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IMPROVING PRODUCTION COMPETENCIES OF FISH FARMERS FOR SUSTAINABLE FOOD SECURITY IN OHAUKWU LOCAL GOVERNMENT AREA OF EBONYI STATE

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Abstract

The study investigated strategies for improving fish farmers production competencies required and farm education imperatives for improving production competencies of fish farmers in Ohaukwu LGA of Ebonyi State. Survey research design was adopted and involved all the 43 senior agricultural science teachers and 64 extension officers in Ohaukwu LGA. 30-Item questionnaires was developed and used in generating data. Data collected was analyzed using mean, percentage and t-test at 0.05% probability level. The study found that all the 30 strategies investigated were all viable enough to enhance fish farmers production capacity, and demonstration, field trip and exposing farmers to training were mostly preferred methods for enhancing production competencies of fish farmers among others. It was concluded that there was no significant difference between the responses of the two sets of respondents regarding the strategies investigated. It was recommended that all competencies and its corresponding strategies identified in this study should be incorporated in a hand manual for the teaching of fish production in schools and colleges by curriculum planners.

Key words: Improving Production, Farmers Competencies and Food Security

Introduction

Livestock sub-sector is an essential component of Nigeria agriculture which contributes towards human empowerment, job creation and primary source of animal protein. Nationally, this sub-sector has contributed over 7% of the gross domestic product (GDP) between 2000 and 2008 (FAO, 2010) and over 4% in India in 2009 (Gorman, 2009). This sector comprises the cattle, sheep, goat, pig, poultry, rabbit, snail and fish.

Fish production is an integral part of livestock and it is concerned with quantitative and qualitative growth improvement of fish product. Fish is reared for food economic use, raw materials and fingerling (fish seed). Ude (2009) defined fish farming as a principal aspect of aquaculture which involves the cultivation of fishes in ponds, tanks or other chambers from which they cannot escape. Gorman (2009) also define, fish farming as form of aquaculture involving raising fish commercially in pond or enclosure and usually for food.

Aquaculture according to Ilozamba in Idenyi (2014) refers to the "rational rearing of fish, shrimps, Oyster, periwinkles and other suitable aquatic organisms in enclosed bodies, of water such as natural and man-made lakes, ponds, cages, tanks and other enclosure in lakes and coastal water" Although, fairly recent form of husbandry in many parts of the world, different form of aquaculture are believed to have been in practice in china and in Egypt for up to 4000 years ago (Damron, 2009). Aquaculture is also known as a culture fisheries' as different from capture fisheries' which involve the hunting of fishes and other aquatic organisms in natural bodies of water. It is necessary to point out that though the contribution of aquaculture to global fish production and food security could be said to be small, its role as an economic activity and source of protein to many country is very important. Moses as cited in Ilozumba (1990) estimated the contribution of aquaculture at 8.6 % and that 1.2millon tons of the world aquaculture output was contributed by tropical developing countries.

However, the need for increase fish product and high quality protein has forced many countries to go for fish production. Although, nothing has been done specifically to improve the competency level of the farmers who are the key actors in the fishery industry. Competency of the fish farmers are directly related to attainable production level of fish industry, As cited by Akegbeyo (1997) records showed that in nearly all the developing countries of the world, including Nigeria, livestock production leaped from 2 to 3% per annum while human population grows at the rate of 4 to 5%. This situation has resulted to a big gap between animal protein demand and actual amount consumed by people. The increase in fish production to reduce this gap can be achieved only if more viable fish pond and corresponding competent fish farmers (manpower) are developed.

Competency according to Olaitan, Alaribe and Omeh (2010) is ability to do something well, measured against a standard especial ability acquired through experience or training. Competency specifics the "how' of performing job, task or what a person needs to do a job successfully. Competency is not fixed but it can usually be developed with effort and support. Robinson, sparrow, Clegy and Biridi (2007) emphasized that the process of developing competency is a lifelong series of doing and reflecting. In an enterprise, employees and their manager together can identify which competencies would be mostly needed to work on to improve the employee effectiveness to maximize production.

