

No. 35029/14/2019-Fy (Trade)  
Government of India  
Ministry of Fisheries, Animal Husbandry & Dairying  
Department of Fisheries

Krishi Bhawan, New Delhi-110114  
Dated the 23<sup>rd</sup> April, 2020

To,

The Secretary (Fisheries),  
All the States and UTs

**Subject: Delegation of powers to State Governments/ UTs to issue permission for establishment and operation of Tilapia hatcheries-reg.**

Sir/Madam,

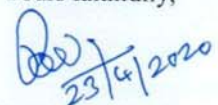
I am directed to refer to the abovementioned subject and to state that as per the Guidelines for Responsible Farming of Tilapia in the Country, entrepreneurs who intend to establish tilapia hatcheries have to obtain approval from National Steering Committee to Oversee and Monitor the Tilapia Seed and Grow-out Production. The matter has been reviewed in this Ministry based on the recommendation of the said National Steering Committee.

With the approval of Competent Authority, the State Governments/UTs are hereby authorised with immediate effect to issue necessary permission for establishment and operation of Tilapia hatcheries which intends to obtain the broodstock from the approved sources within the country subject to the condition that the layout of the hatchery is as per the standard layout developed by CIFA and all the biosecurity measures are in place including necessary precautions to check spread of Tilapia Lake Virus (TiLV). Besides, the approval to the hatcheries shall only be given at the level of Secretary (Fisheries) of State Governments and Union Territories.

However, if the proposal for establishment and operation of Tilapia hatchery involves import of broodstock from overseas suppliers, the entrepreneurs have to obtain permission from the Government of India. Accordingly, the revised Guidelines for Responsible Farming of Tilapia in the Country are enclosed for necessary action.

**Encl.: As above**

Yours faithfully,



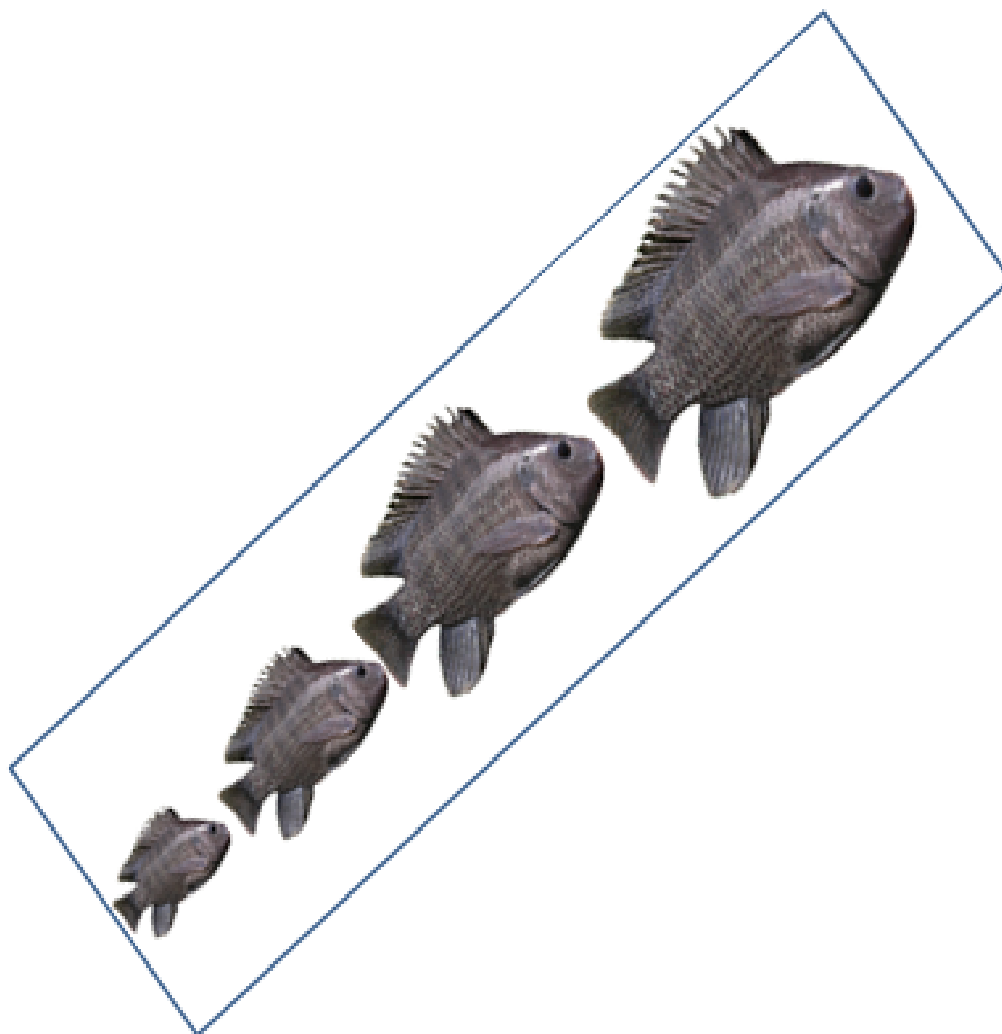
(Dr. P. Paul Pandian)

Fisheries Development Commissioner

Copy to:

Commissioner of Fisheries/ Director of Fisheries, All the States and UTs

# **GUIDELINES FOR RESPONSIBLE FARMING OF TILAPIA IN INDIA**



सत्यमेव जयते

**Government of India**

**DEPARTMENT OF FISHERIES  
MINISTRY OF FISHERIES, ANIMAL HUSBANDRY AND DAIRYING**



सत्यमेव जयते

**Government of India**

## **GUIDELINES FOR RESPONSIBLE FARMING OF TILAPIA IN INDIA**

|                                 |  |
|---------------------------------|--|
| <b>Country:</b>                 | India  |
| <b>Guideline Applicable to:</b> | All states and Union territories of India  |
| <b>Revised Guideline:</b>       | Department of Fisheries, Ministry of Fisheries,<br>Animal Husbandry and Dairying, Government of<br>India                               |
| <b>Scope:</b>                   | Breeding, seed production and grow-out culture of<br>tilapia   |
| <b>Year:</b>                    | April, 2020  |
| <b>Published by:</b>            | Department of Fisheries,<br>Ministry of Fisheries, Animal Husbandry and<br>Dairying<br>Government of India                             |
| <b>Drafted by:</b>              | Dr. P. Routray and other members of the National<br>Steering Committee to Oversee and Monitor<br>Tilapia seed and Grow out Production. |

