

Methods of improving the quality of fish seed supply to fish farmers in Benue State, Nigeria

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Abstract

Methods of improving the quality of fish seed supply to fish farmers in Benue State were studied. Data were obtained from one hundred and thirty three fish farmers' using multistage random sampling technique. Structured questionnaire was used to obtain information from the respondents; data obtained were analyzed using descriptive statistics and Chi square to test relationship between the variables. The result showed that 53.83% of the fish farmers source their fish seeds from the wild. Methods of improving the quality of fish seed supply through brood-stock management were culture method (97.10%), feeding (94.10%) and genetic composition (97.0%). The major constraints to the methods of improving the quality of fish seed supply were respondents' technical knowhow (99.2%), inconsistent government policy (99.20%), lack of government assistance (97.0%) and inadequate extension services (97.0%). The Chi square analysis showed significant relationship between brood stock management and methods of improving the quality of fish seed supply ($p < 0.05$). Also, significant relationship existed between methods of improving the quality of fish seed supply and constraints, inadequate water supply, scarcity of feed, poor brood stock management and lack of government assistance. Government should encourage the fish seed production industry by providing infrastructures, formulation and effective enforcement of consistent policies and provision of credit facilities to fish farmers.

Keywords: Brood stock, extension service, fish farmers, fish seed, management

Introduction

Frequently, rural poor will readily enter into aquaculture if the basic constraints of reliable fingerling supply can be overcome (Philips, 2002). Reliable statistics on rural households involved in fish seed supply is scarce as small scale and dispersed production data do not appear in official statistics. Nevertheless, its role in aquaculture is reflected in the amount of households involved in small-scale freshwater aquaculture. Promotion of decentralized fish seed production and networking offers other advantages – income generation in rural areas, better distribution of income, higher rate of survival of fish to fingerling stage, spread of aquaculture-related activities into a wider area of the country and easier access to

fingerlings for aquaculture and stock enhancement purposes (DeSilva and FungeSmith, 2005).

Nowadays due to the degradation of ecological balance, natural resources of fish seeds are destroyed. So, hatchery is now the main source of fish seed production. The term “Hatchery” is considered in broadest sense as a facility where fish fry and fingerlings suitable for stocking in growth ponds are produced in artificial manner by the process of induced breeding technique. Induced breeding is a technique whereby ripe brood fishes are stimulated by treating them with inducing agents to breed in captivity. The stimulation promotes a timely release of eggs and milt from ripe breeders. It is now used as a widely accepted means of artificial propagation to

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overcome constraints in fish seed supply particularly for species that do not breed in captivity (Bhuiyan *et al.*, 2011).

There is fast growing human population within Benue state, with high demand for scarce and costly animal protein food, fish has all the potential for meeting this demand. Hitherto, there was no record of the availability and the supply of fish seeds for various fish farms within the State. This is in spite of the dire need for such information which will guide fish farmers to attain optimum productivity. This information lacuna is militating against proper planning to achieve sufficient and affordable protein source through the supply of quality fish seed within the study area, thus the need for this study. The objective of the study was to determine methods of improving the quality of fish seed supply to fish farmers in Benue State.

Methodology

The study area was Benue State located in the North Central region of Nigeria. It was carved out of former Benue- Plateau State in February 1976 and is made up of twenty-three Local Government Areas (LGAs) with Makurdi as the State capital. It lies between longitudes 7°47' and 10° East and latitudes 6°25' and 8° North. The major ethnic groups in the State are Tiv, Idoma and

Igede. Majority of the people in the State are farmers with those in riverine areas involved in artisanal fishing activities. The prominent rivers in the State are Rivers Benue and Katsina-Ala. However, there are other small rivers, streams and lakes scattered all over the State that serve as sites for intensive artisanal fishing.

Sampling procedure

Multistage sampling technique was adopted in selecting respondents for the study. One local Government was purposively selected from each of the three agricultural Zones in the State, Zone A, B and C. Thus, North bank in Makurdi LGA, Katsina-Ala in Katsina-Ala LGA and Agatu in Agatu LGA were selected, because of the high number of fish farmers in the areas. Finally, 80% of the fish farmers were randomly selected from the three Local Government Areas to make a population size of 133 respondents.