In the light of the above description, Shippmann, Ash, Hegketh, Pearman, Battish, Prien and Sanchez (2000) explained that enhancing fish production competency (EFPC) means the learning and practice of skills involved in the process of pond construction and rearing of fish from hatching to market size (maturity) with ultimate goal of improving fish product. More so, training, education, practice and development in fishery sector are expected to provide the needed competencies for improving efficiency, productivity and performance of fish farmers for sustainable food security (Agarawal, 2011). Hence, the need arise to sort for educational approaches and techniques of improving production competencies of fish farmers in Ohaukwu L.G.A of Ebonyi State.

In recent years, there has been growing scarcity and cost of animal protein that has made it out of reach of many Nigeria. According to Adewuyi (2009) Nigeria has not been able to provide animal protein sufficient in quantity to meet the per capita animal protein requirement of the citizenry. Out of 35.Og of animal protein per day per person recommended by British Medical Association, less than 7g is consumed on the average in Nigeria (FAO, 1996 and Ukwneye, 2002), this is far below the recommended level. This is evidenced from the fact that the protein intake of people in Ebonyi State is low, although effort is being made to supplement this intake through importing fish from neighboring state such as Akwa-Ibom, Cross River and River States (Ogunlade). This has been at a very high cost because of low supply and high demand. Nigeria according to FAO (2008) is a protein deficient country, thus making fish production viable for meeting this deficiency.

Nwachukwu (2007) reported that fish farmers in Nigeria possessed low level of all the competencies needed for improved fish production. Hence, Ogunlade (2007) found that fish farmers need training on management practices in all competency areas of fish farming practices in order to meet the large demand. It is therefore imperative that fish production which has been since neglected, in spite of its potential be reviewed with the view of highlighting the needed competencies and corresponding educational approaches and technique, as urgent and immediate strategy to remedy the protein deficiency in Ebonyi State.

The main purpose of the study is to determine the educational ways of enhancing fish production competencies of fish farmers in Ebonyi State for sustainable food security. Specifically, this study intends to:

1. determine strategies for improving farmers competencies for pond construction
2. find out strategies for improving farmers competencies in fish breeding.

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3. find out strategies for improving farmers competencies for fish pond management.
4. ascertain the farm education methods/techniques necessary in capacity building of fish farmers in Ebonyi State.

Hypothesis

One null hypothesis was formulated and tested at 0.05 level of significance:

There is no significant difference between the mean ratings of extension officers and senior agricultural science teachers' opinion on strategies for improving fish farmers competencies pond management.

Research Question

The following research questions were posed to guide the study;

1. What are the strategies for improving farmers competencies in fish pond construction in Ebonyi State?
2. What are the strategies for improving farmers competencies in fish breeding in Ebonyi State?
3. What are the strategies for improving farmers competencies in fish pond management in Ebonyi State?
4. What are the farm education methods/techniques necessary in capacity building of fish farmers in Ebonyi State?

Method

The study adopted a survey research design. The study was carried out in Ohaukwu Local Government Area (LGA) of Ebonyi State. Ohaukwu had 43 senior agricultural science teachers in 25 government owned secondary schools and 64 extension officers, making a total of 107 respondents. Therefore, there was no need for sampling since the population was small and manageable. The researcher developed a-30 item questionnaires for the purpose of assessing the opinions of senior agricultural science teachers and extension officers on the competencies required by fish farmers and corresponding education methods and techniques of enhancing production competencies of fish farmers in Ebonyi State. The instrument was validated by three experts one from Department of Vocational Teacher Education University of Nigeria, Nsukka, one from department of Technology and Vocational Education, Enugu State University of Science and Technology and one from Department of Technology and Vocational Education, Ebonyi State University, Abakaliki. The reliability (0.90) of the instrument was determined using Pearsons product moment correlation coefficient. The total of 107 copies of the instrument was administered to the respondents by the researcher personally and collected same as well.