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## ABBREVIATIONS

|            |  |
|------------|--|
| °C:        | Degree Celsius   |
| µg:        | Microgram  |
| CAA:       | Coastal Aquaculture Authority                                |
| CIFA:      | Central Institute of Freshwater Aquaculture                  |
| MT:        | Methyl Testosterone  |
| ECGIFT:    | Genetically Improved Farmed Tilapia                          |
| FAO:       | Food and Agriculture Organization                            |
| FY:        | Financial Year   |
| GMP:       | Good management practice                                     |
| ha:        | hectares   |
| HACCP:     | Hazard analysis at critical control point                    |
| ICAR-:     | Indian Council of Agricultural ResearchCryoprotective Agents |
| DoF:       | Department of Fisheries                                      |
| IM:        | Intra-muscular   |
| IMC:       | Indian major carp  |
| IP:        | Intra-peritoneal   |
| Kg:        | Kilogram   |
| GOI:       | Government of India  |
| MPEDA:     | Marine Products Export Development Agency                    |
| ppt:       | Parts per thousand   |
| ppm:       | Parts per million  |
| RAS:       | Re-circulatory Aquaculture System                            |
| RGCA:      | Rajiv Gandhi Centre for Aquaculture                          |
| WorldFish: | World Fish Centre, Malaysia                                  |
| SOP:       | Standard Operating Procedures                                |
| SRT:       | Sex Reversed Tilapia   |
| MT:        | Metric Tone  |
| BFT:       | Bio floc technology  |

## Introduction

Tilapia, the omnivore cichlids are becoming a natural choice as a candidate species for aquaculture throughout the world. Tilapia is native to Africa and Middle East, and has emerged from mere obscurity to one of the most productive and internationally traded food fish in the world. The farming of tilapias, especially of Nile tilapia (*Oreochromis niloticus*) in its crudest form is believed to have originated more than 4000 years ago from Egypt. The first recorded scientific method of culture of tilapia was reported in Kenya during 1924. Tilapia was later transplanted and became established as a potential farmed species by the 1940s in the Far East and a decade later spread in Americas. The culture of tilapia has become commercially popular in many parts of the world and the fishery experts have dubbed the tilapia as “aquatic chicken” due to its quick growth and low maintenance cultivation. Tilapia is not only the second most important farmed fish globally, but also described as the most important aquaculture species of the 21<sup>st</sup> century (Shelton, 2002). The fish is reported to being grown in about 85 countries around the world (FAO 2008). Today, if any fish that could be named as global fish, no better name can be thought of than tilapia. It has emerged as a strong aquaculture species from the land of Africa and Middle East. However, the development of hormonal sex-reversal techniques in the 1970s, followed with research on nutrition and culture systems, alongwith market development and processing advances, led to rapid expansion of the industry since the mid-1980s. Though several species of tilapia are cultured commercially Nile tilapia is the predominant cultured species worldwide.

The last three decades have seen significant developments in farming of tilapias worldwide. Tilapias are being farmed in about 85 countries worldwide (FAO, 2008) and about 98% of tilapia produced in these countries are grown outside their original habitats (Shelton, 2002). The tilapias have recently been classified into three genera, based on parental incubation of eggs. There are about 70 species of tilapias, of which nine species are used in aquaculture worldwide (FAO 2008). Important commercial species include: the Mozambique tilapia (*Oreochromis mossambicus*), blue tilapia (*O. aureus*), Nile tilapia (*O. niloticus*), Zanzibar tilapia (*O. hornorum*), and the red belly tilapia (*O. zilli*). Several varieties of tilapia are commercially available that are either derived through selective breeding or hybridization from *O. niloticus*. Some of the prominent ones are GIFT, Chitralada, Red-Stirling, genetically super male Indonesian tilapia" (GESIT) etc. GESIT fish are genetically engineered to hatch eggs which will produce 98% - 100% male tilapia.

In India, tilapia (*Oreochromis mossambicus*) was introduced in 1952, with a view to filling up unoccupied niches, such as ponds and reservoirs. The species spread all across the country within a few years due to its prolific breeding and adaptability to wide range of environmental condition. Overpopulation of the species affected the fisheries of several reservoirs and lakes as in Vaigai, Krishnagiri, Amaravati, Bhavanisagar, Tirumoorthy, Uppar and Pambar reservoirs in Tamil Nadu, Walayar, Malampuzha,

Pothundy, Meenkara, Chulliar and Peechi reservoirs of Kerala, Kabini reservoir of Karnataka and Jaisamand Lake of Rajasthan. Introduction of *O. mossambicus* in Jaisamand lake not only resulted in reduction of average weight of major carps, but also posed threat to species like mahseers (*Tor tor* and *T. putitora*), which are on the verge of extinction. The Fisheries Research Committee of India had imposed ban on tilapia propagation in 1959.

Studies carried out at CIFA for a period of three years during 1998 to 2000 with GIFT tilapia had demonstrated production levels of 5-6 MT per crop of 4-6 months duration. Further, the study also showed the possibility of tilapia farming under polyculture with the three Indian major carps showing higher growth over rohu and mrigal at similar stocking levels. Monosex population (all male) is also produced with provision of 17 $\alpha$  Methyl Testosterone treated feed for four weeks.

As the demand for fish is increasing, diversification of species in aquaculture by including more species for increasing production levels has become necessary. Introduction of tilapia in our culture systems is advantageous because it represents lower level in food chain, and thus its culture will be economical and eco-friendly. Mono sex culture of tilapia is advantageous because of faster growth and larger and more uniform size of males. The development of improved variety of tilapia by selection/ hybridization or genetic improvement technology is based on traditional selective breeding and is meant to improve commercially important traits of tropical farmed fish which is a major milestone in the history of tilapia aquaculture. Through combined selection technology, the GIFT program achieved 12-17% average genetic gain per generation over five generations and cumulative increase in growth rate of 85% in *O. niloticus* (Eknath and Acosta, 1998). Other varieties like 'red tilapia' also hold promise. There is high potential of export of tilapia to US, Europe and Japan. Further in recent years the technology of selection and breeding programmes are using modern biotechnological tools along with genetic information to derive good varieties of tilapia. So, National Breeding Programme on tilapia in India needs to be undertaken to overcome several problems associated with frequent imports.

