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**Blue
Gold**

Technical Note 08

**Nursery Management Activities in
Khulna and Patuakhali Areas**

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Blue Gold Program

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Content

Chapter	Title	Page
	List of Abbreviations	ii
	Glossary	iii
1.	Introduction	4
1.1	Definitions and GIFT	4
1.2	Background	4
1.3	Objectives	4
2.	Methodology	5
3.	Hatchling and Fry rearing activities both in Khulna and Patuakhali area	6
3.1	Hatchlings rearing in Khulna area	6
3.2	Fry rearing in Khulna area	6
3.3	Fry rearing activities in Patuakhali area	7
4.	Summary, Conclusion and Recommendations	9
4.1	Advantages	9
4.2	Disadvantages	9
4.3	Conclusion	9
4.4	Recommendations	9

Annexes

No table of contents entries found.

Tables

Table 1	6
Table 2	7
Table 3	8
Table 4	8

Figures

Figure 1: Hatchling stocking in nursery pond	6
Figure 2: Produced fish fries	6
Figure 3: Trained nursery owner produced fingerlings	7
Figure 4: Patilwala (local supplier) purchasing fingerlings from trained	7

List of Abbreviations

GIFT	Genetically Improved Farm Tilapia
PL	Post Larvae
PABAP	Patuakhali And Barguna Aquaculture Project
RFLDC	Regional Fisheries and Livestock Development Component
WMG	Water Management Group

Glossary

GIFT Genetically Improved Farm Tilapia (GIFT) strains have been created with *Oreochromis niloticus* (Nile tilapia), which is native to Africa. In particular, GIFT has been shown to be significantly superior to local African tilapia strains in terms of growth rate. While development economists and fisheries scientist see the potential for food security and poverty reduction in Bangladesh from culture of these new strains of tilapia.

1. Introduction

1.1 Definitions and GIFT

Like all other fishes, the fry of carp at hatchlings are so small and delicate that they require utmost care to make them survive. This care is given through nursery management at the hatchling, fry and fingerling stage.

The fingerlings from the day of hatching to two weeks age are called fry and from two weeks to three months of age they are called fingerlings. The fry are about 0.25 to 0.50 inch long and the fingerlings are 4 to 6 inch long in size. The number of fishes reared up to market size depends directly on the survival rate of the fry and fingerlings respectively.

During the early part of the fingerling stage, it also requires much care and protection. Being in a fast growing stage, they require regular supplementary feeding with balanced feed. Hence the fingerlings also need an extended nursery care. Care and management of hatchling, fry and fingerlings in the nurseries is explained in training sessions that the farmers got clear and distinct idea of the various practices involved at various stages of growth and development.

But in case of Genetically Improved Farm Tilapia (GIFT) hatchlings and fry culture in their pond is totally different. Generally farmers stocked a few pairs of GIFT (male & female) in their pond and supplied the supplementary feed regularly but without maintaining the balance feed. After 3 to 4 months, GIFT released the eggs in this pond because GIFT are capable to release the eggs in the stagnant pond water. Some farmers transferred the 7/8 days old fry to other pond for rearing to make a fingerling (2-3 inch size). But a few farmers do not transfer the fry to other pond. It depends on availability of spare pond and economic condition of farmers.

Some farmers collected GIFT fry from different hatcheries of the country mainly from the Jessore district and Golachipa under Patuakhali district. Farmers feel comfortable to purchase the hatchling or fry from Jessore area due to better quality and comparatively for cheaper price.

1.2 Background

Good quality of seed is a pre-requisite to produce a quality of fry/ fingerlings as well as for improved fish culture. In Bangladesh, the low availability of good quality of seed in rural areas at stocking stage of fry/fingerling production is a main constraints in fish farming. In order to obtain good production of fish, the farmers have to stock healthy and larger size fingerlings in their pond or Gher. The fry should not be stocked directly in the large pond/Gher, as it is vulnerable in larger pond/Gher. Nursery management for hatchling, fry and fingerlings of carp has become a specialized activity in the fisheries management enterprises. The success in rearing healthy fry and fingerling is the key to the successfully production of fish.

