Shrimp Farms and the Environment

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Shrimp farming

- Shrimp culture has been expanded rapidly in Asia. Farmed shrimp is now being a major exporting commodity for several countries, providing job opportunity and income for shrimp farmers and other personnel in relating sectors.
Rapid expansion of intensive shrimp farming without proper planning has created various environmental problems.

Destruction of mangrove is one of the major environmental impact of shrimp farming in several countries.
Shrimp farms and mangrove – Kung Kaben
Bay, Thailand
Shrimp farms and mangrove – Kung Kaben Bay, Thailand
Low salinity shrimp farming in inland area

Salt distribution

- Vertical distribution:
  - mostly within 15-20 cm (maximum 40-50 cm)
- Horizontal distribution:
  - Within 3-5 meters
Low salinity shrimp farming
Shrimp pond effluents

- Shrimp pond effluent containing high load of organic matter, nutrients, chemicals, and antibiotics also affect the environment.
Several chemicals and biological products used in shrimp ponds can affect the environment. These substances include antibiotics, toxic chemicals, and nutrients.
Antibiotics

- The release of antibiotics from shrimp ponds or hatcheries can cause resistance among the pathogens, and a change in micro-organism population in aquatic environment.
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- Resistance towards some of the antibiotics commonly used in shrimp farming, e.g. chloramphenicol and tetracycline, is already developing in human, as well as shrimp pathogens.
Some chemicals released into the environment from shrimp farms can be acutely toxic, mutagenic or have other negative effects on aquatic organisms.

Their potential effect on non-target organisms depends on toxicity and on the degradation rate and dispersion.
The toxicological mechanisms of pollutants cause different stress levels to different groups of organisms and can potentially change the community structure of marine sediments.
- The discharge of shrimp pond water treated with teaseed has been associated with mass fish kills in adjacent water.
- There were reports that insecticides such as Dipterex have been used to kill disease vectors such as crabs and small shrimps, thus posing a threat to the environment.
Some of the substances used in shrimp farms might have an important impact on the environment. For example, copper compounds, some organotin compounds, and certain other substances with a high affinity to sediment that leave persistent and toxic residues.
Organotin compounds

- Organotin compounds e.g. triphenyltin acetate (Brestan), triphenyltin chloride (Aquatin) were used in south-east Asia to remove molluscs before the stocking of shrimp ponds.
Nutrients

- Nutrient input to shrimp ponds by adding fertiliser and feed can result in the eutrophication of waters receiving the shrimp pond effluents.
Environmental impact

- It is very difficult to assess the impact of shrimp farming chemicals on the environment because of the lack of information about the quantities of chemicals used in shrimp farming.
Environmental impact

- It is necessary to collect more information about the types of chemicals and the quantities used in shrimp farming. Without this, it is impossible to draw any conclusions on impact on the environment.
Situation of research

- The literature on degradation and environmental effects of aquaculture chemicals is dominated by studies on antibiotics.
- Little is known about the degradation and environmental effect of these chemicals, especially in tropical environments, and studies in this field are needed.
Another field that needs to be investigated further is the environmental fate and biological effects of the substances, more specifically under the conditions prevalent in marine aquaculture ponds and in a tropical environment.
Eutrophication is often mentioned as an important negative impact of shrimp farming on the environment. However, studies showing the connection between shrimp farming, eutrophication and changes in the ecological community structure have not been found in international journals. Data from such studies would be very valuable.
Sustainable culturing technique with least environmental effect is also needed to be developed to decrease the use of antibiotic and chemicals in shrimp farming and to decrease the load of organic matter and other pollutants in shrimp pond effluents.
Thank you