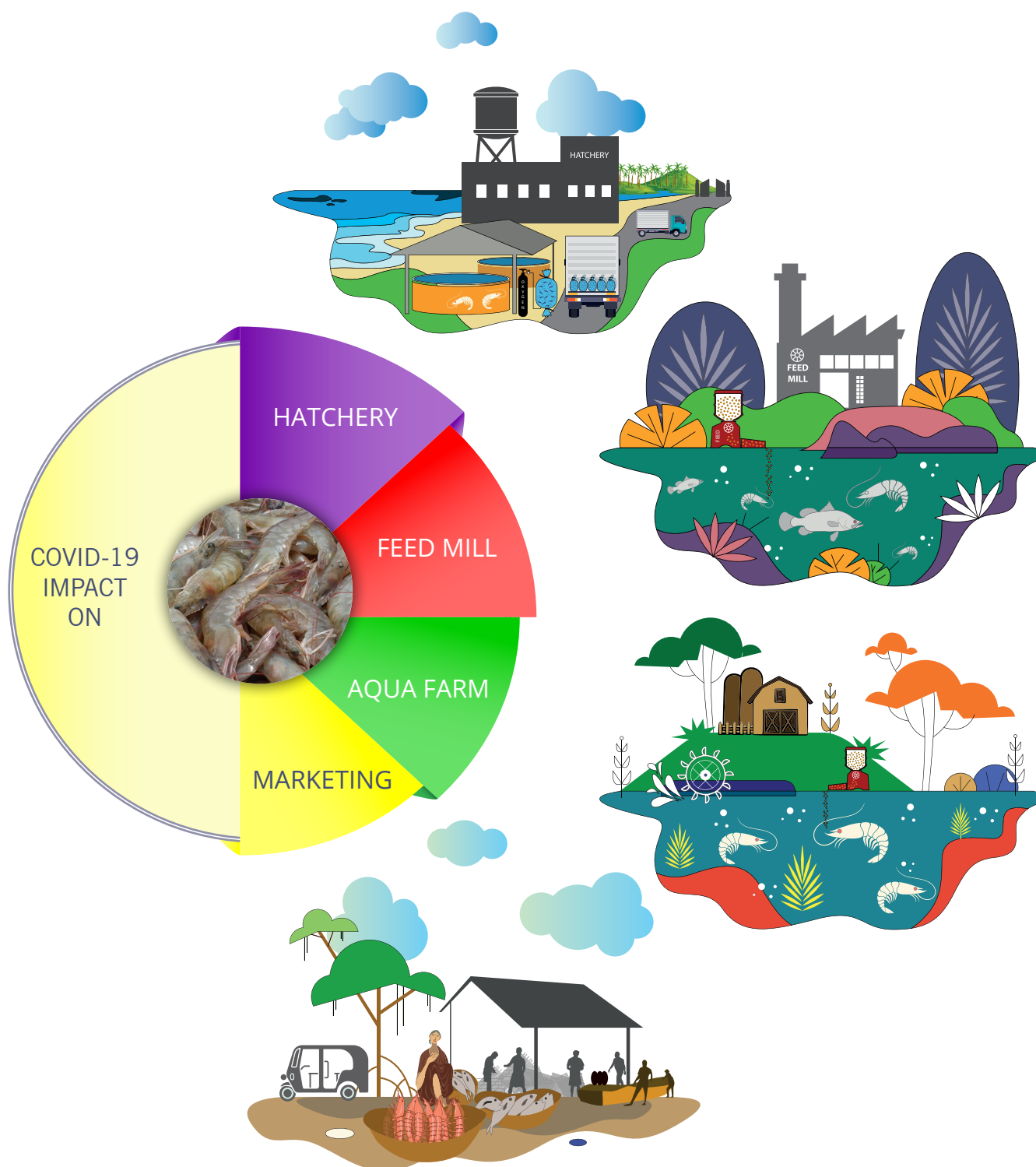
