The requirement of Construction of Fish Culture Pond Time Scheduling for Fish Culture in Pond (PERT/CPM)

Calendar of activities for Fish Seed Production at Government Fish Seed Farms.

January	July
1. Segregation Male & Female Common Carp Brooder. 2. Repairs of Pond Dykes and preparation of nurseries for common carp seed. 3. Maintenance & feeding of I.M.C. breeders. 4. Daily recording of physical & chemical parameters of pond water. 5. Daily recording of behaviourial changes of brood fish. 6. Procurement of material for common carp breeding.	1. Breeding of exotic carps & I.M.C. 2. Supply of Spawn & seed of I.M.C. & exotic carps. 3. Rearing of Spawn of I.M.C. & exotic carps. 4. Special feeding to spent brood fish. 5. Data recording of fish breeding. 6. Aquatic insects & weed control. 7. Management of water quality. 8. Daily recording of physical & chemical parameters of pond waters. 9. Daily recording of behaviourial of changes of brood fish
February	**August**
1. Segregation of I.M.C brood stock. 2. Procurement of I.M.C. brooders if required. 3. Breeding of common carp. 4. Preparation of Nursery such as liming & manuring. 5. Rearing of common carp spawn.	1. Breeding of I.M.C. fishes. 2. Supply of spawn/seed of IMC & exotic carp. 3. Rearing of spawn of I.M.C. 4. Data recording of breeding. 5. Daily recording of physical & chemical parameters of pond waters.

6. Intensive care & feeding of I.M.C. brood stock. 7. Daily recording of Physical & chemical parameters of pond water. 8. Daily recording of behaviourial of changes of brood fish. 9. Procurement of material for common carp breeding.	6. Data recording of behaviourial of changes of brood fish.
March	**September**
1. Breeding of Common Carp. 2. Rearing of Common Carp Spawn. 3. Supply of Common Carp fry. 4. Intensive care & feeding of I.M.C. brood stock. 5. Daily recording of physical & chemical parameters of pond water. 6. Daily recording of behaviourial of changes of brood fish.	1. Supply of IMC seed. 2. Rearing of seed of different varieties at farm for making brood fish for future use. 3. Replacement & procurement of brood stock to maintain required live stock at the farm. 4. Disinfection of Hatchery/ system. 5. Daily recording of physical & chemical parameters of pond water. 6. Daily recording of behaviourial of changes of brood fish.
April	**October**
1. Supply of Common Carp fry. 2. Sun drying of ponds. 3. Disposal of surplus common carp brood fish. 4. Daily recording physical & chemical parameter of pond water.	1. Supply of fingerlings of IMC & exotic carps. 2. Daily recording of physical & chemical parameters of pond water. 3. Daily recording of behaviourial of change of

5. Daily recording of behaviourial of change of brood fish. 6. Dummy operation of Hatchery System.	brood fish. 4. Repair of equipments & nets. 5. Maintenance of Livestock.
May	**November**
1. de-silting of ponds & ploughing. 2. Repairs of ponds. 3. Sun drying of pond. 4. Maintenance of IMC brood fish & common carp seed. 5. Special care of water depth of ponds. 6. Segregation of Male & female of grass carps & silver carp (Exotic carp). 7. Procurement of euipments and accessories for breeding. 8. Daily recording of physical & chemical parameter of pond water. Daily recording of behaviourial of changes of brood fish.	1. Supply of fingerlings of IMC & exotic carps. 2. Segregation of good brood stock & disposal of surplus & old live stock. 3. Procurement of common carp brood stock if required. 4. Daily recording of physical & chemical parameters of pond water. 5. Daily recording of behaviourial of changes of brood fish.
June	**December**
1. Preparation of Nursery Ponds for rearing of IMC & exotic carp spawn. 2. Breeding of exotic carps (grass carp & silver carp). 3. Segregation of male & female of IMC brood fish. 4. Daily recording of physical	1. Supply of fingerlings. 2. Maintenance of brood stock. 3. Daily recording of physical & Chemical parameters of pond water. 4. Daily recording of behaviourial of changes of brood fish.