1.3 Objectives

- To understand how to rear fish hatchling / fry in right way.
- To know the culture technique in field level
- To supply the good quality of fingerling to polder's fish farmers

2. Methodology

A total of 16 hatchling /fry rearing farmers have been trained up practically through 5 sessions to meet up the demand of fingerlings in polder- 30 and 22 under Khulna area and Polder- 43/2D, 43/2B,43/2A and 43/1A under Patuakhali area. Training was organized to enrich the activities. Fries rearing farmers of Polder-22 have joined at Fultola training place with other nursery farmers of polder-30. In Patuakhali area, training was organized in the training room of the Patuakhali zonal office. After that, practical activities were monitored through the respective consultant and FOs with close cooperation.

In the Khulna area , two types of culture techniques were followed, one group with 2 farmers to rear hatchlings to fry (i.e. 0.25 inch size to maximum 1 inch size) and another group with 6 farmers to rear the fry to fingerlings (0.5 inch size to 6 inch size) production. BGP has provided small quantity of hatchlings and fries to farmers. Besides this, some farmers has also stocked the fries of Indian Major Carps (Rui, Catla and Mrigel) and post larvae (PL) of Golda in their pond from their own interest and own fund.

In Patuakhali area, two days duration training was conducted at BGP training centre both for class room and field level training with 8 experienced (3 -12 years experienced) fry rearing farmers. In the training session, we have shared the knowledge of each other and tried to fill up their laps and gaps and advised them to continue their fry rearing activities properly to supply the healthy and desired size fingerlings to polder level fish farmers.

3. Hatchling and Fry rearing activities both in Khulna and Patuakhali area

3.1 Hatchlings rearing in Khulna area

After two sessions of training on hatchlings / fry rearing, hatchlings were supplied to two farmers from Jessore area mainly of rui and mrigel hatchlings to Polder - 30 (Fultola and Kismot Fultola) as a test case basis.

Hatchlings of Kismat Fultola were alive up to expectation time due to availability of fresh water in pond and proper management of the pond owner. Farmer grew his hatchlings up to fingerling size (4-5 inch size) in his pond followed by one step method.

But in case of Fultola farmers (Baby Biswas), the hatchlings were survived up to 10 days in her pond. She thought that some fresh water is needed for her pond for rearing the hatchlings. In this connection, she allowed river water (with high salinity) into her pond through the canal. As a result, all hatchlings were died immediately due to higher salinity in pond water. Here note that, she has been informed several times about salinity in pond water which is one of the main problems for hatchling culture in this polder area. It was also discussed during training sessions and the hatchlings releasing time but unfortunately she forgot it.



Figure 1: Hatchling stocking in nursery pond



Figure 2: Produced fish fries

Table 1

List of hatchling rearing farmers, production & benefit status in Khulna area

Name of operators	Village	Polder	Stocked hatchling (gm)	Cost of hatchling & feed (tk.)	Sale Nos.	Sale value (tk.)	Benefited (tk.)	Remarks
Susin Mondal	Kismat Fultola	P-30	420 gm	8000	30,000	60,000	52,000	
Baby Biswas	Fultola	P-30	720 gm	3500	00	00	00	damaged the fries due to saline water

**Source: From nursery owners through cell phone

3.2 Fry rearing in Khulna area

To test the fry culture in the Polder -22 & 30, a total of 6 new farmers were selected to conduct the fry culture and 0.5 inch to 1 inch size of fries were stocked (Rui, Catla, Silver carp and Raj puti) for the selected farmers pond. Besides this, some farmers also stocked the Golda Post Larvae (PL) and Catla fries in a same pond. Stocked numbers of fries were not equal quantity, it was supplied depend on their

pond size. Fry culture farmers started the activities from initial size, 0.5 inch to grow 4 to 6 inch in size, called fingerlings for a period of 45- 60 days, which size is very appropriate for fish culture in pond due to high survival rate. Out of 6 farmers, 3 farmers sold their fingerling to the surrounding farmers of the polder area and also stocked in their own pond/Ghers and rest of 3 farmers transferred their fingerling to their own Ghers for fish production.

