. The finding was also in agreement with Chakroff (2018) who slated that smoking involves: cut fish, place prepared fish over the smoking house, and smoke the fish for 6 hours among others. The finding also agrees with Nwaigwe (2017) finding on smoking and salting which include: put fish on wood, turn fish every five minutes on the fire, keep smoked fish in aerated container, pack

fish in packages wrapped in dry leaves and reinforce with sticks. On the hypothesis, farmers competencies (skills) have significant (positive) effect on aquatic product preservation.

The findings on the skill in marketing in the study, which include: package the aquatic product in the most appealing form, grade aquatic product for the market and sell aquatic product to wholesalers among others is the agreement with the opinion of Kumar (2022) who enumerated marketing functions to include: grading of fish, package fish in the right form, distribute fish to wholesalers among others. The findings also aligned with that of Ndem and Ogbonna (2016) that the following skills are needed in preservation and storage of fish: ability to select effective and economical preservation techniques, preserve fish by drying, keeping them in refrigerator and in cold rooms, salting, smoking and, canning. The views and opinions of the authors above helped affirm the finding of this study on the aquatic products preservation and marketing skills required in farm enterprise for food security. The hypothesis reveals that farmers competencies affect aquatic product marketing.

Conclusion

Based on the findings of the study, it was discovered that the aquatic products preservation and marketing skills identified in the study are required in farm enterprise for food security. These skills that are identified if packaged and integrated in training the young people, they will have success in the enterprise and this will enhance food security; also reduce restiveness and militancy among the youths, thereby making them effective and productive.

Recommendation

Based on the findings, it was recommended that:

1. The skills identified should be packaged into a training and retraining programme young people to encourage them to become successful in aquatic product farming enterprise for food security.
2. Information provided by this study should be used by teachers in teaching youths who are in school so that they too may be equipped with sufficient knowledge and skills on aquatic product preservation and marketing which will help them establish on their own after graduation, thereby contributing to food security.

References

Amao J. O., Oluwatayo I. B. & Osuntope F. K. (2016). Economics of fish demands in Lagos State, Nigeria. *J. Hum. Ecol.* 19(1):25-30.

Foluke (2017). *How fisheries contribute to food security in Nigeria*. http://www.panoramaacuicola.com/noticias/2017/02/19/_how_fisheries_contribute_to_food_security_in_nigeria_.html

FAO/WHO/UNU (2004). *Human energy requirements*. Report of a Joint FAO/WHO/UNU.

Food and Agriculture Organization, F.A.O. (2009). *Food and Agriculture Organization of the United Nation Fish* stat: Universal Software for Fishery statistical time series V.23. Data and statistics Unit, FAO, Rome Italy.

Edwards P. (2019). *Aquaculture and poverty: Past, present and future prospects of impact*. A discussion paper prepared for the Fifth Fisheries Development Donor Consultation, Rome, Italy, 22-24 February, 2019.

Food and Agriculture Organization, F.A.O. (2015). *Global aquaculture production statistics database updated to 2013*. Summary. Information. Fisheries and Aquaculture Department. I4899E./1/08.15.

Idachaba F. S. (2016). *Strategic and policies for food security and economic development in Nigeria*. Lagos: CBN.

Okonta, A.A. and J.K. Ekelemu, (2015). A prelimnary study of micro-organisms associated with fish spoilage in Asaba, Southern Nigeria. *Proceedings of the 20th Annual Conference of The Fisheries Society of Nigeria (FISON), Port Harcourt*, 14th-18th November, pp: 557-560.

Emokpae, A.O., (2019). *Organoleptic assessment of the quality of fresh fish*. Nigerian Institute of Oceanography and Marine Research (NIOMR) Occasional Paper, No.12, pp: 1-4.

Eyo, A. A. (2021). *Fish processing technology in the tropics*. National Institute for Freshwater Fisheries Research (NIFFR).

Kumar, D. (2022). *Fish culture in undrainable ponds: A manual for extension*. Food and Agriculture Organization.

Oluah, N. S. (2017). Strategies adopted by women folk in fish marketing. In *Proceeding of workshop on women in fish handling, process, preservation storage and marketing. Awka: UNDP Assisted*.

Osinem, E. C., & Nwoji, C. U. (2015). *Students industrial work experience in Nigeria: Concepts, principles and practice*. Cheston Agency Limited.

Adetokunbo, A. A. (2017). Start your own business today. *Lagos: Network Resource Concept Nigeria*.

Enome, E. O. (2013). *Agricultural terms A-Z*. Onitsha: Jenison Publishing Company.

Oyase, A. and Jemerigbe, R. (2016).Contribution of aquaculture to poverty reduction and food security in Nigeria.*Int. Journal of Applied Microbiology and Biotechnology Research,* 4, 26-31

Chakroff, M (2018). *Freshwater fish pond culture and management*. U.S: Volunteer in Technical Assistance.

Nwaigwe, U. V. (2017). *Fish preservation and processing*. Retrieved from https://www.researchgate.net/publication/ 316918904_fish_preservation_and_processing.

Ndem, J. U., & Ogbonna, E. (2016). Management skills in fish farming needed by retired civil and public servants for sustainable income in Ebonyi State. *Journal of biological, agricultural and healthcare*, 6(4), 26-31.