Species of Prawns for culture

In India a total of 34 species of *Macrobrachium* comprising of 20 fresh water species and 14 coastal water species have been reported. Out of these only two species are utilized in monoculture and polyculture practices owing to their large size, fast growth and shorter life history. These two species are,

1. *Macrobrachium rosenbergii*
2. *Macrobrachium malcolmsonii*
3. Marine Water Prawns

India is endowed with a long coastline and hence offers scope for large exploitation of marine wealth. Till a few years back, fishermen in India were involving themselves in traditional marine fishing. In the seventies fishermen started concentrating on catching prawns more commonly known as `shrimps' due to high profitable return on the same on account of their export value. Brackish water prawn farming started in a big way during 91-94 especially in the coastal districts of Andhra Pradesh and Tamil Nadu.

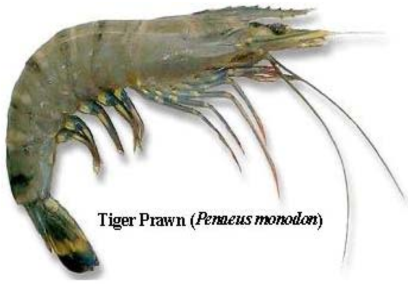
The estimated brackish water area suitable for undertaking shrimp cultivation in India is around 11.91 lakhs ha spread over 10 states and union territories viz; West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala, Karnataka, Goa, Maharashtra and Gujarat. Of this only around 1.2 lakhs ha are under shrimp farming now and hence lot of scope exists for entrepreneurs to venture into this field of activity.

Shrimp species and their suitability

Many factors must be considered when a farmer is deciding which species of shrimp he should culture. Due to its large size and high price, *Penaeus monodon* and *P. indicus* are generally considered for farming. It has also been seen that both these species are suitable for farming in Kerala's environment. Apart from these candidate species other commercially important species such as *Metapenaeus ensis*, *M. monoceros*, *M. brevicornis*, *Penaeus semisulcatus* and *P. merguiensis* are also potential species that can be grown in India. Another potential candidate species that is flooding international market is the White leg shrimp, *Penaeus vannamei.* Although the Government of India has not yet given sanctions to culture it in the country, many Asian countries have already started to culture this species.

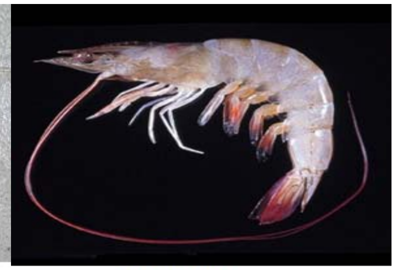
Advantages of *P. monodon*

- It attains a large size. Shrimp with a size of 10 to 12 pieces/kg are common, and sizes of 5 to 7 pieces/kg have been grown in ponds.
- It is the fastest growing of all shrimp tested for culture. In ponds, juveniles of 3 cm in length have been grown to a size of 75 to 100 g in only five to six months.
- Due to its large size, it brings a high price to the farmer. At peak seasons it demands over Rs. 450 per kg in India.
- It can tolerate a wide range of salinity, 0.2 to 70 ppt. Salinity within the range of 10 to 25 ppt has no appreciable effect on growth when food is sufficient. Growth is reported to be slower at very low salinities.
- It can tolerate temperatures up to at least 37.5°C. Mortalities occur at temperatures below 12°C only.
- It grows rapidly when fed either with animal or vegetable protein.
- Food conversion ratios are favourable. Values as low
- as 1.8:1 have been reported from Taiwan.
- It is hardy and not greatly disturbed by handling.