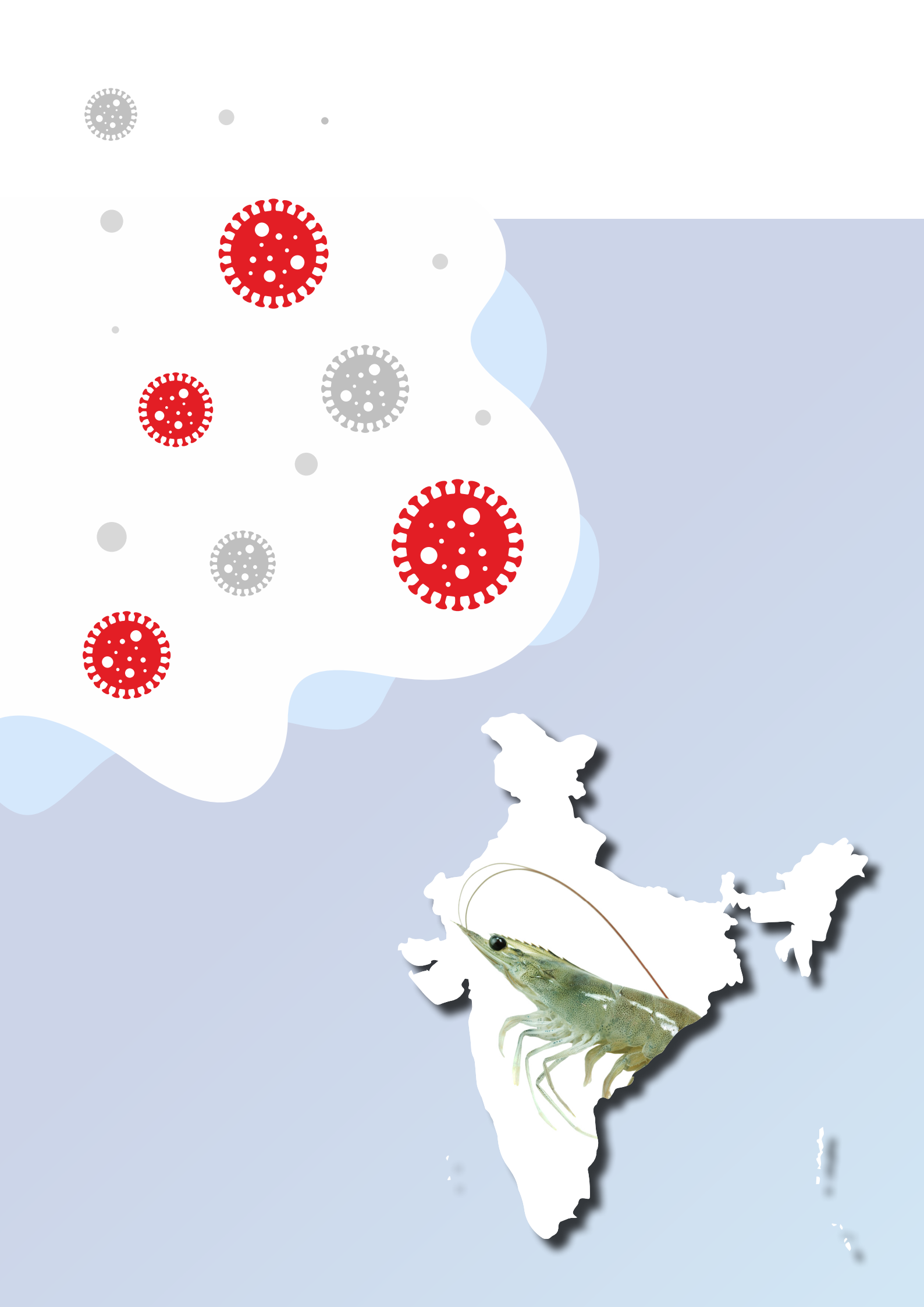