Method of data collection and analysis

Data for the study was obtained from the respondents using a well-structured questionnaire and scheduled interview. Data obtained from the study were analyzed using both descriptive and inferential statistics. Descriptive statistics used were frequency distribution and percentages. Chi-square was used to test significant relationship among the variables p

Table 1: Sources of brood stocks for improving the quality of fish seed

Source	Frequency	%
Personal farm	38	28.57
Individual farm	12	9.02
Wild	71	53.38
Government farm	6	4.51
Research institute	6	4.51
Total	133	100

Source: Field survey 2017

Table 2 indicated that majority (94.10%) agreed that feeding can improve the quality of fish seed. This implies that with adequate feeding of brood stock, the quality of fish seed supply can be improved which

according to (De silva and Funge, 2005) will help to sustain the livelihood of large number of rural people. Majority (87.2%) showed that water source can improve the quality of fish seed in the study area. The

implication is that with good water source, the quality of fish seed can be improved through the brood stock management. Sabuj *et al.* (2015) and Ghorai *et al.* (2016) reported that water quality is the most crucial factor affecting brood stocks management. Majority (89.0%) of respondents agreed that stocking capacity of brood stock can improve the quality of fish seed; this means that with the right stocking capacity the quality of fish seed can be improved to meet the increasing

demand for fish. Many of the respondents (93.90%) showed that genetic composition of brood stocks can improve the quality of fish seed. Brood stocks culture method can improve the quality of fish seed (97.0%). This implies that with the right culture method preferably monoculture of brood stock there can be high production of quality fish seed which will increase the present total production of fry and fingerlings as reported by (FAO, 2004) in a similar study.

Table 2: Methods of improving the quality of fish seed supply through broodstocks management

Variable	Yes	%	No	%
Feeding	125	394.1	8	5.9
Water source	116	87.2	17	12.8
Stocking capacity	119	89.5	14	10.5
Genetic composition	125	93.9	8	6.1
Culture method	129	97.0	4	3.0

Source: Field survey 2017

Table 3 indicated that majority (79.7%) of the respondents agreed that poor road network is a constraint in improving the quality of fish seed supply. This implies that dilapidating and poor state of the road hampers transportation of fish and its product thereby reducing the quality especially that of fish seed as non or minimal stress is needed by fish when it is been transported to the fish farm for stocking. Majority (79.7%) agreed that poor brood stock management is a constraint. This could mean that with the adequate brood stock management method, the quality of fish seed can be improved as poor management of brood stock affects the quality of fish eggs which eventually result to poor quality of fish seeds. Most (92.5%) respondents agreed that lack of credit facilities is a constraint to improving the quality of fish seed. This means the poor quality of fish seed in the studied areas may be due to lack of credit facilities as fish seed

production requires enough capital for setting up of fish hatcheries and other facilities on the farm. Almost all the respondents (97.0%) agreed that lack of government assistance is a constraint to improving the quality of fish seed. Due to lack of assistance from the government, the fish farmers have difficulty in producing quality fish seed, provision of some necessary social amenities like dam, electricity, subsidy and loan will help in production of quality fish seed which will help the culture fisheries industries to witness a faster rate of development in contrast to the slow pace witnessed in the last three decades. Majority (96.2%) of the fish farmers agreed that inadequate information is a constraint to improving the quality of fish seed, inadequate information is a major challenge in improving the quality of fish seed supply as information is the key in production and over all development of human being. Majority

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(97.0%) also agreed that inadequate extension service is a constraint to improving the quality of fish seed. With proper sensitization and education of rural fish farmers in the State by extension officers, there can be increased quality fish seed production and growth of aquaculture in the area. High number (97.7%) of the respondents reported insufficient fund as a constraint. This implied that with enough fund, quality fish seed will be readily available which will meet the increased demand for fish protein (Ezeri *et al.* 2009). Majority (99.2%) agreed that inadequate technical know-how on fish seed multiplication is a constraint in improving the quality of fish seed. It means various technical and advanced methods of fish

seed multiplication knowledge is lacking as this has really affected the quality of fish seed over the years, not many fish farmers can successfully breed to get fish seed as many technicalities and processes are involved. It corroborated the findings of Islam *et al.* (2007). The available fish brood stocks are not sufficient enough to improve the quality of fish seed and thereby meet the increasing demand for fish protein. Majority (98.5%) agreed that inconsistent government policy is a constraint. This may imply that with several policies and laws of the government over the years, there are still lapses which negatively affected fish farming inconsistency of those policies and that with the right and consistent policy and regulation, the quality of fish seed can be improved.