Tiger Prawn (*Penaeus monodon*)

Penaeus indicus



P. vannamei

Advantages of *P. indicus*

- This shrimp grows to a fairly large size and brings a good price.
- It is fairly fast growing, especially when young. Cultured in tanks at a density of $15/m^2$, it reached a size of 14 g in 16 weeks. In polyculture with milkfish in earthen ponds, females grew to about 28 g and males to about 12 g in 160 days.
- Survival is high during the first three months of growth or up to a size of about 10 cm.
- Wild seeds are usually abundant in estuaries near areas where the adults are present.
- Gravid females are relatively easy to obtain from the wild in numbers sufficient to operate a hatchery.
- Females can be matured in captivity with relative ease.
- This shrimp moves out of a pond with water discharge, making harvesting easy.
- Good growth has been obtained in intensive culture with a feed having 40 percent protein, which is lower than that required for some other species.
- The exoskeleton is relatively thin, giving greater portion of edible meat to total weight

Advantage of *P. vannamei*

- *Penaeus vannamei* has the potential to grow as fast as *P. monodon* (at up to 3 g/wk) up to 20 g under intensive culture conditions.
- They are amenable to culture at very high stocking densities of up to $150/m^2$ in pond culture, and even as high as $400/m^2$ in controlled recirculated tank culture.
- Tolerates a wide range of salinities, from 0.5-45 ppt, is comfortable at 7-34 ppt, but grows particularly well at low salinities of around 10-15 ppt.
- *P. vannamei* is very tolerant to low temperatures (down to 15°C) enabling them to be cultured in the cold season.
- *P. vannamei* require lower protein feed (20-35%) than *P. monodon* resulting in a reduction in operational costs and amenability for closed, heterotrophic systems and has a better Food Conversion Ratios (FCRs) of 1.2.
- Specific Pathogen Free (SPF) brood stocks are available for this species to produce disease free larvae.

General Information

The giant freshwater prawn is suitable for cultivation in tropical and subtropical climates. The most commonly cultured species in India is *Macrobrachium rosenbergii*. It is a hardy species by virtue of its ability to adapt to various types of fresh and brackish-water conditions. It accepts pelleted feed and has omnivorous feeding habit. The breeding takes place in low saline waters which is also needed for larval and post larval development after incubation. Breeding of *M. rosenbergii* takes place in estuaries. Though seed may be available in natural sources to a limited extent, for large scale culture there is a need to ensure regular supply of seed. For ensuring availability of quality seed in predictable quantity freshwater prawn hatcheries should be encouraged, technology for which is already developed. Freshwater prawn hatcheries are coming up in many states.

The aquaculture production of giant freshwater prawn, *Macrobrachium rosenbergii* in India has shown a phenomenal increase in recent years that has increased from less than 500 metric tonne in 1997 to more than 30,000 metric tonne in 2003. The major bottleneck for the further expansion of the prawn culture is the lack of adequate supply of post-larvae (prawn seed) for stocking. The projected seed requirement for the development of at least two lakhs hectare of water area in the coming years is 10,000 million. Indian aquaculture has been evolving from the level of subsistence activity to that of an industry. This transformation has been made possible with the development and standardization of many new production and associated techniques of input and output subsystems. In recent years aquaculture has created great enthusiasm and interest among entrepreneurs especially for shrimp farming in coastal areas. Shrimp farming is capital-intensive activity and uncontrolled mushrooming growth of it has led to outbreak of diseases and attributed environmental issues calling for closure of shrimp farms.

Although India has vast freshwater resources they are not fully exploited except for carp culture in limited scale. Fresh water fish culture employing composite fish culture technology has become popular for use in large number of tanks and ponds in the country. To meet the raw material required by the processing units for export demand there is urgent need to expand our production base. In addition it is always stressed that there is a need to utilise our natural resources productively to ensure the much needed food security.

Considering the high export potential, the giant fresh water prawn, *Macrobrachium rosenbergii* , the scampi, enjoys immense potential for culture in India. About 4 million ha of impounded freshwater bodies in the various states of India, offer great potential for fresh water prawn culture. Scampi can be cultivated for export through monoculture in existing as well as new ponds or with compatible freshwater fishes in existing ponds. It is exported to EEC countries and USA. Since the world market for scampi is expanding with attractive prices, there is great scope for scampi production and export.

Macrobrachium rosenbergii is found in inland freshwater areas including lakes, rivers, swamps, irrigation ditches, canals and ponds, as well as in estuarine areas. This species requires brackishwater in the initial stages of their life cycle (and therefore they are found in water that is directly or indirectly connected with the sea). Mature male prawns are considerably larger than the females and the second chelipeds are much larger and thicker. The head of the male is also proportionately larger, and the abdomen is narrower. The head of the mature female and its second walking legs are much smaller than the adult male. A ripe or ‘ovigerous' female can easily be detected because the ovaries can be seen as large orange-coloured masses occupying a large portion of the dorsal and lateral parts of the cephalothorax.