The entire 107 copies of the instrument administered were retrieved and used for the analysis. The mean with standard deviation were used to answer the research questions on strategies required and percentage used to answer research question on farm education methods and techniques while t-test was used to test the hypothesis at 0.05 level of significance and 105 degree of freedom. Four point rating scale of very highly required (VHR), Highly required (HR), moderately required (MR) and less required (LR) with respective values of 4, 3, 2 and 1 with respect to strategies needed. Decisions were reached using lower and upper limit of mean, thus:

Very highly needed (VHN)	350 - 400
Highly needed (HN)	349 – 2.50
Moderately needed (MN)	2.49 – 1.50
Less needed (LN)	1.49 – 1.00

In respect to educational methods, any competency item with highest percentage score is regarded most preferred method.
The null hypothesis would be rejected if the calculated value of the t-test was either equal or greater than the critical value at appropriate degree of freedom and confidence level otherwise will not be rejected.

Result

Table 1: Strategies for improving pond construction competencies include:

Strategies	**Teachers**			**Extension officers**			
	X_1	SD	DEC	X_2	SD	DEC	X_3
1. Conducting farm visit with emphasis on pond site location	2.86	1.09	HN	2.85	0.91	HN	2.86
2. Involving farmers in carry out site survey	3.14	0.73	HN	3.09	0.75	HN	3.12
3. Avoidance of using casual worker in excavating pond bottom	2.87	0.95	HN	2.82	0.83	HN	2.85
4. Conducting method demonstration on pond site clearing	2.95	0.86	HN	2.90	0.87	HN	2.93
5. Preparing extension package on site suitable for pond construction	2.89	0.90	HN	2.09	0.81	HN	2.89
6 Exposing farmers to training on ideal pond depth	2.69	1.09	HN	2.70	1.10	HN	2.70
7. Conducting method demonstrate on construction of water inlet.	2.54	1.03	HN	2.50	0.95	HN	2.52
8. Organizing group lecture on determining pond gradient	2.70	1.04	HR	2.63	0.89	HN	2.67
9. Exposing farmers to training on preparing water splashing ground	2.63	1.07	HR	2.70	1.05	HN	2.67
10 Delivery published bulletin, pamphlets and leaflet with emphasis on construction of water outlet	2.93	104	HR	2.61	1.03	HN	2.77
Grand mean $(\bar{x})$	2.82	0.98	HR	2.77	.92	HN	2.80

The analysis in table 1 above shows that the mean responses of senior agricultural science teachers and extension officers for the 10 strategies for improving fish farmers competency items investigated ranges between 2.50 and 3.14 with grand mean of 2.82 and 2.77 respectively which were all above the criterion mean while the overall mean (Xs) ranges between 2.52 and 3.12 with overall grand mean of 2.80 indicating acceptance of all the strategies for improving fish farmers capacity items in the cluster as viable enough.

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Table 2: Mean and Deviation response on Strategies for improving competences of Fish farmer for fish breeding

	Strategies	**Teachers**			**Extension**			
		x_1	**SD**	**DEC**	X_2	**SD**	**DEC**	**X_3**
11	Provision of extension education aimed at identifying culturable fish species	2.54	1.09	HN	2.55	1.04	HN	2.55
12	Conducting study tour aimed at identifying male and female (sexing) fingerling	3.02	0.97	HN	3.53	0.84	HN	3.28
13	Concluding method demonstration on extraction of pituitary gland	3.09	0.81	HN	3.65	0.82	HN	3.37
14	Expose of farmers to competency training on preparation of solution of the extracted pituitary gland	2.79	1.08	HN	2.63	0.97	HN	2.71
15	Conducting demonstration on method of injecting female spanver with prepared pituitary hormone	2.74	1.09	HN	2.54	1.02	HN	2.64
16	Organizing technical information sharing on selection of good and mature brood stock	2.51	1.07	HN	2.53	1.03	HN	2.52
17	Provision of re-training programme for breeders on storage of freshly collected pituitary gland	3.23	0.84	HN	3.71	088	HN	3.47
18	Organizing seminar for farmers on preparation of spawning container	2.89	0.94	HN	2.67	0.83	HN	2.78
19	Organizing workshop with emphasis on stripping	3.05	0.95	HN	3.51	0.91	HN	3.28
20	Organizing workshop on collection of milt from male brood stock	3.06	0.93	HN	3.63	0.75	HN	3.35
	Grand mean $(\bar{x})$	2.89	0.88	HN	3.10	0.91	HN	3.00

