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## Better management practices (BMPs) for rearing freshwater prawn (*Macrobrachium rosenbergii*) in a nursery pond

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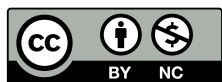
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## Why are nursery ponds required?

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- They help use grow-out facilities more efficiently.
- They have greater biosecurity measures in place.
- They help control water quality and feed management.
- They supply bigger, more robust prawns for grow-out with higher compensatory growth.
- They grow prawns to more uniform size.
- They improve the survival rate of prawns in grow-out ponds.
- They shorten the grow-out cycle.
- They serve as the primary quarantine measure.

## Nursery pond dimensions

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- $8.1 \times 12.3 \text{ m} = 100 \text{ m}^2$
- $11.5 \times 17.4 \text{ m} = 200 \text{ m}^2$
- $14 \times 21.4 \text{ m} = 300 \text{ m}^2$
- $16.3 \times 24.5 \text{ m} = 400 \text{ m}^2$
- $18.2 \times 27.5 \text{ m} = 500 \text{ m}^2$
- $20 \times 30 \text{ m} = 600 \text{ m}^2$

# Outdoor prawn nursery ponds

## Preparing the nursery pond

- Drain the pond completely. Mix powdered calcium oxide lime (CaO) in water and then spread it throughout the pond. This helps with conditioning as well as disinfection.
- Allow the pond bottom to dry in the sun until the soil begins to crack.



- Remove deposited sludge from the bottom, and plough the bottom to expose the lower layers of soil for oxidation.
- Always keep the pond dike clear of bushes to prevent predators from hiding in them.
- Repair the dike as necessary to control water seepage, but never use removed sludge for this purpose.
- Use locally available materials such as used nets and coconut leaves to create a substrate in the pond. This provides a 5%–10% more surface area for the nursery.
- Place a bunch of large-diameter hollow bamboo trees or PVC/HDPE pipes to help periphyton colonize the pond before first feeding and to create hideouts for prawn.



- Check the pH of the soil using a soil pH meter.
- Apply agricultural lime ( $\text{CaCO}_3$ ) and distribute it evenly over the surface of the pond. The following are the recommended doses per 100  $\text{m}^2$ : 20–40 kg for soil with a pH of 3–4; 15–20 kg for soil with a pH of 4–5; 5–10 kg for soil with a pH of 5–6; and 3–5 kg for soil with a pH of 6–7.



- Fence all sides of the pond using nylon nets and bamboo.



## Filling the nursery pond with water

- When filling the pond, use double-lined nylon nets (40P mesh is preferred) if using water from natural sources.
- Maintain a water depth of 3–3.5 feet.



## Fertilizing the nursery pond

- For the first 5-7 days, apply homemade fermented juice fertilizer daily in the pond until the water turns yellowish green. The ingredients and directions are as follows: mix 1 kg of rice bran, 0.5 kg of jaggery and 50 g of baker's yeast in 5-7 L of water for every 100 m<sup>2</sup> of surface area.
- Add 3 kg groundnut oil cake (GOC) in beginning (two to three preparation) given before stocking to develop a sufficient quantity of zooplankton, which are natural feed for post-larvae that are going to be stocked in the nursery.



- Continue applying the homemade fermented juice fertilizer for the next 14–20 days, but only twice a week. The ingredients and directions are as follows: mix 0.5 kg of rice bran, 300 g of jaggery and 50 g of baker's yeast in 3–5 L of water for every 100 m<sup>2</sup> of surface area. Continue applying the same amount of the mixture after Day 20 but decrease the frequency to once a week.

- Avoid using inorganic fertilizers like urea, SSP, TSP, etc. Although these fertilizers can initiate and develop a good water color quickly, the developed bloom is unstable and crashes often.
- Also avoid using raw organic fertilizers like cattle dung and poultry manure. Although these are rich in organic nutrients, they can contaminate the nursery pond ecosystem with bacteria. They may also pass on the remnants of any antibiotics given to livestock where the organic fertilizer was collected.

## Acclimatization and stocking

- Once the prawns are transported and received at the nursery location, check the temperature, pH and oxygen levels in the bags as well as the nursery pond water.





- Place the bags in a confined area within the nursery pond for water temperature conditioning. When the temperature of the water in the bags matches the temperature of the water in the pond, open and fold the bags and allow them to float within the confined area. Gently splash the opened bags with pond water, and mix them gently to ensure the pH of the water inside the bags matches that of the pond water.