The life cycle of *M. rosenbergii* can be summarized as follows. The mating (copulation) of adults results in the deposition of a gelatinous mass of semen on the underside of the thoracic region of the female's body (between the walking legs). Successful mating can only take place between ripe females, which have just completed their pre-mating moult (usually at night) and are therefore soft-shelled, and hard-shelled males. In tropical areas these coincide with the onset of the rainy season. Within a few hours of copulation, eggs are extruded through the gonopores and guided by the ovipositing setae (stiff hairs), which are at the base of the walking legs, into the brood chamber. During this process the semen attached to the exterior of the female's body fertilizes the eggs. The eggs are held in the brood chamber and kept aerated by vigorous movements

The length of time that the eggs are carried by female freshwater prawns varies but is not normally longer than three weeks. The number of eggs that are laid also depends on the size of the female. Female prawns of *M. rosenbergii* are reported to lay from 80000 to 100000 eggs during one spawning when fully mature. Egg incubation time averaged 20 days at 28°C (range 18-23 days).

Freshwater prawn eggs of this species are slightly elliptical, with a long axis of 0.6-0.7 mm, and are bright orange in colour until 2-3 days before hatching when they become grey-black. This colour change occurs as the embryos utilize their food reserves. As the eggs hatch, rapid movements of the abdominal appendages of the parent disperse the larvae. Freshwater prawn larvae are planktonic and swim actively tail first, ventral side uppermost (i.e. upside down). *M. rosenbergii* larvae require brackishwater for survival. The larvae go through 11 distinct stages before metamorphosing into post larvae. Stage I larvae (zoeae) are just under 2 mm long (from the tip of the rostrum to the tip of the telson). Larvae swim upside down by using their thoracic appendages and are positively attracted to light. By stage XI they are about 7.7 mm long. Newly metamorphosed post larvae (PL) are also about 7.7 mm long and are characterized by the fact that they move and swim in the same way as adult prawns. They are generally translucent and have a light orange pink head area.

On completion of their larval life, freshwater prawns metamorphose into post larvae (PL). From this point onwards they resemble miniature adult prawns and become mainly crawling rather than free-swimming animals. When they do swim it is usually in a normal (dorsal side uppermost) way and in a forward direction. Rapid evasive movement is also achieved by contracting the abdominal muscles and rapid movement of the tail. Post larvae exhibit good tolerance to a wide range of salinities, which is a characteristic of freshwater prawns.

Post larvae begin to migrate upstream into freshwater conditions within one or two weeks after metamorphosis and are soon able to swim against rapidly flowing currents and to crawl over the stones at the shallow edges of rivers and in rapids. In addition to using the foods available to them as larvae, they now utilize larger pieces of organic material, both of animal and vegetable origin. Post larval freshwater prawns are omnivorous can also be cannibalistic

Site Selection for Hatcheries and Nurseries

The site requirements for hatcheries and nurseries, which are normally associated with each other, are similar.

Availability of Quality Water

The hatchery and nursery should be located inland where there is ample supply of good freshwater. Saline water required for larval development can be transported and mixed with freshwater to attain the desired salinity. The quality of intake water, whether it is saline or fresh, is of paramount importance for efficient hatchery operation. Water quality is thus a critical factor

in site selection. Hatchery sites should preferably be far from cities, harbours and industrial centres, or other activities, which may pollute the water supply. In all cases, water supplies need careful analysis during site selection, to determine their physical, chemical, and biological characteristics, and the extent to which these may vary daily, seasonally, or through other cycles.
Special care is needed in hatcheries that are situated in or near areas where the use of pesticides, herbicides, and fertilizers is intensive. Ideally, freshwater should be obtained from underground sources. The brackishwater for use in *M. rosenbergii* hatcheries should be 12-16 ppt, should have a pH of 7.0 to 8.5, and contain a minimum dissolved oxygen level of 5 ppm. High levels of heavy metals, such as mercury (Hg), lead (Pb) and zinc (Zn), should also be avoided, since these are most likely to be caused by industrial pollution.