The result as revealed in table 2 shows that all the 10 identify strategies for improving fish breeding competencies were all accepted as being appropriate enough in upgrading farmers' capacity in fish farmers this is based on opinion of the two sets respondents. The statistically evidence indicates that the mean for the two sets of the respondent ranges between 2.54 and 3.65 with mean of 3.00 which were all above the benchmark.

Table 3: Mean and standard deviation responses on strategies for improving fish farmers competencies for fish pond management.

	Strategies	**Teachers**			**Extension officers**			
		X_1	**SD**	**DEC**	X_2	**SD**	**DEC**	X_3
21	Organsing group lecture on how to recognize sign of diseases for treatment	3.08	1.03	HN	3.60	0.86	HN	3.34
22	Organizing co-operation work on pond repair periodically	2.64	1.06	HN	2.81	1.04	HN	2.73
23	Active involvement of farmers in weeding the pond regularly	2.60	1.12	HN	2.61	0.98	HN	2.61
24	Organizing environmental clean-up periodically to prevent fish predators	3.18	0.89	HN	3.53	0.88	HN	3.36
25	Organizing workshop / seminar on fish feed formulation/ administration regularly	2.98	0.96	HN	3.56	0.92	HN	3.47
26	Provision of extension education with emphasis on maintenance of good water level/quality	2.62	1.11	HN	2.54	1.02	HN	2.58
27	Conducting regular monitoring / supervision aimed at examining pond for leaks	2.54	1.78	HN	2.66	1.06	HN	2.60
28	Organizing team work in carrying out fencing of the pond	3.08	0.97	HN	3.57	0.73	HN	3.30
29	Organizing worship/ seminar for the fish farmers on skills in keeping appropriate fish farm records.	2.72	1.11	HN	2.54	1.05	HN	2.63
30	Delivering extension guide on temperature regulation measure in pond to farmers	3.07	0.93	HN	3.60	0.86	HN	3.34
	Grand mean $(\bar{x})$	2.85	1.10	HN	3.11	0.94	HN	2.98

Data in table 3 above revealed that strategies items 21 to 30 on pond management competencies needed by fish farmers had a means range between 2.54 and 3.18 with grand mean of 2.85 for the senior agricultural science teachers. Item for extension officers had mean range between 2.54 and 3.60 with grand of 3.11. However, the two sets of the respondents had overall grand mean (Xa) of 2.98 which indicated acceptance of all the competency items investigated as agreed.

Table 4: Percentage responses on farm education methods/ techniques necessary for capacity building of fish farmers.

Competency Area		Farm Education methods and techniques(%)						
		L	DM	FT	S	M	EFT	OW
1	Pond construction	11.5	16.9	16.8	15.4	10.8	16.1	12.2
2	Fish breeding	9.9	18.3	16.5	15.1	10.3	17.9	11.9
3	Fish pond management	9.4	21	20	14.6	8.4	15.2	11

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Table 4 revealed that the most preferred methods/techniques of enhancing competencies in pond construction by the two sets of respondents were the demonstration (DM), field trip (FT), exposing farmers to training (EFT), and seminar (S) while the less preferred were organizing workshop (OW), lectures (L) and media (M) as statistically indicated above in table 4.