& chemical parameters of pond waters. 5. Daily recording of behaviourial of changes of brood fish. 6. Data recording of fish breeding.	

Calendar of Activities for Fresh Water Prawn Culture in Haryana State.

January	July
1. Inviting tenders for the purchase of Scampi Seed and Feed. 2. Inviting applications for the selection of sites and beneficiaries.	1. Adopting the culture practices as per technical advice. 2. Exchange of water. 3. Trail netting. 4. Testing of soil and water samples.
February	**August**
1. Finalization of rates of Scampi Feed and seed. 2. Finalization of sites and beneficiaries. 3. Training and study tour for the selected beneficiaries. 4. Preparation of plan and estimates of sites. 5. Submission of loan cases to banks.	1. Adopting the culture practices as per technical advice. 2. Exchange of water. 3. Trail netting.
March	**September**
1. Construction of nursery and grow out ponds. 2. Inspection of work and release of subsidy for pond construction. 3. Procurement of Scampi feed.	1. Adopting the culture practices as per technical advice. 2. Exchange of water. 3. Trail netting.

April	October
1. Preparation of nursery and grow out ponds. 2. Stocking (Supply) of scampi seed. 3. Adopting the culture practices as per technical advice.	1. Adopting the culture practices as per technical advice. 2. Harvesting the blue-clawed prawn. 3. Exchange of water. 4. Trail netting. 5. Testing of soil and water samples.
May	**November**
1. Adopting the culture practices as per technical advice. 2. Exchange of water.	1. Adopting the culture practices as per technical advice. 2. Harvesting the blue-clawed prawn. 3. Exchange of water.
June	**December**
1. Adopting the culture practices as per technical advice. 2. Transfer of Scampi Seed in the grow out pond. (if the seed was kept in nursery)	1. Complete Harvesting and Marketing the prawn crop under the guidance of technical expert.

Requirement for Pond Construction

A) Criteria of Site Selection

- Land should have more water holding capacity.
- Land should not be more alkaline or acidic.
- Low lying area are more suitable.
- Site must have assured water supply.
- Outlets and inlets of ponds should be well built.
- Site should be approachable with road or path.
- Site must be away from floods affected areas.

B) Permissible parameter of soil & water.

SOIL :-

- Sand (%) – 40
- Silt (%) – 20
- Clay(%) – 40
- Organic carbon (%) – 0.5 – 2.0
- Available Nitrogen (mg/100gm) – 20-75
- Available phosphorous (mg/100gm) – 2 10