In order to facilitate the culture of Tilapia in India in responsible manner, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying has framed the Guidelines for Tilapia Culture, Establishment Hatchery for Breeding/Seed Production in India.

## **GUIDELINES FOR TILAPIA CULTURE, ESTABLISHMENT OF HATCHERY FOR BREEDING/SEED PRODUCTION/ IN INDIA**

### **I. Role of Central Government and State/UT Governments**

#### **A. National Steering Committee**

- i. The Department of Fisheries (DoF), Ministry of Fisheries, Animal Husbandry and Dairying, Government of India constituted a National Steering Committee to oversee and monitor the tilapia seed and grow-out production. This Committee may empower respective State Fisheries Departments for monitoring, controlling and surveillance (MCS) of Hatchery/Farming (Nursery as well as Grow-out) facility.
- ii. The National Steering Committee shall recommend standard guidelines with regard to quarantine measures required for tilapia brood stock/seed importation for Hatchery and Breeding Programmes for consideration of the National Committee on Introduction of Exotic Aquatic Species.
- iii. The National Steering Committee is empowered to modify/revise the guidelines as and when required.
- iv. The National Steering Committee may consider proposal for establishment of tilapia National Breeding Programme (tNBP) for tilapia through ICAR fisheries research institutes and other similar agencies.
- v. The National Steering Committee shall ask for report on registered farms, the permission given to tilapia hatcheries by the State Governments/UTs.

#### **B. Role of State/ UT Steering-Cum- Monitoring Committee**

- i. If any entrepreneur intends to establish a hatchery for Tilapia breeding and seed production shall apply to the State Fisheries Department in the prescribed Proforma (Annexure-I) for permission. If the proposal involves import of tilapia from overseas sources, the proposal shall require approval of the Government of India (DoF).
- ii. Farmers/ Entrepreneurs who intend to take up Tilapia farming shall apply to the State Fisheries Department in the prescribed Proforma (Annexure-II) to register their farm.
- iii. The States/UTs shall constitute a Steering-Cum-Monitoring Committee headed by the Commissioner/Director of Fisheries with fisheries experts and such other members as deemed appropriate by the States/UTs.
- iv. This Committee shall monitor and regulate the hatcheries including nurseries and grow-out facilities as per the provision of the Guidelines for Responsible Farming of Tilapia in India.
- v. This Committee shall also examine the proposals for establishment of hatchery/breeding/nursery facilities of Tilapia and based on the recommendation of the Committee, the Secretary (Fisheries) of the State Governments/UTs shall issue the permission for the same.
- vi. The States/UTs shall furnish quarterly reports to Government of India showing the details of hatcheries permitted, monitored and farms registered which in turn will be reviewed by the National Steering Committee to Oversee and monitor Tilapia Seed and Grow-out Facilities.



- vii. The permission accorded by the States/UTs for establishment and operation of hatcheries/breeding/nurseries shall be placed on their websites for transparency.
- viii. The State level Steering Committee is authorized to call for details from any registered farm/hatchery /breeding/ nursery facilities of tilapia and take appropriate action in case of violation of the provisions of the Guidelines.
- ix. In case the tilapia farming is proposed to be undertaken within the jurisdiction of CAA, the facilities shall be required to be registered with CAA as per the CAA Act and Rules. However, these guidelines shall be followed for all other practical purposes.
- x. Evaluation and impact assessment will be studied periodically by the State Steering Committee and send the report to the National Steering Committee about the effectiveness of preventive steps taken up to prevent escape of tilapia from ponds and cages and improve them.
- xi. Impact of escapees on ecosystem and how they would modify the invasive capacity of existing tilapia species to be determined. If required the States/UTs may employ an external expert in this field.
- xii. The State Governments/UTs shall ensure that all the provisions of the guidelines are implemented by the farmers and entrepreneurs indulge in the Tilapia farming, breeding and nursery practices.

## II. Culture systems and practices

- i. **Registration:** Tilapia culture shall be under taken by the farmers who have registered their farm with the State Fisheries Department.
- ii. **Location:** Farms may be located in areas which are not prone to floods or in a buffer zone around a declared sanctuary or bio-reserve or other vulnerable areas in order to avoid escape to the open water bodies.
- iii. **Culture type:** Farming of only Monosex male/sterile (through either hormonal manipulation or cross breeding)/super male (YY) is permitted.
- iv. **Area of culture systems:** Farms of any size are allowed to do tilapia culture. Culture of tilapia in indoor systems, peri-urban aquaculture systems, Re-circulatory Aquaculture System (RAS) and Biofloc Technology (BFT) is also permitted.
- v. **Species:** Tilapia is the common name applied to three genera of fish in the family *Cichlidae*: *Oreochromis*, *Sarotherodon*, and *Tilapia*. The species that are most important for aquaculture are in the genus *Oreochromis*, including the Nile tilapia, *O. niloticus*, the Mozambique tilapia, *O. mossambicus*, the blue tilapia, *O. aureus*, and *O. urolepis hornorum*. However, only Nile tilapia (*Oreochromis niloticus*) or its improved strains/hybrids shall be allowed for culture in India. Farming of only monosex male/sterile (through either hormonal manipulation or cross breeding) of *O. niloticus* shall be permitted.
- vi. **Size of the seed to be stocked:** Grow-out ponds should be stocked with sex reversed tilapia (SRT) seed of more than 10 g. About 30 Days old sexually reversed tilapia (SRT) to be reared to 10 g size raised in on-farm nurseries or in registered seed farms. The stocking size of tilapia in cages and pens, RAS, BFT systems should be at least 30g or above.
- vii. **Stocking density:** 5 nos/m<sup>2</sup> or as the diversified system demands.
- viii. **Bio-security:** The approval for farming of tilapia shall be accorded only to those ponds/farms which could maintain bio-security of the farm to ensure no escape of the biological material from the farm to the water source or to any other source even in

situations like flooding. Therefore, there should be a standard design specifying the minimum requirement of bund height water management systems and other bio-security measures which are necessary for farming. Outlet water from culture ponds must be screened and treated before released into drains/canals/rivers during culture practice or subsequent to harvesting in order to prevent escape of eggs into natural water bodies (b) Provision of Bird scaring device/fencing is mandatory, (c) Bund height should be high enough to avoid fish escape and (d) sluice gates must be provided with appropriate mesh size to prevent escape of fish/eggs/fry.

ix. **Sale of seed and broodstock:** No grow out farm should be allowed to sale seed and broodstock from his grow-out ponds/tanks or residual stocks. A strict discipline in this aspect may be followed to ensure good quality seed reaching to the farmers.