Table 3: Constraints to methods of improving the quality of fish seed supply to fish farmers

	Yes	%	No	%
Poor road	106	79.7	27	20.3
Inadequate water supply	39	29.3	94	70.7
Feed scarcity	22	16.5	111	83.5
Poor quality of feed	22	16.5	111	83.5
Middlemen	35	26.3	98	73.7
Poor brood stock	106	79.7	27	20.3
Lack of credit	123	92.5	10	7.5
Lack of Govt assistance	129	97.0	4	3
Inadequate information	128	96.2	5	3.8
Extension service	129	97.0	4	3
Insufficient fund	130	97.7	3	2.3
Technical know how	132	99.2	1	0.8
Insufficiency of seed	132	99.2	1	0.8
Inconsistent government policy	132	99.2	1	0.8
Personal influence	56	42.1	77	57.9

Source: Field survey 2017

Table 4 shows that all the broodstock management methods had significant relationship ($p < 0.05$) with the method of improving the quality of fish seed. This implies that with adequate broodstock

feeding, water source, proper stocking capacity, broodstock genetic composition and culture method the quality of fish seed can be improved. All the factors are encompassing in order to have quality fish seed supply.

Table 4: Chi square showing relationship between broodstock management and method of improving the quality of fish seeds supply

	Value	Df	Assym. Sig (2sided)	Decision
Broodstock feeding	19.455	6	0.03	S
Water source	12.101	2	0.02	S
Stocking capacity	12.924	2	0.02	S
Genetic composition	25.794	2	0.00	S
Culture methods	12.497	4	0.02	S

In table 5 inadequate water supplies, scarcity of feed, problem of middlemen, lack of government assistance, poor broodstock management and personal influence are all significant factors. There is significant relationship between these mentioned constraints and the methods of improving the quality of fish seeds supply

to fish farmers in Benue state. This implies that among the listed constraints, these are the ones with higher adverse or negative effects on the methods of improving the quality of fish seed. On the other hand, the other constraints have no significant relationship with the methods of improving the quality of fish seed supply although they exist.

Table 5: Chi square showing the relationship between constraints and the methods of improving the quality of fish seed supply

Constraints	Value	Df	Assym.sig (2sided)	Decision
Poor road network	4.438	2	.109	NS
Inadequate water supply	6.577	2	.037	S
Scarcity of feed	7.688	2	.022	S
Poor quality of feed	3.503	2	.173	NS
Problem of middlemen	.442	2	.802	NS
Poor broodstock management	8.394	2	.015	S
Lack of credit facilities	4.723	2	.094	NS
Lack of government assistance	6.990	2	.030	S
Personal influence	.79.198	2	.000	NS
Inadequate extension service	.688	2	.709	NS
Insufficient fund	.057	2	.972	NS
Technical knowhow	1.088	2	.580	NS
Insufficiency of fish seed	2.343	2	.310	NS
Inconsistent government policy	1.703	2	.427	NS

Source: Field survey 2017

Conclusion and recommendations

Brood stock management through feeding, water source for rearing, stocking capacity, genetic composition and culture are methods of improving the quality of fish seed supply to fish farmers also poor road network, inadequate water supply, scarcity of feed and poor brood stock management are constraints to improving the quality of fish seed supply to fish farmers. It is

therefore recommended that:

There is need to employ and deploy more Fisheries Officers in the study area to help improve sustainable fish farming practices, the officers could help in public awareness campaign and training of local communities on issues pertaining the best fish farming practices.

Fish farmers should be enlightened on the advantage of forming and joining fish

farmers association as a group through which their requests on fish seed production input could be met and the need to link up fish farmers with Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) as an alternative method to professional money lenders which charge high interest rates.

There is need for intense extension service programme for the enlightenment and sensitization of rural fish farmers on the need to participate in adequate fish seed production.

Government should also encourage the fish seed production industry by providing infrastructures, formulation and effective enforcement of consistent policies, provision of credit facilities to fish farmers.

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