Soil Characteristics

The ideal soil for freshwater prawn culture should be clay-silt mixture or sandy loam comprising of 60% sand and 40% silt with good water retention capacity. There must be enough soil available for pond construction, whether the ponds are to be excavated or pond banks are to be erected above ground. Although supplemental food is given to freshwater prawns reared in earthen ponds, a considerable amount of their food intake is from natural sources. It is therefore preferable to site the farm where the soil is fertile, as this will reduce the need and costs of fertilisation. Freshwater prawn ponds should be constructed on soil, which has good water retention characteristics or where suitable materials can be economically brought onto the site to improve water retention.

Pervious soils, which are very sandy or consist of a mixture of gravel and sand, are unsuitable unless the water table is high and surrounding areas are always waterlogged. Soils, which consist of silt or clay, or a mixture of these with a small proportion of sand, normally have good water retention characteristics. Peaty soils are not suitable. The clay content should not exceed 60%; higher clay content soils swell when moist and crack during the dry season, thus making repairs necessary.

Other requirements for Hatchery sites

In addition to having sufficient supplies of good quality water, a good hatchery site should also have:

- A secure power supply, which is not subject to lengthy power failures. An onsite emergency generator is essential.
- Have good all-weather road access for incoming materials and outgoing PL;
- Have access to food supplies for larvae;
- Employ a high level of technical and managerial skills;
- Have access to professional biological assistance from government or other sources;
- Have its own indoor/outdoor nursery facilities or be close to other nurseries and
- Be as close as possible to the market for its PL. In the extreme case, it should not take more than 16 hours of total transport time from the furthest farm to the market.

Site Selection for Outdoor Nurseries and Grow-Out Facilities

The success of any nursery facility or grow-out farm depends on its access to good markets for its output. Its products may be sold to other farms (in the case of nurseries), directly to the public, to local markets and catering facilities, or to processors or exporters. The needs and potential of each type of market need to be considered.

It also important to consider other factors to ensure success, including the:

- Suitability of the climatic conditions;
- Suitability of the topography;

- Availability of adequate supplies of good quality water;
- Availability of suitable soil for pond construction;
- Maximum protection from agricultural and industrial pollution;
- Availability of adequate physical access to the site for the provision of supplies and the movement of harvested animals;
- Availability of supplies of other necessary inputs, including postlarval and/or juvenile prawns, equipment, aquafeeds or feed ingredients, and power supplies;
- Availability of good skilled (managerial) and unskilled labour;

Topography

Farms must be close to their market so the road access must be good. Large farms will need to have local access for heavy trucks be able to reach the farm easily, for the delivery of supplies and the efficient collection of harvested prawns.

A survey is necessary, to assess the suitability of a site from a topographical point of view. It is important to minimize the quantities of earth to be shifted during pond construction. Flat or slightly sloping lands are the most satisfactory. The ideal site, which slopes close to 2% (2 m in 100 m), allows good savings on earth movement. Care should be taken to ensure that pond sizes and alignments allow efficient construction, and at the same time permit good access and effective water supply and drainage.

Climate

The meteorological records such as temperature, the amount and seasonality of rainfall, evaporation, sunlight, wind speed and direction, and relative humidity should be studied for site selection. Avoid highly unstable meteorological regions. Strong storms and winds increase the risks of flood and erosion damage, and may lead to problems with transport access and power supply.

Temperature is a key factor. Seasonal production is possible in semi-tropical zones where the monthly average air temperature remains above 20°C for at least seven months of the year. The optimum temperature range for year-round production is between 25 and 31°C, with the best results achievable if the water temperature is between 28 and 31°C. The temperature of the rearing water is governed not only by the air and ground temperature but also by solar warming and the cooling effects of wind and evaporation. The rate by which pond water is exchanged and the temperature of the incoming water are also important considerations.