x. **Earthen pond culture:**

- **Size of the seed to be stocked:** Grow-out ponds should be stocked with sex reversed tilapia (SRT) seed of more than 10 g. About 30 Days old sexually reversed tilapia (SRT) to be reared to 10 g size raised in on-farm nurseries or in registered seed farms.
- **Area:** The area of tilapia pond may be a few decimals to several acres. Ideal area should be 0.05–0. 2 ha.
- **Shape and Size:** Rectangular is preferred for fish harvest and all other management activities. However, for tilapia culture, the shape of the water body does not have much impact on the production.
- **Dyke/Embankment:** The pond dyke should be elevated enough to protect flooding during rains and escape of tilapia to wild areas.
- **Dyke slope:** Slope of pond dyke should be minimum of 2: 1. As tilapia build nest after digging soil, steep dyke becomes easily damaged. Therefore for tilapia pond, dyke with appropriate slope is essential.
- **Pond Soil:** Loamy soil should be preferred for tilapia culture. In sandy soil generally a thick layer of mud is built-up in 3 years' time that increases the water holding capacity and makes it suitable.
- **Depth:** About 1.5 meter water depth is regarded as ideal. On the other hand, if there is no provision of water supply from outside, pond should be such deep so it can hold at least 3 feet water in summer season. In these situations, decision should be taken after necessary survey of the ponds located in the region.
- **Water supply and drainage system:** Regular water supply and draining out are necessary for aquaculture intensification. Therefore, inlet and outlet pipes / drain are required. Generally, a pipe of 6-8 inches diameter is sufficient for a pond of 1 acre.
- **Stocking management**
- Fry should be released after 5 – 6 days of fertilizer application in grow out pond. Fry may be stocked into the ponds in the morning hours. If water is cool, fry can be released in any time of the day.
- **Stocking density:** In tilapia monoculture high stocking density of fry results low growth. Therefore, fry should not be released at high stocking density in tilapia culture. If 35000-40000 fry/ha are stocked, the average weight of fish will be 300 – 350 g within 3 - 4 months. Farmers should decide the stocking density of tilapia culture considering their ability and experience.
- A standard lay out for the farm is given at Annexure-III.

xi. **Cage culture**

Cage culture of tilapia shall be restricted to those reservoirs which are having already established stocks of tilapia. Before initiation of such farming assessment studies should be carried out by respective State Fisheries Departments in order to ascertain the presence of tilapia population in such reservoirs. Risk Assessment report from ICAR-CIFA or similar Central Institutes may be obtained before giving permission. Cage area in the reservoir should not exceed 1% of effective water area (EWA). Stocking size in cages must be more than 50 g weight. Accordingly, cage net should have appropriate mesh size. Use of formulated floating pellet feed with minimum protein content of 25% is encouraged in cage culture. Cage culture of Nile tilapia is useful for producers who use public or communal waters, including reservoirs, lakes, bays, irrigation systems, or village ponds. Tilapia culture in cages placed in abandoned mining pits may be encouraged as it is practiced in US State of Florida and in watershed ponds in Alabama (Popma and Rodriquez, 2000). Cages vary widely in construction, from simple bamboo enclosures to complex steel and plastic designs. Capital investment is low compared with ponds, and by concentrating fish the farmer has better control over feeding and harvesting.

xii. **Cemented/FRP/Polyline Tanks**

Tilapia culture in cement tanks/FRP tanks/poly lined tanks following available standard protocol may be permitted. However, these farms are not allowed to produce seed through breeding and sale seed to other farmers for stocking purposes. There are several foldable PVC, tarpaulin made tanks that are also used for tilapia production.

xiii. **RAS**

Indoor RAS solves a number of concerns to the aquaculture sector as they provide a higher degree of environmental control and are the only means for a fish producer to grow tilapia year-round in northern India during winter without using a thermal effluent or high flow geothermal heating. These systems require less water and less land area per kg of fish produced. They can be located in relatively close proximity to markets to reduce transportation costs and stress and mortalities during live transport. RAS have the potential to mitigate much of the environmental impact of fish production systems by reducing the volume of water discharged. Waste solids are concentrated as a sludge that is more easily disposed of by land application, or could be discharged to municipal waste treatment systems. Finally, RAS can increase biosecurity by minimizing the interaction of cultured fish with external biota to maintain integrity of both natural systems and the cultured stocks.

xiv. **Biofloc Technology (BFT)**

Biofloc systems were developed to improve environmental control over production. In places where water is scarce or land is expensive, aquaculture must be practiced for cost-effective production using BFT. There are strong economic incentives for an aquaculture business to be more efficient with production inputs, especially the most costly (feed) and most limiting (water or land). High-density rearing of fish typically requires some waste treatment infrastructure. At its core, biofloc is a waste treatment system. Biofloc systems use a counter-intuitive approach—allow or encourage solids and the associated microbial community to accumulate in water. Managing biofloc systems is not as straightforward as that, however, and some degree of technical sophistication is required

for the system to be fully functional and most productive. The BFT s may be encouraged in India, but at the same time cost effectiveness must be worked out before substantial investment.

- xv. **Intensive Tilapia culture:** Farms intending to undertake re-circulatory farming practice including RAS and BFT should register with State Fisheries Departments with a stocking density of not more than 150 nos/m<sup>3</sup> with provision of floating feeds. Biosecurity measures followed in this case must conform to the standards specified for Grow-out farms.