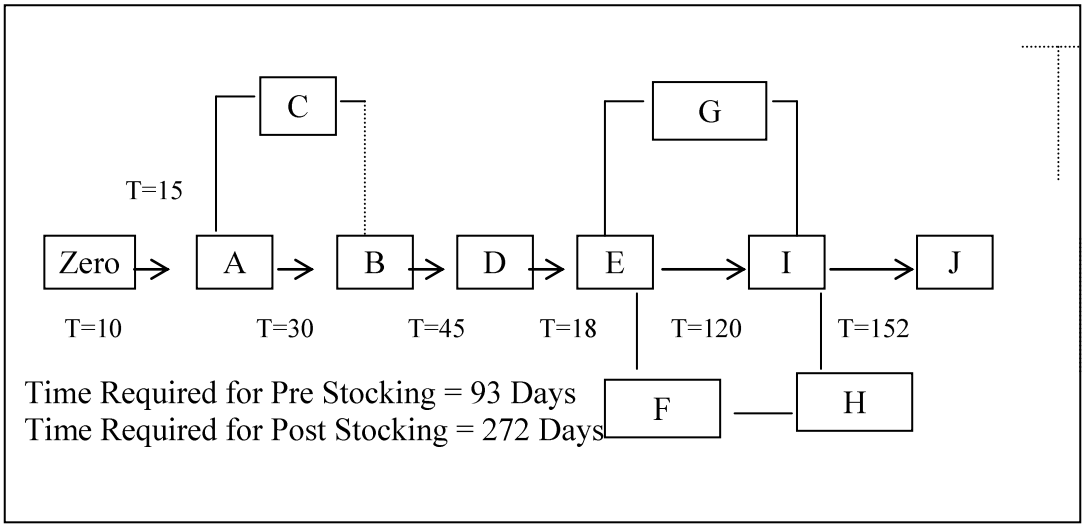
WATER

- Colour – Light Green
- Temperature (Degree Centigrade) – 25-35
- Transparency (cm) – 30 – 40
- PH – 7.0 – 8.6
- Dissolve Oxygen (mg/lt) – 4 – 10
- Carbon Dioxide (mg/lt) – 3 – 7
- Total Alkalinity (mg/lt) – 60 – 230
- Total Nitrogen (mg/lt) – 0.05 – 1.5
- Phosphorous (mg/lt) – 0.05 – 7.0
- Salinity (ppt) - < 5
- Ammonia (ppm) – 0 – 0.1
- Calcium (ppm) – 75 – 150
- Total Dissolve solids (ppm) - <80
- Potassium (ppm) – 0.5 – 10
- Iron (ppm) – 0.3 – 10

Time Scheduling for Fish Culture in Pond (PERT/CPM)

EVENT	ACTIVITY	NET DURATION TIME (DAYS)
A	Identification of Site	10
B	Formulation of Project (preparation of Plan & Estimates, Bank Loans etc.)	30

C	Training in Fish Farming	15
D	Construction/Renovation of Pond	45
E	Stocking Management (Liming, Manuring, Filling of water, Growth of plankton and stocking of seed)	18
F	Soil and Water Analysis	Quarterly. After 60 days of seed in the pond.
G	Sale of Fingerlings	30 days after stocking of seed
H	Trail Netting	Every Month
I	Partial Harvesting	After 150-180 days of Stocking. (10 Jan)
J	Final Harvesting & Marketing	After 250-300 days of stocking.



Construction of Prawn culture pond

A - Criteria of Selection of Site

- Site must be easily approachable with road or path.
- Site should be free from floods and seepage.
- Assured water supply system.
- Arrangement of outlet of water be made.

B. **Permissible Parameters for Soil & Water**

i) SOIL :-

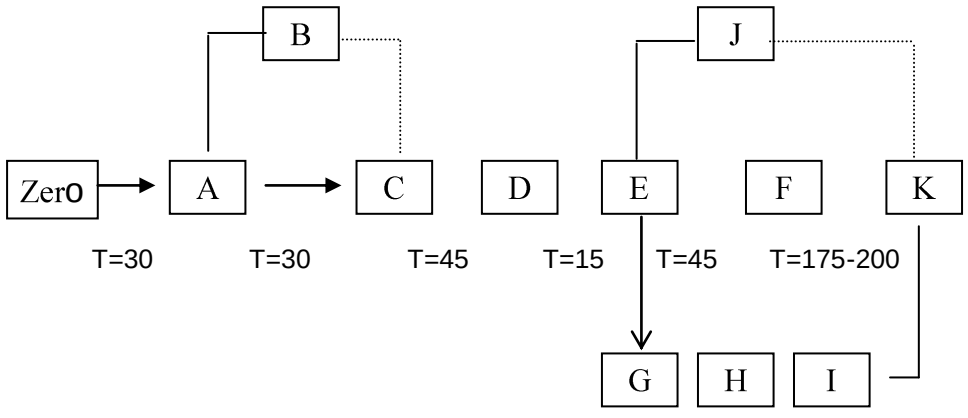
- Texture
  - Sand (%) – 40
  - Silt (%) – 20
  - Clay(%) – 40
- Colour – Blackish brown
- Moisture (%) – 35-40
- Water Retention Capacity (%) – 40
- Total Alkalinity (mg/100gm) – 0 – 150
- Total Hardness (mg/100gm) – 50 – 180
- Phosphate (mg/100gm) – 0.5 – 2.0
- Salinity (ppt) - <5

ii) WATER :-

- Temperature (Celsius) – 28-30
- Dissolved oxygen (mg/lt) – 5-10
- Visibility (cm) – 35-40
- Color – Light Green
- PH- 7.0 – 8.5
- Carbonate (mg/lt) – 30-50
- Total Alkalinity (mg/lt) 50-180
- Total Hardness (mg/lt) – 50-150
- Conductivity (mohs/cm) – 20-1500
- Salinity (ppt) - <5
- BOD (mg/lt) - <30
- COD (mg/lt) - <40
- Phytoplankton (nos/lt) - >500
- Zooplankton (nos/lt) - > 500