The most preferred methods/techniques for enhancing competencies in fish breeding were demonstration (DM), exposing farmers to training (EFT), field trip (FT), and seminar (S) while the less preferred were organizing workshop (OW), media (M) and lecture as shown in the table 4 above.

The study also revealed that the two sets of the respondents preferred the demonstration (DM), field trip (FT), exposing farmers to training x and seminar for enhancing pond management competencies of fish farmers while organizing workshop (OW), lecture (L) and media were less preferred by the respondents.

Finally, the study revealed that media (m) and lecture (L) were the least preferred, whereas demonstration (DM), field trip (FT), exposing farmers to training (EFT) were most preferred for enhancing the three competency areas investigated in this study.

Table 5: t-test comparison of mean responses on strategies for improving the competencies of fish farmers for pond management

Items	**N0.**	$\bar{x}$	**SD**	**df**	**SE**	**t-cal**	**t-table**	**Dee**
Extension officers	64	3.11	1.10			1.73	1.96	NS
Agric SC. Teachers	43	2.85	0.94	.105	150			

The analysis in table 5 above shows that t-calculated (1.73) is less than t-table (1.96) hence; the null hypothesis is not rejected. Therefore, the H_0 is upheld with the conclusion that there is no significant difference between the opinions of extension officers and senior agricultural science teachers on the strategies for improving fish farmers' competencies for pond management in the study area.

Discussion

From the study, it was found out that 10 strategies were identified in pond construction, fish breeding and pond management (30 strategies investigated) were all agreed as viable strategies for improving farmers competencies for sustainable food security. These findings indicated that farmers required improvement through appropriate farm education before they can be efficiently more productive. The findings are in consonance with the findings of Abudu (2005) on 'competency needs of small-scale fish farmers in Lagos State' where it was found that the 54 competencies were required, 14 competencies out of 54 were performed and 50 needed improvements. What this means is that fish farmers require on the training to improve performance for sustainable production. The findings of this study is also in agreement with those of Dumbiri (2006) on Svork-skills required by graduates of secondary school for employment in fish enterprise in Delta State' where it was found that work-skill in planning, breeding, pond construction, management of stock, harvesting, preservation and marketing investigated were all required for sustainable fish production, but were not possessed adequate for improved production.

The study was also in conformity with the findings of Ogunley et al (2010) on 'training needs of fish farmers in Ibadan North Local Government Area of Oyo State' where it

was found that fish farmers studied did not possess the needed competencies adequately for success in fish farming and therefore, need improvement.

However, with regards to the farm education imperative, the findings are consistent with the finding of Okpala (2008) on 'Pig production proficiencies and farm education imperatives in South-East Nigeria' where it was found that demonstration, field trip, seminar, workshops, media, lecture and exposing farmers to training were preferred for imparting pig production proficiencies to farmers at various degree. The findings of the above authors help to give credence to the findings of this study.

Conclusion

The need for sustainable fish production has made it imperative to consider all identified strategies for improving fish farmers competencies as viable in designing fish pond, conducting fish breeding and pond management. Fish farmers' improvement is basic in achieving improved production, hence relevant educational approach is imperative for capacity building of fish farmers for sustainable food security in the study area. The study investigated seven farm education methods/ techniques necessary for imparting production competencies to farmers and was considered appropriate to be used in achieving increased production.

However, the results of this investigation suggest that the difference between the responses of the extension officers and senior agricultural science teachers is not statistically different. So there is every reason from the result to conclude that there is no significant difference between the mean responses of the two sets of respondents regarding the strategies for improving the competencies of fish farmers' for pond management.

Recommendation

Based on the findings of this study the following recommendations are being suggested.

- All strategies for improving fish farmers' competencies in fish production identified in this study should be incorporated in a hand manual for the teaching of fish production in schools and colleges by curriculum planners.
- Extension officers should integrate all the competencies and corresponding strategies into extension package for educating farmers.
- Demonstration, field trip, farmers training and workshop should be used in imparting competencies to farmers would been farmers (students) and the other agricultural workers engaging in fish production enterprise.

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