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**Entrepreneurial Skill Improvement Needs of Agricultural Science Teachers for Sustainable Fingerling Production as a Support Enterprise in Cross River State, Nigeria**

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**Abstract**

*The purpose of this study was to determine the entrepreneurial skill improvement needs of agricultural science teachers for sustainable fingerling production as a support enterprise in Cross River state, Nigeria. The study had three specific objectives and three research questions. The study adopted survey design. The population for the study was 120 respondents which comprised of 78 fish farmers, 20 Agricultural Extension agents and 22 University Lecturers. The sample size was 88 which were obtained using Taro Yamane formular. Purposive sampling technique was used to select 88 respondents consisting of 60 fish farmers, 13 extension agents and 15 University lecturers in Cross River State. Data for the study was collected through a structured questionnaire divided into sections to reflect the specific objectives of the study. The instrument was face validated by three experts in the fish production industry. The reliability of the instrument was determined using Cronbach Alpha and yielded a coefficient of 0.89 indicating that the instrument is reliable. The data obtained were coded and manipulated using Descriptive statistical tools (mean and standard deviation). The findings of the study revealed that 10 skills in planning of fingerling production, 17 skills in breeding of fingerlings and 14 marketing skills for marketing of fingerlings were mostly needed by agricultural undergraduates for entry into sustainable fingerling production enterprise. The study concluded that agricultural undergraduates need skills in planning of fingerling production, breeding of fingerlings and marketing of fingerlings. Based on the findings it was recommended that the identified skills should be package into a retraining programme to enable secondary school teachers to have a support business.*

**Introduction**

Fish belong to the kingdom Animalia and the phylum Chordate. It is any member of a paraphyletic group of organisms that consists of all gill-bearing aquatic organisms. Fish is believed to have 32000 species, exhibiting greater species diversity than any other group of vertebrate. According to Helfman (2017), the various fish group account for more than 28,000 known species of which 27,000 are bony fish, with 970 sharks􀈂 rays and chimeras, and about 108 are hagfish and lampreys. Peter (2017), pointed out that fish are an important resource for humans worldwide, especially as food. The author further added that commercial and subsistence fishers hunt fish in wild fisheries or farm them in ponds or in cages in oceans. The author stress out that fish has had role in culture through the ages, serving as duties, religious symbols and as subject of art. According to Essien (2019), fish is one of the highest sources of protein. Fish is a low-fat high-quality protein that is filled with omega-3 fatty acids and vitamins such as D and B2 (riboflavin). According to the author, fish is also very rich in calcium and phosphorus and is equally a great source of minerals, such as iron, zinc, iodine, magnesium and potassium. A right step towards ensuring the availability of fish depends heavily on adequate supply of fish seeds or juvenile fish with which to stock ponds, enclosure and other aquaculture systems. Fishing business has a huge potential in contributing to food security, employment generation, increase of foreign exchange earnings as well as poverty reduction (Oguntade, Ayinla, Adeogun, Ogunbadejo & Alhaji, 2016). Arinze (2012) advised Nigerian youths who are unemployed to venture into aquaculture which is not capital intensive, thereby making them entrepreneurs.

Entrepreneurs are pioneers who are ready to face challenges. Omoluabi (2014) noted that creating job as an entrepreneur is a function of mental ability which helps in understanding and provision of the existing need of the people. This is achievable by acquisition of certain entrepreneurial skills. Ben (2020) opined those skills involves ability and capacity which is learnt through deliberate, systematic and affirmed endeavour. Therefore, entrepreneurial skills are the special abilities needed to enhance an enterprise. For the purpose of this study, entrepreneurial skill refers to special abilities that needs improvement by agricultural science teachers in becoming successful fingerlings entrepreneurs.

The act of raising this fish is taught to students by agricultural science teachers. Agricultural science teachers according to National Board for Technical Education (NBTE (2020), are set of teachers who are trained in the field of agriculture to affect learners with agricultural knowledge and principles. In the context of the study, agricultural science teacher is a person who have received training in knowledge, skills, attitude and pedagogy from a recognized tertiary institution and vested with the role of imparting same to learners. Fish is taught in secondary schools as fishery. Peter (2017), defined fishery as the industry or occupation devoted to the catching, processing or selling of fish, shellfish or another aquatic animal. The author further added that it is a place where fish or other aquatic animals are raised. The cultivation of fish in ponds requires and involves daily routine tasks and performance management activities. It begins with the skill of raising of broad stock, otherwise known as the parent stock of male and female of reputable characteristics that are adaptable to enclosed water environment. This is followed by the breeding the hatching and the raising of fish seeds (fingerlings /juveniles), pond preparation, water impoundment/preparation, introduction of fish seeds into the pond (stocking), fish feeding, fish sorting, fish safety, fish harvesting and the strategic marketing skills (Udoh, Offiong and Iwatt, 2022). The rearing of this fish required the use of skills.