Time Scheduling for Prawn Culture in Pond

EVENT	ACTIVITY	NET DURATION TIME (DAYS)
A	Selection of Site & Beneficiary	30
B	Training & Study Tour	15
C	Formulation of Project & Sanction of loan from bank	30
D	Construction of pond & Infrastructure	45
E	Nursery pond preparation & Stocking	15
F	Stocking of Seed in grow out of pond	45
G	Trail Netting	After 60 days of stocking of seed
H	Soil & water analysis	Quarterly
I	Water exchange	Every month after 60 days of stocking
J	Partial Harvesting	After 150 days of stocking.
K	Total Harvesting	After 220-245 Days of Stocking



Time Required for Pre Stocking = 120 Days
Time Required for Post Stocking = 220 – 245 Days
To Harvest

TRAINING AND EXTENSION

Agriculture Human Resources Development Programme

Human resources development (hrd) is a critical input for sustainable utilization of fisheries resources. Recognization the importance of hrd, a training centre named aquaculture research & training institute (arti) at hisar was established under the World Bank Project. Human resources development is of more important in the State of Haryana being non traditional fish farming. The state has taken steps to bring available water resources for economical utilization. The main objective of the programme is to impart inservice training of the departmental officers and official and hands-on training to fish farmers so as to increase their efficiency through training/ refresher courses and study tours under the scheme. The plan schemes of education, training & extension and utilization of the saline ground water have been merged with the scheme. A fish farmer day is being celebrated at state level every year and participation of fish farmers of all districts is ensured. It is targeted to provide training to 230 departmental officers/officials and fish farmers during the year at the training institute. Research programmes for fish biotechnology and bio-diversity are also proposed to be undertaken at this institute. An outlay of rs. 1200 lakh for the 10^{th} five year plan and rs. 61.00 lakh for the annual plan 2004-2005 have been, approved against which the government has sanctioned rs. 46.60 lakh.

Man's interest in water is as old as his history. The world of water and its inhabitants have fascinated man, who is struggling till today to explore the aquatic environment and to enjoy the beauty of nature. While standing near the water, he forgets his worries and derives pleasure from it. The excitement of chase and fascination of the water are strong stimulations of man who satisfies them through fishing. The joy and excitement of fishing is a panacea for all worldly cares and worries. Human nature is such that it likes challenges and the angling provides this. When fish is hooked and tries hard to get out of that hook, it is the moment when angler can not resist – wah kaya seen hai.

The play or resistance offered by the fish is the climax of the game. The more fish plays, the angler gets pleasure and his passion to capture the fishs enhanced. When the fish is captured, it enthralls the angler. Fishing brings man nearer to God and Nature and he develops strong mind, patience and physical fitness. The game fish is an adventure into another world, a world in which professional struggles, day to day bitter conflicts of life have no place. He comes to peace with body and mind.

Away from Noisy World …… Come in the lap of Nature …….. enjoy chanting and singing of gushing water.

Mahseer is calling you. Come …… give it a tough fight fresh water shark challenges you …… play with it and win the game of patience.

Haryana a Lilliput in size but a giant in attainments, welcome you to "Tajewala" an "Anglers' Paradise" Moved by the adventure spirit, Fisheries Department, Haryana arrnages Angling Competition at Dadupar Hear Works every year.