Rainfall, evaporation rates, relative air humidity and wind speed and direction also need to be investigated. Ideally, evaporation losses should be equal to or slightly lower than rainfall input, to maintain an approximate water balance. Mild winds are useful to promote gas exchange (oxygenation) between water and the atmosphere. However, strong winds can increase water losses by evaporation and may also generate wave action, causing erosion of the pond banks. Avoid areas where it is constantly cloudy because this makes it hard to maintain a steady water temperature, as it interferes with solar penetration. Periods of cloud cover of several days' duration may also cause algal blooms to crash, which in turn lead to oxygen depletion.

Nursery Phase

The nursery can be either indoor or outdoor. The selection of sites for indoor nurseries should follow the same pattern as for hatcheries. Site selection for outdoor nursery facilities should be similar to that for grow-out ponds.

Holding Tanks

After rearing freshwater prawns in hatchery, hold them until ready for stocking in ponds. Concrete tanks of 50 m^3 are convenient for holding postlarvae (PL) prior to transport for stocking in ponds. Use nets suspended from floats in the tanks to increase the surface area available to the PL but this may make the normal operations of feeding, cleaning etc. more difficult.

Indoor Nursery Facilities

Tanks for indoor freshwater prawn nurseries can be constructed from concrete or fibreglass. The use of asbestos cement tanks is not recommended. The shape of nursery tanks is not important and their size, usually from 10 to 50 m^2 with a water depth of 1 m. The best stocking density for indoor nursery tanks depends on the length of time the animals will remain in the tanks before transfer to an outdoor nursery or grow-out facility. It is recommended not to exceed a stocking density of 1000 PL/m^3 in tanks without substrates.

Artificial substrates of various designs and materials can be used to increase surface area; these provide shelter and increase survival rates. Layers of mesh can therefore be used to increase the amount of surface edges available to the prawns in both vertical and horizontal planes.

The water supplies for indoor nurseries can be flow-through or recirculating. For flow-through, water is allowed to continuously enter from above the tank and exit from the lowest part of the tank through a vertical standpipe. Standpipes are covered with a 1.0 mm mesh screen to prevent PL and juveniles from escaping. This drainage system draws water from the tank bottom where food waste and detritus settle.

Outdoor Nursery Facilities

Nursery ponds are similar to grow-out ponds in design and facility requirements. They usually vary in area from 300 to 2000 m^2 . Artificial substrates can be used to increase the surface area available to the prawns. PL is retained in holding tanks for more than a week or two prior to stocking in nursery facilities, grow-out ponds.

Whilst the PL is in the holding tanks water is exchanged at a rate of 40-50% every 2-3 days and provide aeration.

PL is at densities of up to 5000 PL/m^2 for one week or up to 1500-2000 PL/m2 for one month under these conditions. If you need to hold them for one month, you could improve survival if you reduce the density to 1000/m^2.

Using substrates can help you maximize the stocking density, thus reducing other equipment and labour costs.

Water Management

Water quality and supply

Freshwater is normally used for rearing freshwater prawns from postlarvae to market size. Water of 3-4 ppt salinity may be acceptable for the culture of *M. rosenbergii*. The reliability of the quality and quantity of the water available at the site is a critical factor in site choice. However, as in the case of hatchery water supplies, the absolute ‘ideal' for rearing sites may be difficult to define; a range of water qualities may be generally suitable. As for hatchery water, the level of calcium in the freshwater seems to be important. Growth rate has been reported to be lower in hard than in soft water. It is recommended that freshwater prawn farming should not be attempted where the water supply has a total hardness of more than 150 mg/l (CaCO3).