Concisely, Okorie (2020) explained that skill is a well-established habit of performing task in a manner acceptable by workers in the profession. In the view of Osinem (2015), skills referred to the ability of a person to perform an act expertly. Continuing the author stated that, it is therefore expertness, practice’s ability or proficiency displayed in the performance of the task. In the context of this research work, skills are those abilities that are required by secondary school teachers to enable them carry out fishery activities as a support business. These skills are needed by secondary school teachers to be proficient in fishery. Specifically, Triner (2020) defined needs as the gap between current and desired (or required) result that is, the results of the gap between what is and what it should be. These teachers need improvement to be able to go into full part-time fishery. Isa (2012), defined skill improvement needs as the process of strengthening and equipping them with the content, knowledge, skills, access to information, and training that will enhance their planning performances in an efficient and effective way. Contextually, skill improvement needs are those production skills required for improvement by agricultural science teachers who wish to pick up fish production as a support business. These skills are in the area of construction of fishpond, stocking of fingerling, management of fishpond, harvesting and marketing. Teachers need this fish production in order to support their income.

According to Hornby (2014), support is defined as something which often used attributively as a complement or supplement to. Ellah (2013) view support as an assistance or encouragement to person or something in order to bring about success and accomplishment. In the context of this study, a support business could be seen as any additional income generating enterprise by agricultural science teacher who is already employed to support his income based.

 In this study, the Agricultural science teachers who are who teaches the act of rearing fish and fingerlings production as a livelihood activity needs to be equipped with the necessary skills for a successful livelihood and as such need to improve on the needed skill for a successful fingerling production. The major advantage of having improving on the skills is to be able to reduce dependency on outside sources for supply of fingerlings, which often times is not timely and causes shortage of fingerling in the business. This makes the availability of fish seed (fingerlings) an important pre-requisite for successful fish farming business. Hence, there is need for improvement of entrepreneurial skills by agricultural science teachers for sustainable fingerling production enterprise. Personal observation has shown that most agriculture teacher lack the potentials and skills in entering into a fingerling production enterprise as a support enterprise. They solely depend on their white-collar jobs and much revenue of the nation is spent annually in the importation of fish into the country due to lack of skilled personnel in this area. This study therefore is of high importance to agricultural undergraduates, agricultural teachers and fish farmers due to the fact that the knowledge on the needed skills for fingerling production will be determined.

**Statement of the problem**

Many agricultural science teachers wholly depend on their salaries from Government for survival. They do not in any way make provisions for any other business to support their monthly stipends from white collar jobs. Because of this, when Government could not pay them at the end of the months or for some couple of months, they run into indebtedness and borrowing or remain in abject poverty. Therefore, the need for them to pick up a business as a support is quite necessary. Having observed that fish farming is a major business that is profitable in the area of study and does not require much time as compared to other animal production, the researcher feels that agricultural science teachers who do not have any other support business could engaged in fish production to build up their revenue in order to improve their earning so as not to make them fully dependent on their meager salaries. Interactions with some of the teacher revealed that they do not possess all the required skills in modern fish production. Therefore, they still need improvement to meet up with the new techniques in planning for fingerlings, breeding and marketing. It is on this premise that the researcher feels that improvement skill could be packaged into a retraining programme with the view to provide support business for these teachers hence this study on entrepreneurial skill improvement needs of agricultural science teachers for sustainable fingerling production as a support enterprise in Cross River state, Nigeria.

**Purpose of the study**

The general purpose of this study was to identify the entrepreneurial skill improvement needs of agricultural science teachers for sustainable fingerling production as a support enterprise in Cross River state, Nigeria. Specifically, the study investigated:

1. the entrepreneurial skills improvement needs for planning of fingerlings production enterprise

2. the entrepreneurial skills improvement needs for breeding of fingerlings

3. the entrepreneurial skills improvement needs for marketing of fingerlings.

**Research questions**

The following research questions guided the study.

1. What are the skill improvement needs of agricultural science teachers in planning of fingerlings production enterprise?
2. What are the skill improvement needs of agricultural science teachers in breeding of fingerlings?
3. What are the skill improvement needs of agricultural science teachers in marketing of fingerlings?

**Methodology**

The descriptive survey research design was adopted for the study. Descriptive survey design according to Nworgu (2015), is one in which a group of people or subjects is studied by collecting and analyzing data from only a few people or subjects considered to be representative of the entire group. The study was carried out in Cross River State, Nigeria. The population for the study was 120 respondents which comprised of 78 fish farmers, 20 Agricultural Extension agents and 22 University Lecturers. The sample size was 88 which were obtained using Taro Yamane formular. Purposive sampling technique was used to select 88 respondents consisting of 60 fish farmers, 13 extension agents and 15 University lecturers in Cross River State.