ADVISORY ON COVID-19 LOCKDOWN: BEST PRACTICES FOR BRACKISHWATER AQUACULTURE SECTOR WITH SPECIAL FOCUS ON SHRIMP





BACKGROUND

The novel coronavirus disease-2019 (COVID-19) caused by severe acute respiratory syndrome virus 2 (SARS-CoV2) which was first reported from Wuhan, China in December 2019 has since then spread to around 213 countries, and has been recognized as a 'Global Pandemic' by the World health organization on the 11th of March, 2020. Apart from causing around 2 lakh confirmed deaths and 3 million infections till date, the pandemic has severely disrupted human life and economic activities across the globe, including India. Highly contagious nature of the disease has forced governments across the world to force lockdown/shutdown in their territories and enact strict restrictions, affecting the economic health.

Covid-19 is a highly contagious disease that spreads through close people to people contact and the number of infections have been steadily rising. Being a viral disease with no specific treatment and vaccines being only in early stages of development, the Govt. of India has enforced nationwide lockdown from 25th March to 3rd May, 2020 to enforce adequate social distancing. The Government order restricted the movement of people, transports, logistics and closure of all businesses to prevent the spread of the disease and to contain the rate of infection and mortalities. This virus spreads from person to person, and most frequently among close contacts within six feet, through the respiratory droplets. There is also risk of transmission through surface contamination through the materials or objects which are likely to carry infection (for example: clothes, furniture, utensils, packages etc.). The current evidences suggest that COVID-19 may remain viable for hours to days on surfaces made from variety of materials. Personnel and environmental hygiene is the best practice for prevention of COVID-19.

Indian Shrimp aquaculture sector with a production of 7,00,000 tonnes, earning a foreign exchange to the tune of 35,000 crores in 2019, is largely affected by this pandemic owing to its high dependence on global marketing, and lack of domestic marketing. Since shrimp aquaculture in India is an export driven market, and majority of the farmed shrimp is produced targeting foreign markets, demand for shrimp and economic condition of the importing countries are deciding factors in pricing of shrimp which eventually determine farm gate prices for shrimp in India. Major aquaculture activities, viz. hatchery seed production, feed production, farming, harvesting, processing and marketing are affected. To manage and reduce impact of COVID-19 pandemic conditions on aquaculture, it is important to understand the issues and plan for way forward.

GUIDELINES

This guideline provides recommendations on best practices to be followed by shrimp hatchery, farm, feed mill and domestic marketing personnel. Although it is meant for Brackishwater Aquaculture Sector, it can be used for marine and freshwater sectors. It is aimed to prevent the introduction of the COVID-19 virus in the aquaculture environment and thereby reducing the possibilities of infection among personnel's involved in aquaculture operation in hatcheries, farm, feed mill and domestic marketing. These recommendations will be updated frequently when additional information becomes available.

The best way to combat spread of COVID-19 is to remain informed about the precautions and practices for safety.

Guidelines on best practices to be followed by shrimp hatchery



Hatchery, Farm & Feed mill

- Ensure strict biosecurity principles in shrimp hatcheries and farms. As most hatcheries follows biosecurity principles particularly towards the successful operation, it is relatively easy to extend the exclusion of human pathogen from the facilities.
- Number of workers operating at a particular point of time should be minimized with maximum output.
- As most hatcheries has their resident workers, management of work force is relatively easy, compared to other aquaculture and fishery related operations. This resident model can be adapted for the farm operations also, with minimum number of workers, and maximum efficiencies, in shift mode.
- Screen all the workers for COVID- 19 symptoms while entry to the hatchery
- All machines, utensils and netting materials should be sanitized at the entry point and at regular intervals.
- All incoming vehicles, materials and inputs need to be sanitized as per the standard protocols, and drivers need to follow the personal hygiene and use of mask etc.
- In feed mill, ensure that the workers are following industry best practices, along with strict adherence to personal hygiene and physical sanitation prescribed under COVID-19 Clean and sanitize outsider-access area more frequently.

Employer measures

Hatchery workers should be clearly informed about the situation and this communication is critical, It includes:

- Employees should be aware about the tools and other assistance provided by the employer.
- Print and paste the information in the form of posters (the printable poster is [linked here](#))
- Ensure that the plan and work schedules are flexible, and involve employees in developing and reviewing the plans.
- Conduct a focused discussion of the plan to find out ahead of time whether the plan has gaps, or problems that need to be corrected.

Employees measures

- Sanitize all tools and surfaces regularly.
- Increase access to hand sanitizers and hand washes (if hand sanitizers and washing solutions are hard to obtain, it can be made, the procedures are given in the annexure)
- Rotate shifts to decrease the number of employees in proximities of each other.

Respiratory hygiene

- Cover cough and sneeze with tissues or corner of elbow.
- Dispose soiled tissues in plastic lined dust bins.
- Cloths masks are reusable, it can be washed and dried in the sunlight or iron it before using again.

Cleaning, Disinfection and Sanitizaion

Cleaning

Cleaning refers to the removal of germs, dirt, and impurities from surfaces by soaps or detergents. It does not kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.

Disinfecting

Disinfecting refers to using chemicals, for example sodium hypochlorite disinfectants, to kill germs on surfaces. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.