Hatchery Systems

Greenwater System of Freshwater Prawn Culture

A more common alternative to the ‘clearwater' system for flow-through hatcheries is known as the ‘greenwater' system. In the greenwater system, a mixed phytoplankton culture in which *Chlorella* spp. is dominant is maintained in separate tanks. Its cell density is about 750000-1500000 cells/ml. A fertilizer solution in tap water is added to the tanks at least once per week to maintain the culture. This solution provides a mixture of 4 parts of urea to 1 part of NPK (15:15:15) garden fertilizer, applied at the rate of 185 g per 10 m3 tanks. Tilapia (*Oreochromis mossambicus*) is held in the tanks at the rate of about 1 per 400 l to graze on and control filamentous algae. Copper sulphate, at the rate of 0.6 ppm is added to the greenwater tanks once per week to control rotifers. The tilapia also helped to fertilize the culture. The sodium salt of EDTA (ethylene diaminetetraacetic acid) is included in the greenwater culture at 10 ppm as a chelator. The greenwater is prepared at the same salinity as the larval rearing water. Greenwater does not thrive at more than 12 ppt salinity. The greenwater culture is never used for larvae if the culture is more than three days old. Part had to be discarded or used for filling larval tanks and the rest diluted regularly to avoid phytoplankton 'crashes' occurring in the larval tanks. Although the greenwater system may have some advantages, it is difficult to manage successfully and adds more complications to the hatchery process. For this reason, most commercial freshwater prawn hatcheries now use clearwater systems of management, whether they are flow-through or recirculation.

Semi-Closed, Two Phase Clear Water Larval Rearing Technology

Central Institute of Freshwater Aquaculture has developed and standardized a two-phase clear water technology for larval rearing that is suitable for non-coastal hatcheries. This technology can be suitably modified to suite other locations also. Healthy mother prawns (bearing grey eggs on their pleopods >50 g) are selected from the broodstock pond/tank and disinfected with 0.3 ppm copper sulphate or 30 ppm formalin for 30 min. Mother prawns are then stocked @ 100-150 g/m^2 (2-3 nos of ~ 50 g female) in brackishwater (salinity of 5‰) and reared till hatching. Tanks are checked daily for appearance of larvae.

Once hatching occurs it may continue for 24-48 h. The spent female is removed from the tank and released back to the broodstock pond. The salinity of the larval rearing medium is then increased to 12‰ and the rearing is continued in the same tank. In the first phase the larvae (Zoea I) are stocked in cylindro-conical tanks at a high density (200-300 larvae/l). About 50% of the medium is usually exchanged every other day with fresh medium of identical salinity. The larvae are reared for about 10-12 days in this phase. In the second phase, the advanced larvae are stocked in larger tanks with a greater surface area at the rate of 50-80 per litre and reared till metamorphosis. About 50% of the medium is exchanged every alternate day.

The freshly hatched *Artemia* nauplii are given as live food to the prawn larvae, 4-5 times per day in the early stages (Stages II to V or VI) and later, once during late evening in combination with wet larval feed which is usually given during day time. The brine shrimp nauplii are fed to the prawn larvae at the rate of 5 to 50 nauplii per larva per day. About 2 kg of *Artemia* cysts are required to produce one-lakh post-larvae.

Wet larval feed (egg custard, minced fish/mollusc flesh; protein level> 50%) is fed @ 50-200 mg/larva/day depending on the larval stage. The wet feed is given from 8 am till 2 pm at one-hour interval. The larval rearing tanks are cleaned daily by siphoning off excess food particles and metabolic waste from the bottom of the tank. This is done after stopping aeration, preferably in the evening hours before exchange of water and introduction of live food (*Artemia* nauplii). Daily monitoring of temperature, salinity, pH and dissolved oxygen levels is essential to maintain the water quality at optimum levels. The optimum ranges of water quality parameters for successful seed production are given below

The appearance of first post-larva is usually observed 20 days after hatching, normally between 22 and 26 days (at 28-32°C) and 90% larvae metamorphose within next 10 days. The seed production normally ranges between 35-40 per litre and the cycle lasts for 35-40 days. The post-larvae are gradually acclimatized to the freshwater and reared at high densities (2000-5000/m2) for 10-15 days in hatchery. The post-larvae are fed with formulated diet @ 100% of the biomass per day. After a week post-larvae are suitable for stocking in grow-out ponds.

New postlarvae (PL) are about 7-8 mm long. Although PL can withstand the physiological shock of sudden transfer from 12 ppt water into freshwater, it is not recommended to harvest them from the larval tanks and transfer them directly into holding tanks containing freshwater.

The animals are best acclimatized to freshwater in the larval tank. Once the majority of larvae have metamorphosed (at least by day 32-35) water level in reduced in flow-through system tanks to about 35 cm.

