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**CML- TATA TRUSTS & MAC collaborative multi theme livelihood initiative in
MAC areas of Assam**

Developed by-Abdul Mannan Choudhury

PACKAGE OF PRACTICES (POP) FOR FISH REARING

Basic Objectives: To develop 3 Fishery clusters with Composite Fish Culture in ponds by providing skill development training, hand holding support; and to make the fishery cluster sustainable with revolving fund, CRPs and CFCs (Fish Hatchery).

The initiative will focus mainly on the following areas,

A: SOCIAL MOBILIZATION AND INSTITUTION BUILDING:

- Cluster selection: 3 clusters with 150 farmers in each cluster will be selected with the help of elected members of the MAC and in accordance with criteria fixed by the project team. Preference will be given to low-lying areas protected from flood by embankment. Normally, a cluster should consist of maximum 5-6 closely located villages
- Promotion of Cluster level producers group (PG): It's very important to mobilize respective members into an Activity group (AG) on hamlet basis so that it can be used as platform for mutual support, selection of nursery farmers (NF) to take up spawn to fingerling rearing in the hamlet, easy transaction and conducting any kind of handholding training related to activity. Again, there is a need to promote a producer's group (PG) with the representatives members from each AG. The PG is playing the role to support each AG to arrange timely training, exposure, help in planning and budgeting, procurement and stock management, seed money and credit management etc. In future course of time, PG will actually be a registered body comprising of 150 fish farmers/partners as general member of the institution
- Formation of Apex Level Cooperative Society: The selected 450 farmers from 3 clusters and other fish farmers from similar clusters, developed under similar condition through other projects of MAC, will be organized in an Apex Level Fish Farmers' Cooperative Society and will duly be registered.



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B: TRAINING AND CAPACITY BUILDING:

- Handholds training for the general fishers on pond development and rearing practices.
 - Training module:
 - Types & varieties of fresh water fish
 - Commercial importance and feasibility of carps
 - Pond specifications
 - Pond fertility
 - Importance of pond water pH value
 - Fish breeding principles
 - Importance of different fish variety ratio in a pond
 - Importance of fish feed
 - Fish diseases and control
 - Fish harvesting
 - Fishery economics
- Grooming of Village level Community Resource Person (barefoot fish doctor): All together 15 Nos. of Village Level Community Resource Persons (5 in each cluster) will be groomed from among the advanced fish farmers. These CRPVs will become human resources for community mobilization, skill development, institution building, management of resources and production etc.
- Advanced training to CRPVs: The advanced fish farmers selected through the training program and practice shall be chosen for advanced training so that they can be groomed as Community Resource Person in fishery sector.
- Training of office bearers on records and book keeping, planning, budgeting, procurements, distribution, management of stocks etc.
- Handholds training and exposure of nursery farmers on quality fish seed rearing; it's proper management (Pond development and fish rearing practices including feeding).
- Training for functionaries of Cooperative Societies: The functionaries of Cooperative Societies will be imparted training on
 - Legal aspects of running a Cooperative Society
 - Principles of Cooperative Society
 - Ethical leadership
 - Managerial skill
 - Documentation
 - Accounts keeping
 - Marketing
 - Conducting skill development training for others.
- Exposure visit for fish farmers: To bring home the proverbial "*seeing is believing*", the advance farmers in select batches will be taken to other places, institutions etc. to see for themselves about the success of collective efforts which can increase their confidence level.
- Exposure visit for functionaries: Similarly, the functionaries of the Cooperative Societies will be taken in exposure visit to other successful Cooperative Societies for knowledge sharing and interactive learning.

C: POND DEVELOPMENT AND FISH CULTURE:

150 or so existing but unproductive pond will be selected in the cluster. The beneficiaries shall have to clear the jungles and stubbles of the pond with his/her own labour and other cost. The MAC will provide fund for further clearance of weed, de-silting and digging of the pond as per



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specification provided by Fishery deptt, GoA. The beneficiary shall have to make further investment for raising and strengthening the bank. The MAC will invest for lime and others to make the suitable for fish culture.

D: REVOLVING FUND FOR FISH SEED AND FEED:

The Tata Trust will provide a revolving fund to the cluster level cooperative society from where the farmers can take loan at 8% interest for purchase of Fish seed and feed. The loan shall have to be returned after harvesting the crop so that other members of the coop society can take loan.