### **III. Establishment of hatchery for breeding and seed production of tilapia**

- i. Entrepreneurs who intend to establish tilapia seed hatcheries without involvement of import shall require approval of the State Governments/UTs. The approved hatcheries shall obtain broodstock from the approved sources within the country. Hatcheries shall sale seed only to the registered nurseries/farms. Hatcheries should comply with the lay-out as given in Annexure-III.
- ii. The broodstock/brood seed for the approved hatcheries shall be procured from the overseas/Indian source as approved by Government of India.
- iii. Importer should have qualified and trained technical staff (Aquaculture/ Fishery/Zoology/Genetics) Graduates or post-graduates.
- iv. Traceability of the particular strain till culture should be in place to avoid illegal import trade across border).
- v. Importer should demonstrate that imported fishes are kept under biosecurity measures.
- vi. The broodstock supplier/ exporter and the importer need to demonstrate or understand that the imported stock/sample is subject to independent disease surveillance for relevant viral diseases.
- vii. The State Steering-Cum-Monitoring Committee shall inspect the design to ensure that it is in conformity with the designed and lay-out for hatchery including quarantine facility as approved by the National Steering Committee at Annexure-III.
- viii. The brood stock/seed imported from overseas shall be subject to quarantine for a period of 21 days as per the standard protocol.
- ix. Production of mono-sex male tilapia by the hatcheries should conform to the standard protocols available.
- x. Tilapia breeding programme with an objective of selective breeding for genetic improvement in subsequent generations involving geneticist should be encouraged to avoid future catastrophe due to inbreeding.
- xi. Sex reversal using non-hormonal techniques/technology should be encouraged. (take to appropriate place)

### **IV. Seed nurseries**

Nurseries which are intending to raise seed (Seed Farms) for tilapia culture have to be registered with State Fisheries Departments following the guidelines available for Grow-out farms. Nurseries should procure sex reversed tilapia (SRT) seed only from the registered hatcheries.

### **V. Monitoring of the farm/hatchery/breeding/nursery facilities**

- i. The District Fisheries Officers (DFO) will regularly monitor and inspect the Tilapia farm/hatchery/breeding/nursery facilities in order to ensure that all the biosecurity measures are in place and the guidelines are fully implemented.

- ii. The DFO will also monitor and inspect the health of the stock periodically and in case of disease incidence, permissible therapeutics may only be recommended for judicious use. The occurrence of disease and the action taken shall be informed to the Government of India by the States/UTs immediately.
- iii. The DFO will send a Quarterly inspection report to the Commissioner/Director of Fisheries.
- iv. The State Steering-Cum- Monitoring Committee shall establish a monitoring and inspection system for periodic checkup of disease status, biosecurity managements and report immediately (if any disease incidence is there) and suggest remedial/therapeutic measures for the same.
- v. The inspection and monitoring shall be done as per the monitoring checklist at Annexure-VI.
- vi. The State Steering-Cum- Monitoring Committee shall at least inspect the approved facility once in the year to review the report submitted by the DFO.
- vii. The State Steering-Cum- Monitoring Committee shall develop a Schedule of Inspection including the schedule of inspection for the DFO of the States/UTs for under taking inspection of the approved facilities.

## **VI. Record Management**

Records should be maintained regarding pond wise and day to day management of the farm indicating the details of stocking, source of seed, inputs, sampling details, water quality details, health, growth etc. The records should be produced at the time of inspection by the concerned fisheries authorities. The Data Sheet for daily recordings of feed and water quality management is at Annexure-V.

## **VII. Harvesting, Post-Harvest and Transport/marketing**

- i. Feeding should be suspended one/two days prior to harvest. Harvesting may be done using drag nets or any other quick harvesting methods. Termination of crop after each crop is highly advocated. This will ensure procurement of good quality seed from reputed hatcheries each time.
- ii. Harvested fish should be immediately iced and transported for domestic markets/processing plants. Adequate infrastructure facilities for processing of tilapia in value added items should be encouraged. Live fish transport may be included.

## **VIII. Further technical suggestions**

- i. **Fertilization:** Fertilization in pond culture using organic manures can be done depending on the nutrient status of the soil as and when required.
- ii. **Types of feeds:** Formulated standardized certified floating pellet feed/farm made pellet feed with minimum protein content of 20% should be used.
- iii. **Feed storage:** Proper feed storage facility should be provided at the farm site with proper ventilation and management of humidity. The feed should be stacked on raised wooden platforms without touching the walls to avoid mold. The feed should be used within three months from the date of production.

\*\*\*\*\*

**Application for Permission to Establish Hatchery and Breeding of Tilapia**

1. Name of the Applicant (s) / registered company/  
establishment (in BLOCK LETTER with  
permanent address, fax number, email etc.) :
2. Communication address :
3. If already farming Tilapia, Details of registration  
by the State Fisheries Department.(Please furnish  
a copy of the registration Certificate. In case certificate  
has not been issued, mention the Registration Number,  
date and other details.) :
4. Hatchery details
  - 4.1. Land area :
  - 4.2. Area allotted for hatchery :
  - 4.3. Proposed seed production capacity :
  - 4.4. List out area/dimension details of different  
sections of the hatchery :
  - 4.5. Enclose a copy of the Hatchery diagram :
  - 4.6. Water source and water quality details :
  - 4.7. Soil Quality Details :
  - 4.8. Land ownership details :
  - 4.9. Any other information :
5. Proposed source of broodstock :
  - 5.1. Broodstock supplier :
  - 5.2. Number of broodstock to be procured :
  - 5.3. Genetic information of the broodstock to  
be supplied by the suppliers :
    - 5.3.1. Generation from which the broodstock procured :
    - 5.3.2. Growth Rate at optimal environment :
    - 5.3.3. Growth Rate under monosex culture :
    - 5.3.4. Growth Rate under mixed culture :
- 5.4 How the genetic vigour of the broodstock  
will be maintained? :
- 5.5 Details of the technicians available  
with the hatchery. Give their  
Qualification & experience :
6. State how the seed produced by your hatchery will  
be distributed :
7. Whether your seed will be sold to registered

- farmers only? If yes, whether sales registers are maintained? :
8. Please provide a self-contained proposal alongwith details of the purposed biosecurity measures :
9. In case the broodstock is proposed to be imported from overseas supplier: :
- 9.1. Please provide the details of quarantine facility at the hatchery premises :
- 9.2. Please provide details of the overseas supplier alongwith documents on the quality of the broodstock to be imported. :
10. Do you have Effluent Treatment Plant provided With measures to prevent escape of GIFT Tilapia into natural waters? If yes, please give the details thereof. :
11. If GIFT Tilapia seeds are to be stocked in reservoirs in cages, information to be provided by the State Department of Fisheries as to whether any farming assessment study (as per the Guidelines) was carried out to ascertain presence of Tilapia population in such reservoirs? :
12. How much area (EWA) in reservoirs is proposed to be brought under cage culture of Tilapia? :
13. What is the total area of the reservoir (EWA)?
14. Any other information. :

**Signature of the Applicant**

### **DECLARATION**

I/ We hereby declare that the information furnished above is true to the best of my knowledge.

I/We undertake to abide by the rules, regulations and guidelines of the Government of India.