The instrument used for data collection was Skills Needed in fingerlings production enterprise Questionnaire (SNFPEQ) made up of two sections (Section A and B). Section A was designed to collect demographic information of respondents, while section B is a four-point option scale of Highly Needed (HN), Needed (N), Slightly Needed (SN) and Not Needed (NN). The instrument was face validated by three experts in the fish production industry. The reliability of the instrument was determined using Cronbach Alpha using a pilot sample of 20 teachers in the study area (this number did not constitute part of the actual sample) and yielded a coefficient of 0.89 indicating that the instrument is reliable. The researcher utilized the assistance of the principals of the schools from where the teachers were selected. The principals were instructed to give the agricultural science teachers the questionnaire to respond to after which the researcher went back to collect the instruments from the principals.

Data was collected from the respondent and coded according to the scale of measurement which are highly needed (4 points); needed (3 points); slightly needed (2 points) and not needed (1 point). The decision rule is that where a skill item had a mean score of between 1.1 and 4 indicates that the skill is needed and if a skill item has a mean score of 0.0-1.0 indicates that the skill is not needed. The data was analyzed using mean and standard deviation and the Skill Need Index (SNI).

**Results**

**Research question 1**

What are the skill improvement needs of agricultural science teachers in planning of fingerlings production enterprise?

**Table 1**: Means and standard deviations of skill improvement needs of agricultural science teachers in planning of fingerlings production

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Items | Mean | SD | Remark |
| 1  | Set goal for fish breeding  | 3.90  | 0.71  | Needed |
| 2  | Identify major activities to be carried out to meet fish breeding objectives  | 3.80  | 0.90  | Needed |
| 3  | Identify suitable location for building the enterprise  | 3.78  | 0.40  | Needed |
| 4  | Identify culturable fish species and examine them for use  | 3.60  | 0.89  | Needed |
| 5  | Determine hatching system to use  | 3.50  | 1.00  | Needed |
| 6  | Identify customer for fingerlings to be produced  | 3.70  | 0.80  | Needed |
| 7  | Identify appropriate equipment for production  | 3.60  | 1.02  | Needed |
| 8  | Make provision for contingencies  | 3.54  | 0.78  | Needed |
| 9  | Identify areas that are conducive and secured  | 3.90  | 0.86  | Needed |
| 10  | Prepare budget  | 3.80  | 1.06  | Needed |

Data on Table 1 shows that all the skill items had their mean scores above the cut-off point of 2.50 with their corresponding standard deviation ranging between 0.40 and 1.06. This showed that agricultural science teachers needed improvement on all the skills in planning of fingerlings production enterprise.

**Research question 2**

What are the skill improvement needs of agricultural science teachers in breeding of fingerlings?

**Table 2**: Means and standard deviations of skill improvement needs of agricultural science teachers in breeding of fingerlings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Items | Mean | SD | Remark |
| 1  | Starve fish two(2) days prior to sexing to reduce stress  | 2.50  | 0.50  | Needed  |
| 2  | Separate fish into sexes  | 3.40  | 0.70  | Needed  |
| 3  | Select good and mature stock  | 3.70  | 0.90  | Needed  |
| 4  | Weigh the brooder  | 3.70  | 0.93  | Needed  |
| 5  | Extract pituitary gland  | 3.50  | 1.00  | Needed  |
| 6  | Prepare solution of the extracted pituitary hormone  | 2.80  | 0.55  | Needed  |
| 7  | Inject the female spawner with an hormone  | 3.80  | 0.65  | Needed  |
| 8  | Prepare spawner container  | 3.30  | 0.89  | Needed  |
| 9  | Dry and store freshly collected pituitary hormone  | 3.60  | 0.56  | Needed  |
| 10  | Collect ovulated egg from female spawner (stripping)  | 3.80  | 0.59  | Needed  |
| 11  | Collect milt from the male brood stock  | 3.80  | 1.01  | Needed  |
| 12  | Fertilize the stripped egg artificially  | 3.80  | 0.81  | Needed  |
| 13  | Incubate fertilized eggs  | 3.80  | 0.88  | Needed  |
| 14  | Rear larva and transfer to clean water supply  | 3.60  | 0.91  | Needed  |
| 15  | Maintain the required water temperature  | 3.70  | 1.04  | Needed  |
| 16  | Adjust daily ration in accordance with the average weight of fish  | 3.60  | 1.02  | Needed  |
| 17  | Feed fingerlings appropriately  | 3.80  | 0.74  | Needed  |

Table 2 above showed that all the skill items had their mean scores above the cut-off point of 2.50 with their corresponding standard deviation, which indicated that agricultural science teachers needed improvement on all the skill in breeding of fingerlings.