Out of the 4 farmers in Polder-22, 3 farmers activities are remarkable like pond preparation, stocking of fry, and supplementary feed supply, in addition to this, they stocked additional fingerling (carp and golda PL) in their pond to get the more benefit as well as supply to their own Gher.

Table 2
List of fry rearing farmers, and their production & benefit status in Khulna area

Name of operators	Village	Polder	Stocked fry	Cost of fry & feed	Sell Nos.	Sell value (tk.)	Remarks
Lochon	Sayed Khali	P-22	40,000	45000	8,000	76,000	Not completed sell, partially transferred to Gher
Biplob	Do	do	11000	16000	10200	34500	50 % sell, with golda fry and transferred to Gher
Jahan Ali Gazi	Noai	do	9000	3800	8500	21250	70 % completed the sell and transferred to Gher
Bablu	Gupipagla	do	3600	5000	3450	8625	Transfer to his Gher
Mohasin sheikh	Debotola	P-30	7000	8,700	6600	16500	Transferred to Gher/pond
Babylbis was	Fultola WMG	do	5000	6200	4800	12000	Transferred to her pond

Source: From nursery owners through cell phone

3.3 Fry rearing activities in Patuakhali area

After the training, nursery farmers started their activities like pond preparation, contact with hatcheries owners to collect the hatchlings and fries, assess stocking amount of hatchlings / fries for their pond and feed amount.

Most of the farmers collected the hatchlings / fries from the Jessore area, a few are collected from Golachipa Upazila hatcheries for Indian major carp. But in case of GIFT, farmers stocked the brood fish (male and female) in their pond to release the eggs in pond and after that they start rearing up to 2-4 inch size but few farmers collected the GIFT hatchlings (below 1 inch) from Jessore, Golachipa and Dumki Upazila hatcheries for rearing in their pond.

After stocking of hatchlings, most of the farmers supplied the mustard oil cake, flour and industrial mega feed but in case of fry rearing, they supplied rice bran, mustard oil cake and industrial feed. Most of the farmers supplied the supplementary feed without maintaining the proper amount of feed due to proper awareness of culture technique as well as try to reduce the production cost and lack of cash money in their hand.



Figure 3: Trained nursery owner produced fingerlings



Figure 4: Patilwala (local supplier) purchasing fingerlings from trained

Table 3
List of fry rearing farmers, their production & benefit status in Patuakhali area

Name of owners	Village	Polder	Area (Dec)	Fingerling production, 2014 (lac)	Net benefit, 2014 (lac)	Fingerling production, 2015 (lac)	Net benefit, 2015 (lac)	Remarks
Nurulislam	Utter Badhura	P-43/2B	122	3.50	4.20	5.40	6.30	Carp & GIFT
Wahed Mia	Poshim Sarkkhali	P-43/2D	265	9.20	10.50	11.50	12.70	Mostly carp
AbulBasar	Purbo Gerakhali	P- 43/2D	75	3.20	4.10	5.50	6.20	Mostly carp
Mahabub	Dokhin Sonakhali	P-43/1 A	115	5.20	2.80	7.50	3.70	Mostly GIFT
Muzaffar	Sonakhali	P-43/1A	100	3.00	2.10	4.10	2.50	Mostly GIFT
Halim	Madda mativanga	P- 43/2A	252	4.50	3.20	5.80	4.90	Mostly carp
Altaf	Poshim titkata	P-43/2A	156	2.20	1.05	4.50	1.60	Carp & GIFT
Solaiman	Dokhin solabunia	P-43/2B	115	5.25	4.80	5.05	6.30	Carp & tilapia
Average			150	4.50	4.09	6.16	5.52	

*Sources: Respective FOs and respective nursery owners. Here note that farmers do not follow proper record keeping activities, only they recorded big amount related information.