E: COMMON FACILITY:

CONSTRUCTION OF LOW COST FISH HATCHERY:

The Assam Agricultural University, Jorhat has developed a low cost, easy to operate, fish hatchery suitable for conditions of Assam. There is positive feedback from farmers who have implemented the project. The Mising Autonomous Council, with full technical guidance from AAU, Jorhat will construct 3 such low cost and small scale fish hatcheries, one each in the cluster. The hatcheries, after successful completion of the project, shall be handed over to the Cluster level Coop Societies.

F: THE POP:

1) INTERVENTION ON QUALITY FISH SEEDS:

For the better quality fish seeds access, orientation of project staffs, AG and PG representatives are very important. Exploration of quality breeding farms, interaction with the respective farm owners, negotiate with them to be presence during the breeding process to get ensure age and body weight of the parental fish before collecting spawn etc. are to be taken into consideration.

(It is advised that parents fish quality in terms of age (minimum 2 years) and body weight for breeding, must be 4 kg, 3 kg and 2 kg of Katla, Rohu and Mrigal respectively. These criteria assure 50% good harvest).

2) POND DEVELOPMENT PROCESS:

A) POND SELECTION:

The pond shape should be rectangular and a pond with perennial water is ideal for fish rearing. It of course depends on kind of fish one wants to rear. For seed production purpose, the pond size may vary from 0.08 ha to 0.13 ha (i.e. 0.6 bigha to 1.2 bigha). Water bodies of 1 bigha or above are ideal for table fish rearing.



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B) POND PREPARATION:

Pond must be selected a dry one or with little water with no fish in the pond. The ideal month for pond preparation is **Falghun/Chaitra (Feb - March)**. The pond should be ready by 15-20 days ahead of rearing spawn/fry/fingerling.

- ❖ In the beginning, the pond should be measured properly to know the exact size,
- ❖ Clearing all kind of weeds, jungles in the pond side and surface, pruning of twigs and branches of trees, shrubs etc. It also important to keep notice on some other things like repairing of dykes of the pond, filling of holes presences in the embankment etc.
- ❖ Water depth of the pond between 1 to 1.5 meter is preffered, there must be water lifting device if water level goes more than the ideal depth,
- ❖ Overall, there must be good sunlight in the pond, must be free from tree shadow from southern side of the pond.

C) APPLICATION OF LIME:

- ❖ If the target pond is on dried condition, then one needs to water @ 1 ft before application of lime.
- ❖ Apply 32 kg lime (mixed with water) per 0.13 ha (1 bigha) pond and rag with the soil and leave for 7 days.
- ❖ Ensure water pH test every month.
- ❖ Repeated netting with disturbing the pond bottom surface rigorously before application of compost in the nursery pond.
- ❖ Apply lime in the rearing pond @ 8 kg per 0.13 ha (**1 bigha**) at an interval of 2 months. Alternatively, one can use fresh ash @ 12-16 kg in place of lime.

D) COMPOST PREPARATION AND APPLICATION:

This manure supports to grow plankton (**Phytoplankton and Zooplankton**) which is primary feed for the fish and farmers can easily prepare and apply in the pond. This manure has significantly reduced total dependency of supplementary feeds. It is advisable not to use raw cow dung as well as mustard oilcake in the pond, which deteriorate water quality.

- ❖ In the days itself of liming, compost preparation must start.
- ❖ The prepared compost application should ensure after 7 days of lime application
- ❖ For a pond with size 0.13 (1 bigha) the following quantity of materials are required

Materials	Unit	Pre stocking pond	Stocked pond at 15-30 days interval
Cow dung	Kg	49-65	40
Oil cake*	Kg	16	8



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SSP	Kg	1.5	0.8
Urea	Kg	1.5	0.8

*Preferably Muster Oil Cake (MOC), Single Super Phosphate (SSP), instead of urea; one can apply baker yeast @ 40 gm mixed in ½ lit of hot water for quick fermentation.