Sanitizing

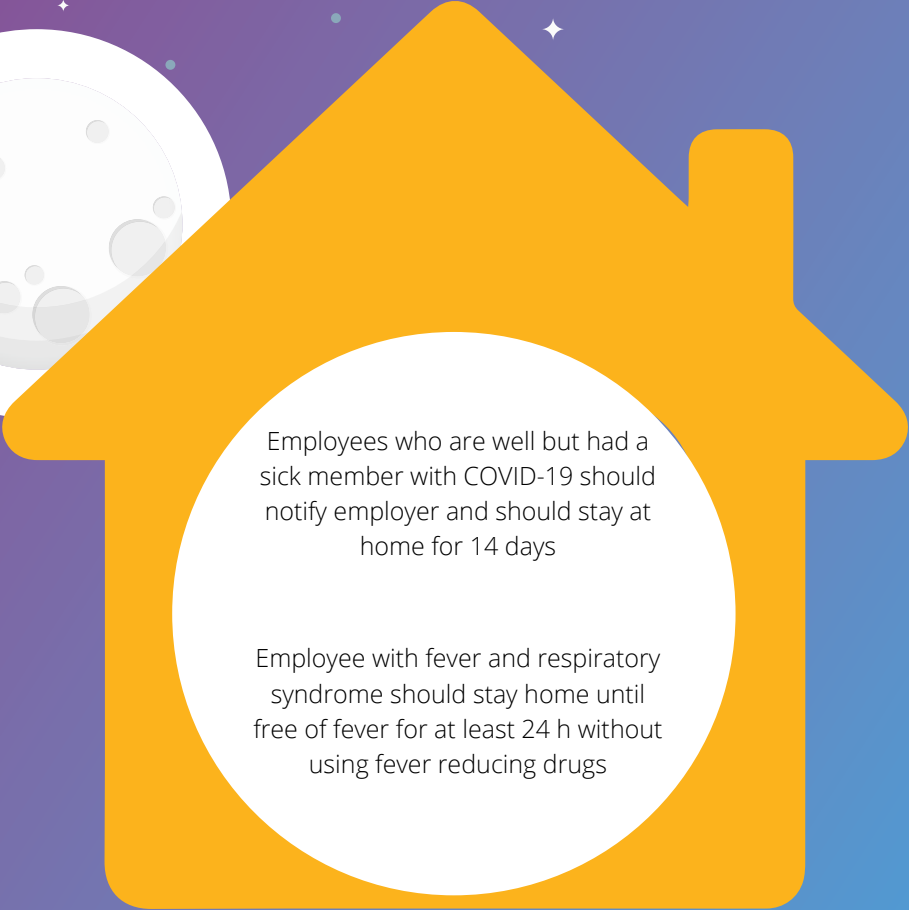
Sanitizing lowers the number of germs on surfaces or objects to a safe level, as judged by public health standards or requirements

Hand hygiene

- The procedure for hand washing should be pasted in prominent locations
- Regular hand washing with soap and water for at least 20 seconds should be done:

- > After sneezing, nose blowing
 - > After touching face and cellphone
 - > After using rest room
 - > Upon arriving from home
 - > Before handling product
 - > Between facilities and vehicles
- Employees must sanitize their hands frequently.
 - Employees who have symptoms (for example: fever, cough or shortness of breath) should notify their supervisor.
 - Lunch and tiffin break should be staggered to allow sufficient distancing.
 - If an employee is confirmed to have COVID-19, he should inform fellow employees of their possible exposure to COVID-19 in the work place.