The PL can then be harvested and transferred, or the larval tanks refilled to 70 cm with freshwater and the animals temporarily held in them. If the latter is done, the PL should only remain in the larval tanks for a few more days, with frequent water exchange, before transfer to a larger holding tank.

The best way to harvest PL from the larval tanks is to reduce the water level and then remove them in dip nets. Most flow-through hatchery operators harvest their post larvae only once, at the end of the production cycle.

Nursery pond management

The preferred stocking density in the nursery pond is $20/m^2$. Post-larvae (8-10 mg) may be fed with pellet diet (crude protein 35%; lipid 8%) in crumble form @ 100% of the biomass during the first fortnight and further reduced to 50% in subsequent period. In the absence of pellet diet a mixture of groundnut oil cake (powdered) and rice bran may be given as feed. The feed should be broadcasted in the pond twice daily preferably in the morning and in the late evenings. In nursery ponds approximately 10% of the pond surface may be covered with floating weeds with dense root system such as *Eichhornia* sp. to improve the survival rate of post-larvae. The weeds should be kept inside a PVC or bamboo frame to avoid their spreading in the pond. Aeration is provided for ~8 h/day.

A fortnight after stocking sampling of post-larvae may be done to observe the growth using cast net or fry net. During nursery rearing water temperature may be checked twice daily. pH, dissolved oxygen, transparency and depth may be checked once every week and to be maintained in optimum ranges. Loss of water due to seepage and evaporation should be compensated by water addition at least once every fortnight. Nursery rearing may be done for 45-60 days. At the end of rearing period the juveniles (>1.0 g) are collected by dewatering the pond and transferred to grow-out ponds

Juvenile prawns can be harvested by seining your ponds two or three times with a 5 to 6 mm mesh seine, or by emptying them completely. Polypropylene boxes or tanks filled with water from the nursery pond and kept aerated, can be used to transport the juveniles to the grow-out ponds if they are close by. There are some advantages in grading the juveniles into two or three groups, depending on their average weight, before stocking them into separate grow-out facilities. This decreases competition in grow-out ponds by reducing Heterogeneous Individual Growth (HIG) and increases productivity.

Some mortality (10-20%) will occur soon after PL are stocked, even when the conditions are ideal. Total survival from stocking until removal from the nursery ponds should be at least 75%. The weight of the prawns at the end of the outdoor nursery period should be about 0.8-2.0 g, but the time taken to reach those sizes will depend on local conditions.

Grow-out phase

A freshwater prawn farm is very similar to a freshwater fish farm. Prior to initiation of culture the ponds should be well prepared. The pond bunds/dykes should be repaired and strengthened. Ponds should be drained and the pond bottom should be exposed to sun for a week to kill all predatory fishes. Rectangular ponds are suitable mainly from the harvesting point of view. A convenient width is 30-50 m, whereas length of the pond depends on site, topography and farm layout. Normally a size of 0.5 to 1.5 ha is found suitable. The average depth of the ponds should be 0.9m with a minimum of 0.75m and a maximum of 1.2 m. Dike and pond slope may be kept at 2:1. Bund must have a freeboard of at least 60 cm above the highest water level in the pond. Designing and layout of the farms may be done keeping in view the water intake and water outlet facilities. The drainage system should be designed carefully to prevent mixing of outlet water with incoming water.

Lime may be applied as per the requirement after testing the soil pH. It can be applied @ 200 kg/ha, if the soil pH is between 6.5-7.0. Higher dose will be required in case of soil with low pH values. Water should be let into the pond up to two feet using nylon mesh nets to prevent the entry of eggs and larvae of predatory fishes and competitors. Pond should be fertilized with raw cow dung/poultry manure and super phosphate as per the requirement. In general for a pond of medium nutrient contents the fertilizers may be applied at the rate of 5 tonnes raw cow dung, 200 kg urea and 300 kg/ha/crop super phosphate.

After a week of fertilization the pond should be filled up to 4 feet water level. Transparency of pond water should be checked after 2-3 days using a secchi disc. Ponds can be stocked with post-larvae in case of nursery pond and with juveniles in case of grow-out ponds once the transparency is 30-35 cm during early morning or late evening hours.