PREPARATION PROCESS:

- ❖ Make a pit with size 3'X 2'X 1.5' in one of the corner side of the pond.
- ❖ Put a plastic sheet in the pit and put material and mix well, add water make easy slurry, keep it for 7 days for fermentation.
- ❖ In every day, stir the mixture once in a day; add more water if the slurry gets dried.
- ❖ Apply the ready compost in the pond uniformly after adding water in it (diluted), and even go for 3 equal split doses by 3 consecutive days.



E) MONITORING OF PLANKTON GROWTH AND APPLICATION OF MANURE:

The ideal pond water becomes greenish that indicates fully grown plankton in the pond after application of manure. One can check the presence of plankton in the pond by observing water colour, harvesting plankton with plankton net and turbidity test.

- ❖ **WATER TURBIDITY TEST:** If you insert a white metal contain up to 1 feet depth inside water, and if it becomes transparent /visible, one needs to go for immediate manure application. If the metal becomes invisible, then stop further application of manure by 15 days, rather go for monthly.
- ❖ **USE OF PLANKTON NET:** Plankton is the primary productivity of pond and basic food of the plankton (Phytoplankton and Zooplankton). There is a device called **PLANKTON NET** to catch plankton for observing of its density. The minimum density of plankton must be 2 ml per 50 later of water passing through NET and it's the indication to apply compost immediately

F) STOCKING OF SPAWN/FRY/FINGERLING:

In the prepared nursery pond it is advisable to stock spawn (Spawn to Fry/FL) on 15-20 days from the lime application in the pond. It also ensures proper netting of the pond by 2-3 days ahead of stocking to free from harmful insects. It's also advisable to spread kerosene oil in the water bank of pond @ 0.8 ltr per bigha to kill Notonecta (back swimmer) insect.



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In the day of stocking of spawn/fry/fingerling, allow a little pond water in the spawn carrying plastic bag / container up to 2/3rd of its volume, wait for 15-20 minutes to acclimatise with the pond water condition and then, release the spawn/fry/fingerling slowly.

STOCKING RATE:

Fish seed type	Unit	Dose (for 0.13 ha /1 bigha)	Remarks
Spawn	Bati	10	5 lakh spawn
Fry	No.	3250	Rear as table fish
Fingerling	No.	1625	Mix culture
Yearling	No.	1220	Mix culture



G, REGULAR

FEEDING:

- ❖ **APPLICATION OF COMPOST:** Apply compost manure as mentioned above (refer section d) in the stocked pond at an interval of 15-30 days based on plankton growth and it's monitoring.
- ❖ **PROMOTION OF PERIPHYTON:** This is a kind of phytoplankton are favorite feed for the column feeder. It can be easily promoted by putting few bamboo poles with shorten branches in the 2-3 places of the pond.
- ❖ **HOME MAKING FEED FOR NURSERY POND:** One needs to feed fine MOC and rice bran @400 gm of each by mixing well up to 1st 5 days and in the next week onward, the dose will be just double (800 gm MOC and 800 gm rice bran). Feeding must be given in the early morning and evening in everyday. The mixed feeds should be hand thrown in the bank of pond. This dose will continue up to 30-35 days.

Particulars	Morning (gm)*	Afternoon(gm)*
1 st 5 days (1-5 th day)	500	500
2 nd 5 days (6-10 th day)	800	800
3 rd 11 day to 30 day	800	800

Early morning & early evening

NETTING PROCESS:

- FOR SPAWN TO FRY:** Netting must be done once after 12 – 14 days to assess fry quantity and growth. For quantity assessment netting should be done by one go only (frequency). By the onetime netting 90% of the live fry will catch in the net.
- FRY TO FINGERLING:** Netting must be done in every 10 days for selling of the early matured fingerling or growth assessment of the fingerling.
- FINGERLING TO TABLE FISH:** Netting must be done monthly or disturb the bottom soil by any other suitable means.



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TRANSFER OF FRY (EXTRA ABOVE ONE LAKH FROM THE SPAWN POND):

On 12th day, after estimating of fry population of the nursery pond by netting, if there is fry population over 0.8 lakh, then the extra fry must transfer to other pond or sell. For one bigha of a nursery pond (0.13 ha), 0.8 lakh fry is ideal to rear as fingerling. Feeding must be continued till 30th days to rear as fingerling or sale in the market.