The gamest of game fish the Mahseer is well renowned as splendid, riverine fish. Being a fish of the rocks and the hills, it has been providing sport to many enthusiastic anglers in India. Mahseer fish is found in upper reaches of the river Yamuna in Yamunanagar district near Dadupur, Tajewala and Hathni Kund surrounded by Kalesar forest. Major General J.G. Elliot in his book "Field sports in India – 1980 mentioned that "Mahseer is a fish" that gives the sportsman weakness and a night full of dreams and while angling it, your arms are almost worn out of their sockets and you will need all your skills and experience to keep the point of the rod up". Mahseer take bait like spoon, plug, fly or live fish. They are omnivorous in habit in their quiet mood when ample vegetative food is available, they have preference in vegetative matter. There are many other game fishes in Haryana such as fresh water Shark-Wallago attu, Singhara, Mytus aor, Baganus bagaruis (Goonch), Rita rita (Khagga), Labeo rohita (Rohu), Labeo, calbasu (Kalban).

In order to promote sport fisheries, the Fisheries Department, Haryana organizes Annual Angling Competition at Dadupur in Yamunanagar district. There are many fishing locations in Haryana such as Dadupur, Badkhal lake, Damdama lake and Suraj Kund lake. Anglers may obtain sport fishing licence from the offices of District Fisheres Officer on payment of following licence fee.

Period of Licence	Fee
One year	Rs. 100/-
One month	Rs. 50/-
Seven days	Rs. 25/-
One day	Rs. 5/-

Angling Tips

- Get your fishing licence fist which can be had from the office of the District Fisheries Officer. It is also available at Tajewala and Dadupur head works.
- While walking do not keep the tip of the rod infront it is safer to have butt in front of you.
- Do not let your shadow fall in the water when proceeding up steam on the look out for fish.
- Good casting means good fishing practice makes the man perfect.
- All books should be examined to see these are sharp.
- Do not fill your reel to the top, it will cause line jam.
- Brightness attracts fish so keep spoon always polished.
- Fish discriminate between shapes and forms. Always carry a good selection of baits.
- Casting up and across steam is a most natural presentation of a bait.
- Do take with you a landing net or gaff.
- Light tackle gives best fishing results.
- Where fry are abundant it is a good fishing spot.
- More fish are captured in the morning, heavier fish in the evening.
- A quick jerk, shake of rod, a fast and slow reel generally entice-fish.
- When successful at certain spot, leave it for some time and then again try there after few hours otherwise place will be ruined.
- When warm, fish generally look for deep water, so spin deep.
- Don’t use your rod for cleaning the site.

- Tire the fish completely before landing. Play it, to a suitable lending place.
- Don't wade in the fast waters, it is positively dangerous.
- No matter how careful you are, accidents are likely to occur, So take first-aid material with you.

Ornamental Fisheries

Fish keeping in captivity is an age-old practice. Chinese used a variety of containers for the purpose such as dishes, bowls and small tanks that permitted viewing from the top. Vivaria were used by Romans to advertise fresh food fishes in restaurants that were kept alive for use or for sale. Later on, vivaria modified into Aquaria. First public aquaria were established in London and Paris in 19th Century. In India first public Aquaria "Taraporewala" was established in the mid of 20th century. Now the aquaria has entered in houses, schools, tourist places and laboratories, offices, markets, colonies for amusement, education, serving as advertisement for fresh food fishes and aquatic animals/plants. Today, culture of ornamental fish for aquarium is a rewarding industry and fish keeping indoors is more popular hobby. Now a days concept of urban aquaculture in towns is becoming popular. Small pool or tank in open space with ornamental fish and blanded with aquatic plants and natural stone becomes more attractive.

An aquarium unlike large water bodied is highly unstable with regard to environment for fishes housed in it. Water it holds is subject to very variable conditions which brings about changes. Fish keeping in such water requires a good deal of careful management which is perhaps more important. An aquarium must be so set as to simulate the natural surroundings of fish as far as possible. It is therefore, to give natural touch to aquarium, the equipments to regulate the ph, oxygen, temp., water quality are required.

Ornamental fishes and aquatic plants are the main components of an aquarium. Aquarium are termed as charming to look at in colour or shape or both. The life style of these fishes is swift, gentle and simple. Some of the common aquarium fishes suitable to the Haryana are Gold fish of all

varieties. For Angle fish, fighter fish, Gourami of all varieties. Guppy, Platy, Molly, Tangerine, Barbas, Sword tail etc. criteria for the selection of fishes should be as following.