**Research question 3**

What are the skill improvement needs of agricultural science teachers in marketing of fingerlings?

**Table 3**: Means and standard deviations of skill improvement needs of agricultural science teachers in marketing of fingerlings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Items | Mean | SD | Remark |
| 1  | Publicize and identify customers for patronage  | 3.70  | 0.82  | Needed  |
| 2  | Keep records of sales  | 3.07  | 0.90  | Needed  |
| 3  | Transport live fingerlings in secured containers for delivery to buyers  | 3.11  | 0.68  | Needed  |
| 4  | Identify threat to the business, innovative and risks management ability  | 3.50  | 1.01  | Needed  |
| 5  | Forecast new trends in production of fingerling  | 3.50  | 0.88  | Needed  |
| 6  | Identify the availability of fingerlings in the area  | 3.60  | 0.80  | Needed  |
| 7  | Determine consumers appreciation behaviour  | 3.40  | 1.00  | Needed  |
| 8  | Identifymarket channels  | 3.55  | 1.05  | Needed  |
| 9  | Determine the sales level of fingerlings  | 3.53  | 0.79  | Needed  |
| 10  | Determine and interpret factors which indicate extent and strength of competition  | 3.60  | 1.13  | Needed  |
| 11  | Predict seasonal fluctuation of fingerlings  | 3.51  | 0.70  | Needed  |
| 12  | Recognize different prevalent pricing rates  | 3.80  | 1.00  | Needed  |
| 13  | Utilize advertising media for fingerling marketing  | 3.00  | 0.72  | Needed  |
| 14  | Adopt different sales promotion  | 3.03  | 0.96  | Needed  |

Table 3 above showed that all the skill items had their mean scores above the cut-off point of 2.50 with their corresponding standard deviations. This implies that agricultural science teachers needed improvement on all the skills in marketing of fingerlings.

**Discussion of results**

The findings from Table 1 showed that the respondents agree with all skills which are needed by Agricultural undergraduates in planning for fingerling production. The skills are setting goal for fish breeding, identifying major activities to be carried out to meet fish breeding objectives, identifying suitable location for building the enterprise, identifying culturable fish species and examine them for use, determine hatching system to use, identifying customer for fingerlings to be produced, identifying appropriate equipment for production, making provision for contingencies, ensuring conduciveness and identifying areas that are conducive and secured. The findings are in line with those of Egwui (2001) and Obi (2002) who described planning as a decision on what to be done and strategies to accomplish it which may include goal setting, selection of suitable location, arranging for regular supplies, selection of appropriate production facilities and identification of customers or market as some aspects of planning required for profitability.

The finding in Table 2 indicated that the respondents agree with skills needed by Agricultural undergraduates for breeding of fingerlings among which are separating fish into sexes, selecting good and mature stock, extracting pituitary gland, fertilizing the stripped egg artificially, incubating fertilized eggs, maintain the required water temperature among others. This is in line with Okeke (1992) who identified ability to fertilize eggs rearing of larva, choosing matured male and female brood stock, extracting pituitary gland and 32 other skills.

Findings in Table 3 revealed that the respondents agree with the items on the skills needed by Agricultural undergraduates for marketing of fingerlings among which are publicize and identify customers for patronage, keep records of sales, transport live fingerlings in secured containers for delivery to buyers, forecast new trends in production of fingerling, identify market channels, ability to determine and interpret factors which indicate extent and strength of competition, adopting different sales promotion among others. This is in agreement with Kotler (2001) who also outlined ability to identify market channel, advertise products to create awareness as skills required for effective fingerlings marketing and Adaka, Newadim, Ibekwe & Ebonumah (2007) also opined that producers should fix moderate prices on their produce, embark on intensive sales promotion and maintain quality control mechanism to guarantee greater patronage.

**Conclusion**

Fingerlings production in Cross River State has not been given fitting consideration especially among agricultural teachers as a support business. This area of fingerling production is worthwhile in the area because of the elevated level of fish farming that is practiced among the individuals of Delta State. It is seen as an occupational opportunity by which agricultural teachers can improve on the skills needed for successful enterprise. Observation have shown that many agricultural science teachers do not have requisite skills in the above areas of fish production as evidence in the answers to the research questions which indicated skills where agricultural science teachers needed improvement. In view of the findings of this study, it is therefore concluded that Agricultural Science teachers needs improvement in planning skills, breeding skills and marketing skills for sustainable fingerling production enterprise.

**Recommendation**

Based on the findings, it was recommended that:

1. This skills identified should be packaged into a retraining programme for Agricultural science teachers to encourage them to become interested in fish farming enterprise.
2. Information provided by this study should be used by teachers in teaching their students so that they too may be equipped with sufficient knowledge and skills on pond construction and stocking of fingerlings which will help them establish on their own after graduation.

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