- Once the parameters match, place a few of the prawn post-larvae in a bowl on the surface of the nursery pond. Tilt the bowl slightly so that they swim out. If they do not swim out freely, this means more time is required for conditioning.
- Maintain a higher stocking density in the nursery pond of 40–50/m<sup>2</sup> (4000–5000 per 100 m<sup>2</sup>) to attain a survival rate of 50%–60% (depending on the quality of the post-larvae procured).
- Rear the prawns for 45–60 days, and then move them into the grow-out ponds.
- Check the pH of the water after heavy rainfall, and apply lime if it drops below 6.5.
- Partially exchange the pond water, or sprinkle water over the pond to increase dissolved oxygen levels.
- If the water turns dark or black in color, drain some of water from the bottom, and then top up with new water. Apply the homemade fertilizer (rice bran, jaggery and baker's yeast mixed in water) more frequently until the water regains its yellowish green color.



## Managing water quality

- Check the pond regularly—in the early morning, late afternoon, and evening.
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- Check the following parameters:
    - temperature: 28°C–31°C (morning and evening)
    - dissolved oxygen: 4–5 ppm (morning and evening)
    - water pH: 7–8 (morning and afternoon)
    - water color: yellowish green (most productive and preferable)
    - water transparency: 25–30 cm
    - alkalinity: 25–60 ppm
    - total hardness: 30–150 ppm.
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- There are two scenarios that indicate low dissolved oxygen levels: (1) if the pond turns dark green in color and the transparency drops below 15 cm, and (2) if the pond water turns dark or black in color and smells foul (e.g. hydrogen sulphide). This usually happens during cloudy periods or in the very early morning hours.

## Feeding

- Give the prawns feed with a 35% protein content 2–4 times daily.
- Give the prawns feed amounting to 20% of their weight for the first week. Then reduce the amount by 2% every week (18% in the second week, 16% in the third and 14% in fourth) over the course of the first month.
- During the second month, continue decreasing the amount of feed 2% each week (12%, 10%, 8% and 6%).
- For the first week or 10 days, feed the prawns with groundnut cake pre-soaked in water.
- After 1 week, feed the prawns no. 2 Vannamei feed.

## Regular sampling

- Sample the prawns every 10–15 days to assess their health and growth.
- Monitor the length and weight of the prawns.
- Adjust the feeding rates using the information given above.



## Disease management

Use the following preventive measures to reduce the risk of diseases and parasitic infections:

- Stock the pond with healthy, disease-free seed.
- Apply 1-2 kg of agricultural lime for every 100 m<sup>2</sup> each week in the morning, 1 day before the full moon, Ashtami, 1 day before the half-moon day and Navami.
- Disinfect all tools used in prawn culture operations with potassium permanganate.
- Avoid overcrowding.
- Follow proper feeding, fermented juice fertilizer application and water quality management practices.
- Conduct routine screening for any signs of disease or stress.
- Record all clinical signs. Take photos of clinical signs and record the number of dead (if any).
- Follow the suggestions of the responsible authority for disease management.

## Harvesting

- Harvest prawns when they reach 2–3 g in weight.
- Drag the nets in the morning before 10:00.
- Take care to reduce stress to a minimum when moving the prawns within water.

## Environmental care

- Ensure that farming operations do not harm the surrounding aquatic and terrestrial environments.
- Avoid draining the pond water and sludge directly into nearby waterbodies.
- Dispose of feed bags, fertilizer bags, used bottles and containers properly.

## Recordkeeping

- Keep track of all farm operations, including information about the source of the seed and the stage the post-larvae were purchased at, as well as acclimatization, stocking, routine parameter checks, inputs, sampling for health and growth, harvesting, and selling.
- Maintain all records in the record books provided by the APART project.
- Ensure the records are updated periodically by project staff or department officials when they visit the farm.



A large, stylized graphic of a fish's tail, rendered in various shades of blue, occupies the right side of the page. The tail is curved and has several distinct rays, creating a sense of movement and depth. The background is a solid, dark blue color.

## **About WorldFish**

WorldFish is a leading international research organization working to transform aquatic food systems to reduce hunger, malnutrition and poverty. It collaborates with international, regional and national partners to co-develop and deliver scientific innovations, evidence for policy, and knowledge to enable equitable and inclusive impact for millions who depend on fish for their livelihoods. As a member of CGIAR, WorldFish contributes to building a food- and nutrition-secure future and restoring natural resources. Headquartered in Penang, Malaysia, with country offices across Africa, Asia and the Pacific, WorldFish strives to create resilient and inclusive food systems for shared prosperity.

For more information, please visit [www.worldfishcenter.org](http://www.worldfishcenter.org)