WHO CAN STAY AT HOME

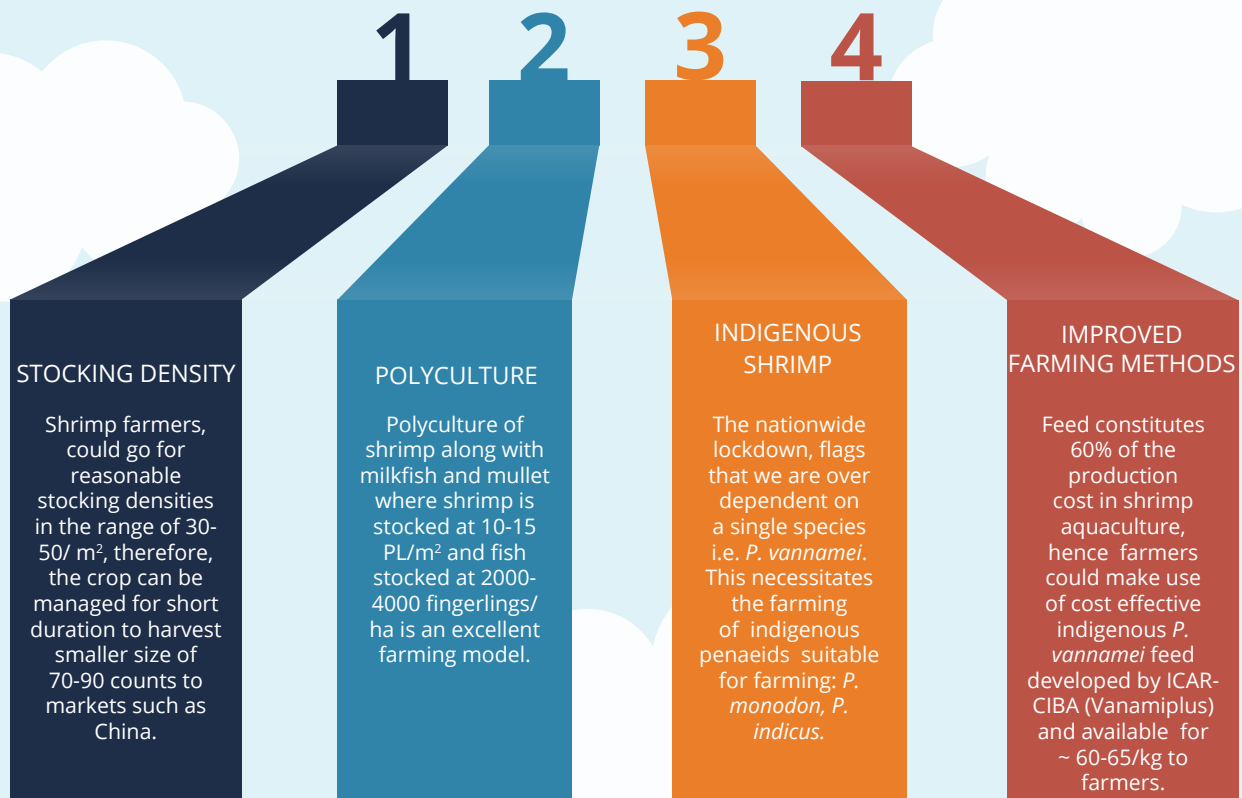


Employees who are well but had a sick member with COVID-19 should notify employer and should stay at home for 14 days

Employee with fever and respiratory syndrome should stay home until free of fever for at least 24 h without using fever reducing drugs

ADVISORY

FOR SHRIMP FARMERS



Anticipating a fluid market scenario in demand and farm gate prices, farmers need to resort to farming models, which would help them to tide over the uncertainties, through regulating the stocking densities, optimising the cost of production and flexible harvesting options, to earn sustainable profits.

Stocking density:

Shrimp farmers, could go for reasonable stocking densities in the range of 30-50/ m², therefore, the crop can be managed for short durations to harvest smaller sized shrimps of 70-90 counts to markets such as China, or to extend the crop to have 40-50 counts, catering to US and Europe markets. High densities would also mean higher productions costs in terms of feed, fuel, and other inputs, which may not be economically viable in scenario where farm gate prices are in an uncertain mode. Smaller size shrimp can be also taken out as partial harvest and supply to the local markets.

Low density rearing of *P. vannamei*:

Demand for larger sized shrimp would definitely exist in certain importing countries although at volumes much lower than the pre COVID-19 era. Shrimp farmers can resort to low stocking densities of 10 PL/m² or lower and target production of larger sized shrimp (20-25 count) over an extended culture duration.

duration. Since stocking is done at lower densities, production cost is optimised, and production is adjusted to the global demand without over producing a product resulting in falling market prices. Farming over extended period also allows the farmers to market their produce when prices are high and provide longer time for importing nations to come out of the COVID-19 menace.