STOCKING OF FINGERLING PER BIGHA OF POND - TABLE FISH REARING:

It is advisable to stock 1625 multi carp per bigha (0.13 ha) in the pond with the ratio as mentioned in the table below:

Sl. no.	Fish species	Number	Habitat	Favorite feeds
1	Katla	250	Surface feeder	Zoo planktons
2	Rohu	480	Mid layer (column feeder)	Omnivorous
3	Mrigal	480	Bottom layer feeder	Detrivorous
4	Bhata/Japanese puthi	160	Column and bottom feeder	Omnivorous/Detrivorous
5	Grass carp	20	Mid layer feeder	Herbivorous
6	Common carp	235	Bottom feeder	Omnivorous
	Total	1625		

Note:

1. One should not stock silver carp and big head in, small water body up to 1 ha.
2. Grass carp is herbivorous, feeds on grasses; its undigested drooping is good feeds for column and bottom dweller and excess use of green manure of a pond.

FEEDING FOR TABLE FISH REARING:

For the feeding of fingerling to rear as table fish, the process of manuring, liming, use of bamboo branches are same as mentioned above (section 5 – C, D & G).

For the home made feeds, the feeding process should be followed as mentioned in the table below –

Month	Dose per alternate day (kg)	Total Qty. (kg)
1 st	0.8	12
2 nd	1.6	24

Note:

- 1) Mustard oil cake and rice bran is to be made powder and mixed up in the ratio of 1:1.
- 2) Water, over ripen banana, rice froth or boiled potato can be mixed with the above mixture, make a ball like shape and put in a plastic/gunny bag with few pencil size holes.



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3 rd	3.25	49
4 th	3.25	49
5 th & 6 th	4.8	144
7 th , 8 th & 9 th	6.5	293



CULTURING YEARLING:

Stocking of fingerling with high dose i.e. @ 16250 per bigha and can be reared up to 12 months to sale as yearling in the next season or stock in the pond in the beginning of the season. This yearling grows fast, survival rate is very high, and one can sale ready fish by 4-5 month and then again can go for 2nd batch to stock for rearing to table fish. For this, feeding should be given @ 0.8 kg MOC and rice bran in every day and compost manure mixture monthly.

DISEASE AND INSECT MANAGEMENT:

1. Proper pond preparation before stocking and management of stocked pond discouraged disease and pest infestation,
2. Regular liming and netting can help to maintain water quality and removal of obnoxious gases in the bottom of the pond,
3. If any symptom of ulcer in the fish, then immediately apply mixture of lime and turmeric powder paste (@11.5 kg wet lime and 1.6 kg turmeric powder) and hand throw by mixing with little water in the pond per bigha (0.13 ha). Apply two doses at one week interval and see the fish health.
4. Heavily infected fish must be removed immediately,
5. 25 kg fresh ash apply at a time in the pond followed by mixture of stackline bollous 500 mg @ 6 tablet per bigha with 8 kg of dust feed in 5 days split dose. (1.6 kg per day).

It is experienced by the pisciculturist that in the fish culture pond where netting, liming and feeding done regularly, there is no evidence of disease of fish in Tripura (Mr. A. Bhattacharjee)



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FISH HARVEST AND YIELD:

After following the package of practices mentioned above, one can harvest 500-700kg and can earn net profit over 70,000/bigha. Fish can be harvested after 9 months of rearing.



FEW IMPORTANT POINTS TO BE FOLLOWED:

1. Netting for the table fish rearing must be ensured monthly.
2. Monitoring plankton growth, water turbidity test, pH test once in every 15 days.
3. Composting must be done after observing water colour and plankton density of the pond.
4. Ensure liming bimonthly @ 8 kg per bigha, or one can apply fresh ash @12-16 kg in place of lime.
5. Disturb water every day in the morning with the help of a bamboo slip or encourage swimming in the pond (table fish rearing pond only), duck can be used as biological aerator or use electric aerator.
6. Keep clean of the pond dyke and pond from unwanted weeds, plants and fishes.
7. Avoid entry of water from household areas and other sources.
8. Maintain water depth between 1 m in nursery pond and maximum 2.5 to 3 m for table fish rearing, preferably.
Reduce feeding dose in the winter season, give feed once or twice in a week @ 1.6 kg at one time per bigha.