**Signature of the Applicant**

**Annexure-II****Format for Application for Culture/Farming of Tilapia**

| S.No | Particulars  | Remarks |
|------|--|---------|
| 1.   | Name and address of the Applicants(s)/ registered company/establishment in full (in Block Letters with permanent address)              |         |
| 2.   | Status of the Farm:<br>Individual/Society/Private/Proprietary/Partnership  |         |
| 3.   | Address for communication  |         |
|      | Street:  |         |
|      | City:  |         |
|      | District:  |         |
|      | State:   |         |
| 4.   | Location of the farm   |         |
|      | State:<br>District:<br>Taluk/ Mandal<br>Revenue Village:<br>Survey No:   |         |
| 5.   | Ownership (Whether free hold or on lease)  |         |
| 6.   | If on lease, Specify the lease period and attach copy of the lease period  |         |
| 7.   | Whether the farm is registered with DoF and approved by CAA/ Other Agency (Enclose a copy of the certificate)                          |         |
| 8.   | Attested Copy of the layout of the farm approved by DoF/MPEDA/Chartered Engineer   |         |
| 9.   | List of species that are cultured in the farm  |         |
| 10   | Source of water  |         |
| 11.  | Pond History   |         |
|      | a) Month & year of construction of the ponds and financial assistance received if any.   |         |
|      | b) Production details of Fish/ shrimp from the year of construction  |         |
|      | c) Whether assistance for fish farming received under any scheme of the Central / State Government? If so, please provide the details: |         |
|      | d) Present condition of the ponds, if existing   |         |
| 12.  | Details of the proposed ponds construction/renovation/ repair works of the ponds   |         |
| 13.  | Proposed date of operation of the farm and tentative   |         |



|     |   |  |
|-----|---|--|
|     | schedule of activities  |  |
| 14. | List of Machinery and facilities available at the farm<br>(As per to the Performa at Appendix-1.        |  |
| 15. | Estimates regarding input costs and economics of<br>operations in culture of Tilapia in ponds and cages |  |

Place:  
Date:

Signature of the applicant:  
Name:  
Address:

**Note:**

**This form should be accompanied by the additional information regarding available infrastructure at the farm as per the Appendix-I and the declaration by the applicant as per the Appendix-II.**

**Proforma for furnishing details of infrastructure available at the farm**

Name of the Owner/Lessee:

Place:

Physical facilities

Farm Extent :  
No. of Ponds :  
Area of each Pond :  
Bund high of each pond :  
Water outlet (Hume pipes/  
Sluice gates) :  
Sedimentation tank :

Buildings

a) Office/ Admn :  
b) Living Quarters :  
c) Stores :  
d) Lab for undertaking basic tests :

Machinery:

Pumps :  
Aerators :  
Gen Set :  
Machine Room :

**Declaration to be furnished by the owner of the farm along with the application (to be signed on the Rs 100/- Non- judicial stamp paper).**

1. I/ We....., aged .....son(s) of .....  
.....and owner(s) of the farm at .....  
.....declare that I/ We have read and understood the norms for undertaking tilapia culture and agree to abide by the conditions laid down in the guidelines.
2. I/We hereby declare that/We shall follow the guidelines specified issued .....  
by Govt of India .....guidelines for farming tilapia.
3. I/We also agree to abide by any instructions that may be issued by concerned agency from time to time regarding the culture of Tilapia/ failing which I/We understand that the registration may be cancelled.
4. I/We also agree to the inspection of the farm by any designated officer(s) of the Agency at any time, with prior intimation.
5. I/We also agree to provide information regarding source of the seed, production record, laboratory analysis sheets to the inspection team and shall submit regular reports.
6. I/We also agree to abide by the specifications and penalty clause laid down in the guidelines in the farming of tilapia failing which shall be liable to the cancellation of the approval issued by ....., destruction of stock and pond(s).
7. We also undertake that a quality certificate shall accompany the consignment of fish shipped from my establishment (Self certification) regarding the chemicals/ antibiotics residue status of the fish.

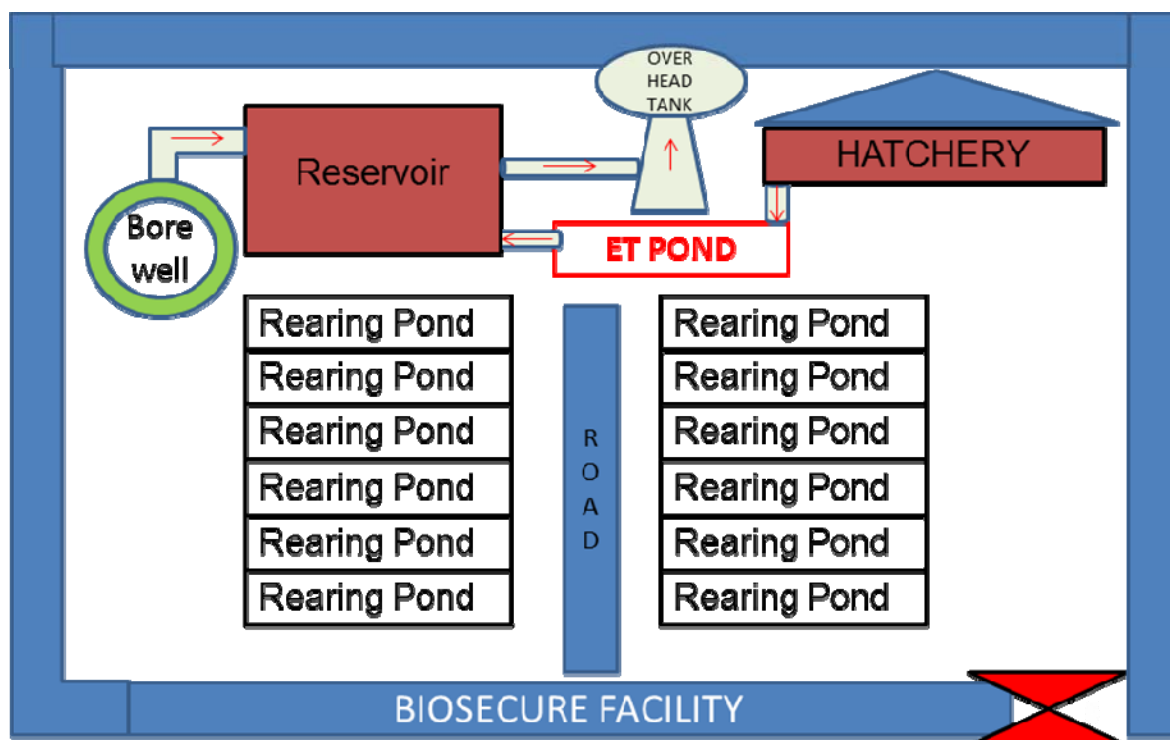
Place:  
Date:

Signature  
Address:

### STANDARD LAY-OUT PLAN FOR TILAPIA FARM AND HATCHERY

Generally in a tilapia farm where hatchery is envisaged, an area 0.2 ha of area should be earmarked for hatchery and the rest should be for nursery and grow-out ponds. In tilapia culture, hapa nursery is a modern technique. When setting up of nursery in pond / canal is not possible during monsoon, fry mortality can significantly be reduced in hapa nursery. Hapa is usually made from synthetic blue nylon net. It may be of different sizes. The stocking density of fry in hapa is 250 – 300 fry. Hapa should be cleaned after every 4-5 days so algae do not clog the net mesh and prevent water flow. It is better to use commercial floating feed in hapa.

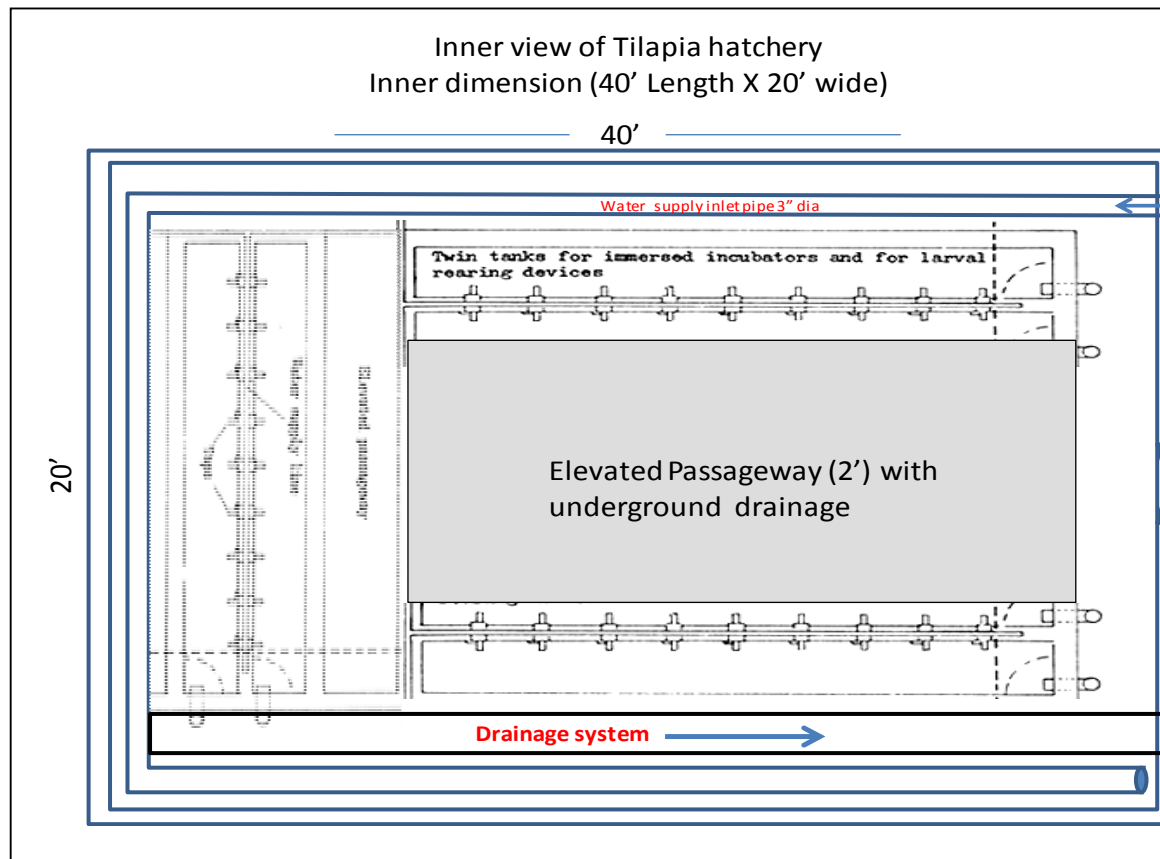
### A STANDARD LAY-OUT FOR TILAPIA HATCHERY (NOT TO SCALE)



### Specifications of hatchery

| Hatchery Unit                             |                                    |
|---|------------------------------------|
| Hatching unit floor area                  | 500 square feet                    |
| Number of jars                            | 50                                 |
| Jar capacity                              | 10 liters                          |
| Egg holding capacity of each jar          | 10,000                             |
| Trays for incubation of just hatch larvae | 50 nos (2000-4000 nos/tray)        |
| Maximum unit capacity of hatchery         | 2.5-3.0 million eggs per month     |
| Maximum output capacity                   | 0.5 – 1.0 million larvae per month |
|   |                                    |

| Indoor Unit of All-Male tilapia Production |   |
|--|---|
| Floor Area                                 | 1000 sq ft                                  |
| Water Storage                              | 2 x 10,000 liter FRP/Sintex or cement tanks |
| Culture Tanks                              | 15nos (20 x 10 ft) cement or FRP Tanks      |
| Tank Capacity                              | 50000 fry/tank @ 20-25 fry/lit              |
| Production Capacity                        | Approx 4-5 Lakh seed per month              |
| Recirculation System with Biofilter        | Must be functional                          |