Poly culture of shrimp with herbivores fish

Polyculture of shrimp along with milkfish and mullet where shrimp is stocked at 10-15 PL/m² and fish stocked at 2000-4000 fingerlings/ha is an excellent farming model. In such farming systems farmers shall feed both the species, using cost-effective feeds, as per their feeding requirements and prolong the culture for extended period so as to harvest larger sized shrimp and fish of about 300-500 g. Such a model shall also minimise cost incurred on water quality management and shall ideally suit to farming regions wherein high local demand exist for fish. Farmers may also resort to continuous harvesting in such systems based on local demand for fish and shrimp. During this COVID-19 period, a higher demand for finfishes in the domestic market has been reported in India and even in other foreign countries. This market opportunity would open up more farming options that would provide economic benefit to farmers.

Thrust for indigenous shrimp species

The nationwide lockdown, flags the weakness of the Indian shrimp industry that we are over dependent on a single species i.e. *P. vannamei*, overseas suppliers. This necessitates in building our efforts in reinventing the farming of indigenous penaeids suitable for farming: *P. monodon*, *P. indicus*, the technology for their hatchery seed production, farming, and feed technology is already available in the country. Indigenous penaeids command excellent local demand and a higher price due to their characteristic flavour and colouration. Central and State governments could provide economic incentives for the farming and domestic marketing of these indigenous shrimps.

Cost effective farming methods

Feed constitutes 60% of the production cost in shrimp aquaculture, hence farmers could make use of cost effective indigenous *P. vannamei* feed developed by ICAR-CIBA (Vanamiplus) and available for ~ 60-65/kg to farmers. This would bring down the cost of production of the farmers and increase the profitability, under these difficult times.

Domestic Markets

Indian shrimp farming sector almost exclusively depends on overseas markets, without any significant domestic marketing efforts. It has made the sector vulnerable during the emergency situation such as the present COVID -19 period, when the shipments to US, China, Europe and the Far East countries have slowed down. The industry reckons the situation is likely to get better only from the middle of 2020. Indian shrimp processors and exporters need to diversify their activity into the domestic marketing, to tide over the present challenges in export, and also to have a back-up strategies for the future. The establishment of domestic markets plays a very crucial role in the event of decline in exports due to a global pandemic like COVID-19, or such eventualities.

State Fisheries Departments, Local Civic Bodies such as Municipal Corporations, State Fisheries Corporations/ State Fishermen Federation, Fishermen Cooperative Societies, SHGs, corporate bodies and private entrepreneurs and farmers could develop a networking to bring the aquaculture produce directly to the customers.



ANNEXURE 1



Liquid hand wash: to make 2 litres

Materials:

Bath soap : 100 g; Glycerin : 10 ml

Procedure:

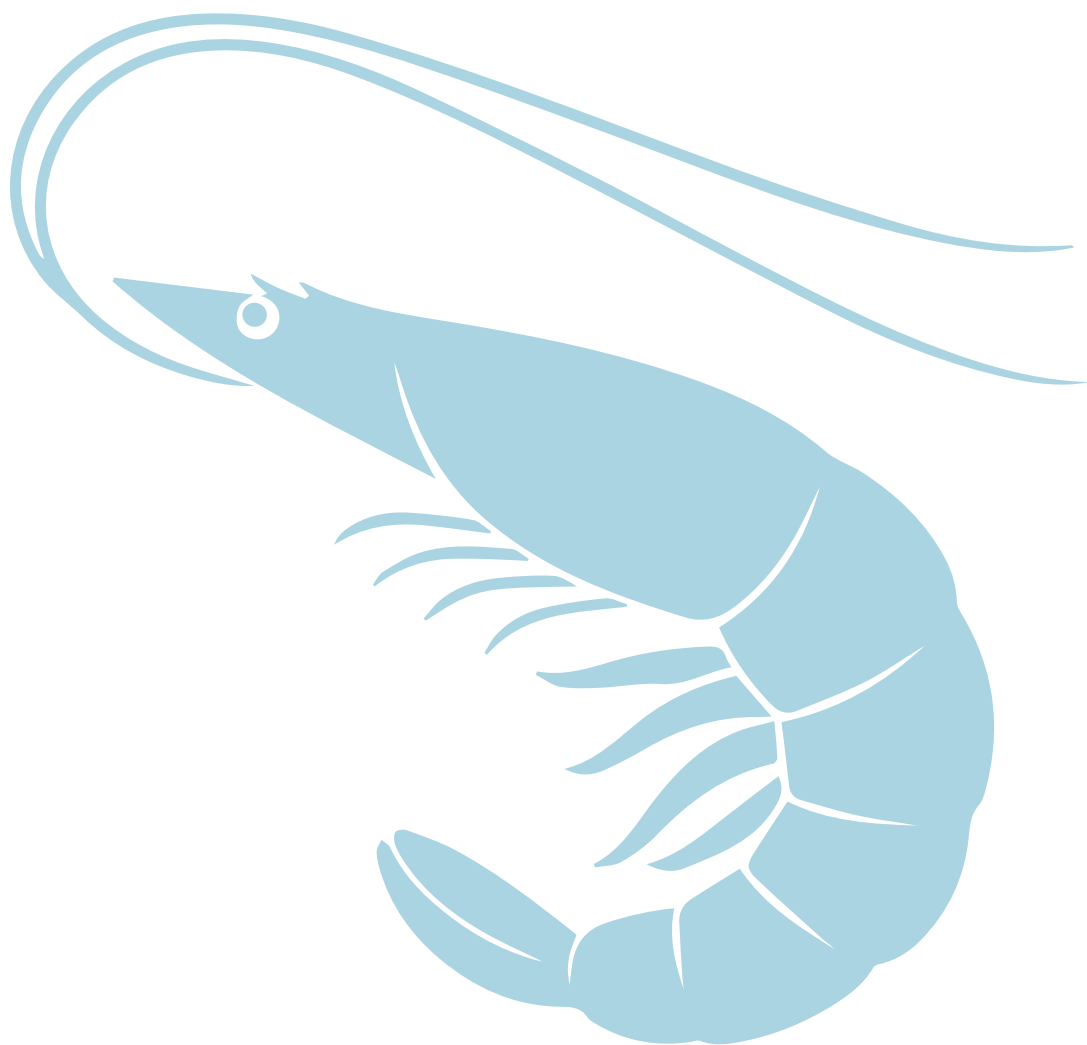
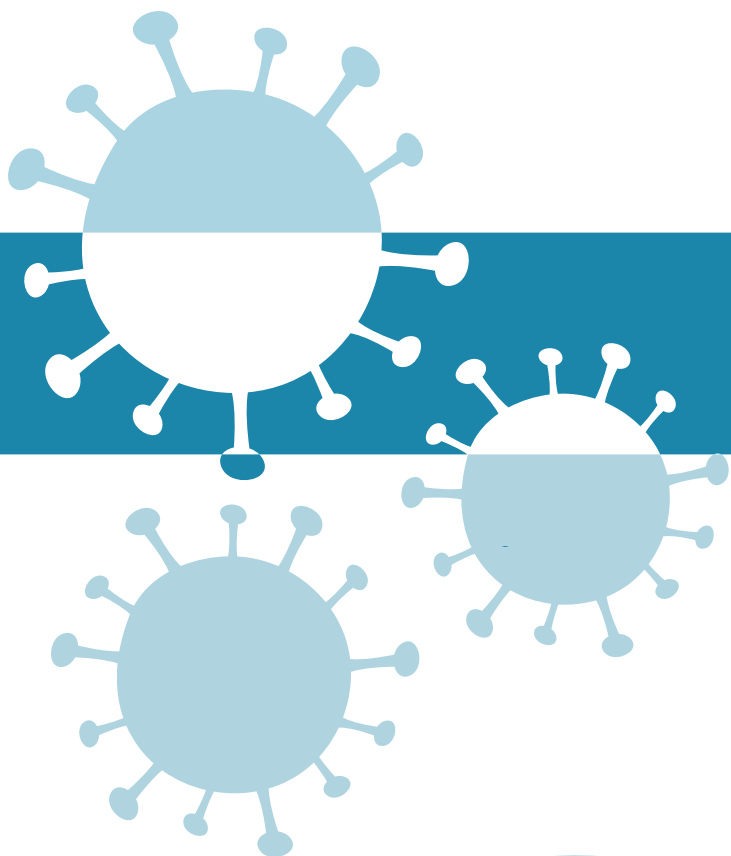
- Grind/dissolve the bathing soap in 1 liter water
- Add 1 litre water and boil
- Add 10 ml of glycerin and mix well
- Mix well, wait to cooldown the solution,
- Fill in 500 ml bottles & Use.



Hand sanitizer: to make 100 ml

Procedure:

- - 70 ml isopropyl alcohol-
- - Add 10 ml Hydrogen peroxide-
- - Add 3 ml of Glycerol-
- - 17 ml of water-
- - Add one drop of lavender oil (optional)
- Mix and fill in the dispenser & Use



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