Table 3 indicated that, fry rearing farmers are gradually increasing (4.50 lac to 6.16 lac) their fingerlings production to meet the fingerlings demand in the polder area. Last year, an average net income was Tk.4.09 lac and this year is Tk.5.52 lac. An average incremental benefit is Tk.1.43 lac (35%).

Table 4
Comparison between the last year (2014) and this year (2015) activities after receiving Training

S.N.	Indicators	Last year (2014)	This year (2015)	Remarks
01	Pond preparation steps	Not followed properly	80 % farmer followed the steps	Experience farmer are too much aware
02	Remove the aquatic insect before stocking of hatchlings	Only few were aware	Now all are aware	Trained farmers tried to follow
03	Stocking rate of hatchling / decimal	Some ideas but not clear	Received clear ideas	But not followed 100%
04	Stocking ratio of fries	Some ideas but not maintain	They understand but not followed the layer properly	Gradually accepted the ideas
05	Transportation of hatchling and fry	A few ideas	Got ideas but not followed properly	
06	Supplementary feed & its amount	Some ideas but not clear	Got ideas & 80% followed	But not maintained proper amount
07	Fingerling selling size	Do not think for mortality rate in farmer level	Now try to maintain the proper size for farmer level fish pond	Gradually realized the situation
08	Production and net income	Reasonable	Good	Reduce the mortality rate of fingerlings

4. Summary, Conclusion and Recommendations

4.1 Advantages

In the project area, a lot of fry rearing farmers (nursurer) are being working with training from previous development projects (PABAP and RFLDC) or without proper training. Some farmers are motivated from other surrounding local farmers, but mainly from Jessore area's farmers.

The local fish culture farmers are getting the following facilities/advantages from the local nursery owners:

- Fish culture farmers are being receiving better quality of fingerlings from short distance as well as within a short time, and comparatively cheaper rate.
- Farmers trust the nursery farmers because they know each other.
- Sometimes, nursurer provide the fingerlings to fish farmers without hand cash.
- In some case, the fingerlings are supplied for a long term credit basis even after harvesting of fish.

4.2 Disadvantages

- Nursery owners try to motivate the pond farmers to release the small size and more fingerlings in the farmer's fish culture pond without maintaining the pond water layer and pond area.
- Nursery owners usually try to earn more money by selling other species of fish as a major carp species. Such activities were found in other part of Bangladesh.
- Generally in the 2nd half of the day, weak fingerlings are being supplied to fish culture farmers which will promote the mortality rate of fingerlings in farmer's level.

4.3 Conclusion

- Hatchling rearing is very difficult in Polder -22 due to shortage of fresh water as well as salinity environment of surrounding area of Polder -22, especially in the month of April-June but it is possible in Polder- 30 with ensuring fresh water availability in the culture pond.
- Fry rearing is possible both in Polder-22 & 30
- In Polder -30 , some farmer should start the hatchling/fry rearing to supply the fingerling to surrounding farmers to enhance the fish production as well create an employment opportunity.
- Patuakhali nursery farmers should follow the modern technology both for hatchling and fry rearing to reduce the mortality rate as well as to supply the good quality of fingerling to surrounding farmer of the polders and to enhance the fish production
- Benefit fully depends on culture techniques, proper management, quality of hatchlings/ fries and proper fingerling selling size and time.
- Khulna farmers have failed partially to sell their all fingerlings timely due to delay the fries stocked in their pond.
- Carp hatchling rearing is more profitable but very risky
- Farmers realize that hatchlings / fries rearing is a profitable business than fish culture.

4.4 Recommendations

Khulna area

- Enhancement program should start for hatchling and fry rearing to supply the good quality of fingerling to local fish farmers.

Patuakhali area

The following activities should be ensured to develop a good business enterprise

- a. Pond preparation activities should be followed in proper way
- b. Ensure the stocking of hatchlings with proper amount and quality
- c. Make sure the stocking of fries with maintaining proper ratio and number
- d. Maintain the quality and quantity of supplementary feed
- e. Motivate nursery farmers to supply proper size of fingerlings (not below 4 inch) to the local supplier as well as local fish farmers to reduce the mortality rate in farmer's level.