## A STANDARD LAY-OUT FARM FOR TILAPIA FARMING

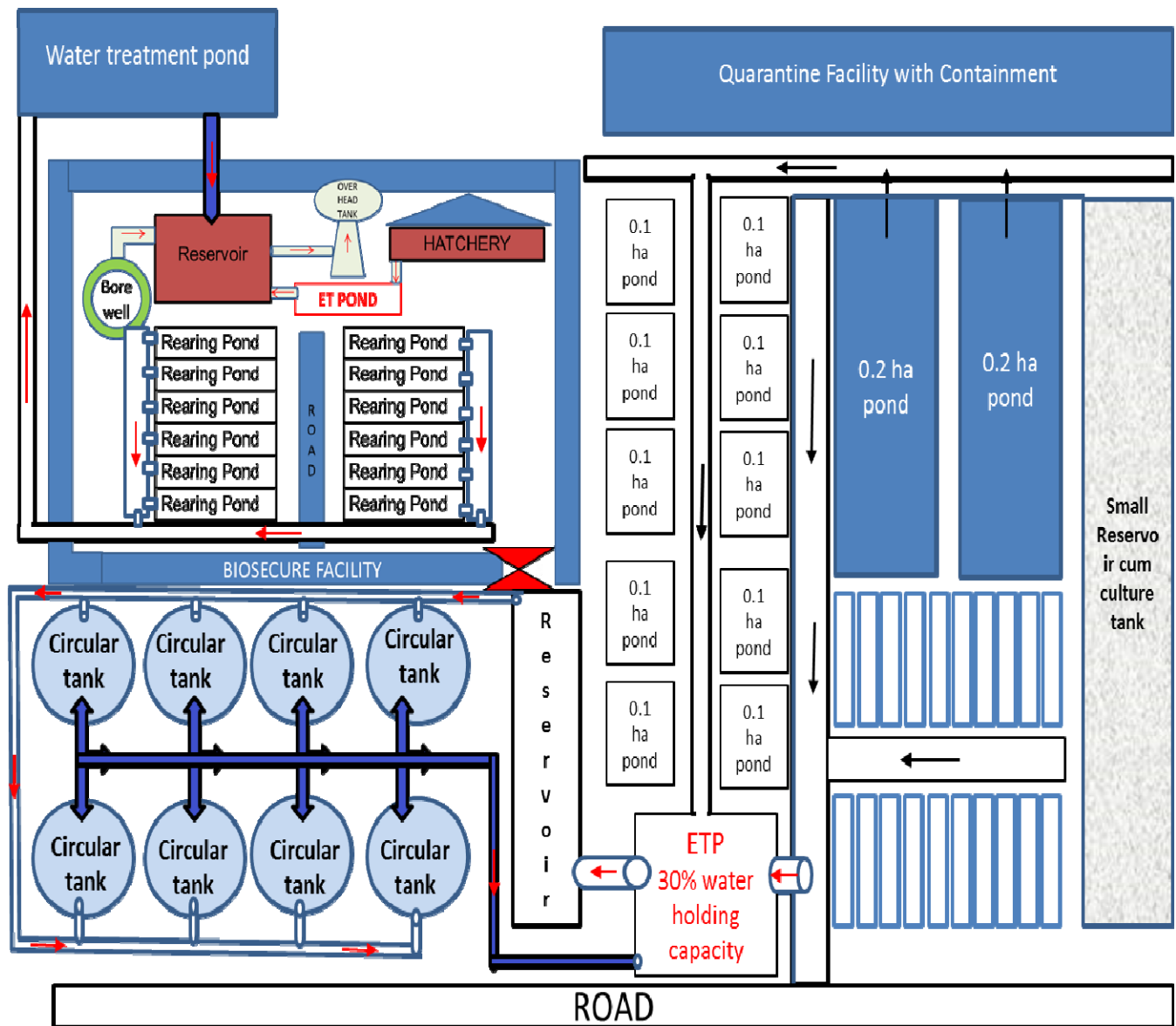
Farm layout for a tilapia farm refers to the compiling of physical structures such as store house, hatchery, outbuildings, waterways, contours, camps, water supply roads and the layout of farm ponds etc. However, a standard farm lay out in a 2ha area involving hatchery and farm is given below (not to scale). It is important to note that the area where the farm is situated, the topography, the availability of natural resources such as water is of prime importance for tilapia farming. Moreover, as per the guidelines it is important to note that the farm and hatchery should not have a direct connection to the natural streams and rivers and canals. The availability of capital and the preference of the farmer/owner may also affect the farm layout.

### Principles of site selection

It is necessary to draw a map indicating the proposed farm's topography, boundaries as well as soil and water resources. This essential information is needed in the planning process when

selecting a site for a specific purpose, e.g. building a hatchery and farm for tilapia farming. Generally, eastern slopes are preferred for maximum sunlight, warmth and protection from winds. Slopes do have a tendency to erosion and need to be cultivated with care. Attention must be paid towards the following while selecting the site:

- Soil types, soil depth and fertility
- Drainage of the soil
- Availability of water
- the natural vegetation
- Access to the area
- Water flow onto and off the farm.
- Aquatic organisms found on the farm.



Layout of a tilapia hatchery cum farm complex

**Monitoring Checklist**

1. Operation of in house Quarantine Facility (for hatcheries)
2. Hatchery layout
3. Breeding and maintenance of broodstock (for hatcheries)
4. Diseases including the Tilapia Lake Virus (TiLV)
5. Basic laboratory for health management measures
6. Seed and feed quality
7. Health management including emergency preparedness to prevent the introduction of pathogenic agents and to deal with occurrence of diseases.
8. Biosecurity measures such as disinfection, water quality monitoring, disposal of dead/ moribund fish, waste and wastewater disposal.
9. Restriction on visitors & workers, equipment maintenance, staff training
10. Environment Impact Assessment
11. Basic Data Management and register maintenance
12. Other requirements as per the Guidelines or as considered by the State Steering-Cum-Monitoring Committee

**DATA SHEET**

Daily recordings of feed and water quality management

Pond No:                      Area:                      No stocked:                      Size:                      Density:

Stocking Date:                      Time:                      Fry Source:                      Condition:                      A Wt:

| Date | DOC | ABW | % Survival | Fertilizers: |            | Water Quality Parameters: |      |        |    |     |         |
|------|-----|-----|------------|--------------|------------|---------------------------|------|--------|----|-----|---------|
|      |     |     |            | Organic      | In-organic | Ph                        | Temp | Trans' | DO | S%O | NO2-NO3 |
|      |     |     |            |              |            |                           |      |        |    |     |         |
|      |     |     |            |              |            |                           |      |        |    |     |         |
|      |     |     |            |              |            |                           |      |        |    |     |         |
|      |     |     |            |              |            |                           |      |        |    |     |         |
|      |     |     |            |              |            |                           |      |        |    |     |         |

| Feeds |    |                 | Health observations | Treatment (approved chemicals) | Remarks |
|-------|----|-----------------|---------------------|--------------------------------|---------|
| Type  | Qt | No. of Feedings |                     |                                |         |
|       |    |                 |                     |                                |         |
|       |    |                 |                     |                                |         |
|       |    |                 |                     |                                |         |
|       |    |                 |                     |                                |         |
|       |    |                 |                     |                                |         |