1. Maximum adult size of fish should not be more than 3".
2. Quality of water should be easy to keep.
3. Fish species should be omnivorous.
4. Fish species should be attractive and fascinating.

Following are the guidelines for aquarist and entrepreneur :-

1. Small and social fish are ideal.
2. Small fish in group of 2 (male and female) or 6 are very suitable.
3. Fish species are easy to breed for developing.
4. Fish species should be freely and cheaply available.
5. Fish species should be hard.

Small aquarim house is available at Aquaculture Research And Training Institute, Hisar. Big Aquarium house in collaboration with HUDA is under construction at Millennum Park Sector 29 Gurgaon. Department provides technical and financial assistance for establishing ornamental fish hatchery.

Cage Culture Technology

Cage culture is the most innovative way to utilize the open water bodies under the common property resources by the individuals or a group of people for profitable fish farming. In the South-East Asia, out of total fish production from equaculture, more than 30% is from cage culture. In India, the cage culture of fish was initialed under the All India Coordinated Research project on Air Breathing Fish Culture. In 2004, Mahseer fish is being reared in cages at Lonewala (Maharashtra) and carp at Gobind Sagar (HP).

Cages are of four types : Fixed, Floating, Submersible and Submerged. Many variations and combinations of these are in use today. The cage is fabricated from wood or plywood with small wire or plastic mesh opening on the sides for water exchange. The cage can be constructed with a rigid frame made up of either wood or rigid plastic metal tubing. Cages are covered to prevent escape and predator. Hinged lids provide ready access for feeding and harvesting while locks discourage poaching. Longer floating cages and net pens have working platforms which facilitate feeding, harvesting and other routine activities. Fixed cages are accessible with boats.

The cage culture practices are having following benefits over the land leased activities.

1. Cage culture makes use of existing water bodies which can be major benefit in giving non-land owning sectors of the community access to fish farming.
2. Cage culture management is less complex than land-based systems.
3. Cages can easily be altered as per need.
4. Cage farming can easily expanded by simply adding cages.
5. Cages can be moved from one place to under site of better quality of water and more abundant food organizations.
6. Cage culture is more economical to raise high value fishes and ornamental fishes.

It is planned to initiate a cage culture project in canal in Dadupur area with total outlay of Rs. 34,72,500 to install 16 cages to evolve a technology. There is provision for providing subsidy to the beneficiaries for the installation of cages.

After green and white revolution in the state, the blue revolution has been witnessed in recent years. More than 40,000 tonnes of fish is being produced in Haryana State every year. 10-15% fish is consumed within the state for which 3 modern fish markets have been established at Faridabad, Panipat and Yamunanagar. The remaining fish is sent to Saharanpur, Delhi and Howrah markets for sale. The department has also taken up Freshwater Prawn Farming in the village ponds to increase the income to the farmers. The saline effected and water logged area would also be brought under fish farming in coming years. Fish

farming has provided employment opportunity to various unemployed youths and additional income to the panchayats in recent years. The innovative approach of the department is paying rich dividends. The department has also envisaged to increase the fish production to 70 thousand tonnes from the present 42 thousand tonnes in the next five years. However, illegal fishing is causing trouble to acquaculture. When Haryana was created in 1966, there were 112 species of fish in the state but today only 55 species are left. The department has started patrolling along rivers, canals and government-owned ponds over 20 thousand hectares in the area. An awareness centre-cum-aquarium is coming in Gurgaon. The department is also setting up a modern fish laboratory at Hisar. Earlier there was no provision for fish health care in the state. A project to identify the disease among fish had been implemented by CCS Haryana Agricultural Universty, Hisar. To expand the network, four new markets would be setup in Gurgaon, Bahadurgarh, Ambala and Hisar. Three such markets are already functioning in Panipat, Yamunanagar and Faridabad. The small state of Haryana, thus has transformed it self into a giant aquarium.