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## Environmental Risks of Chemicals used in Asian Aquaculture

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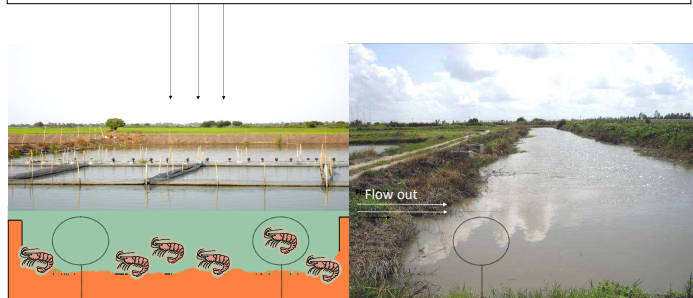
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### The SEAT project

- Aims at creating a scientific and evidence-based approach to enhance economic, social and environmental sustainability of four major seafood commodities farmed in Asia and exported to Europe (Fig. 1)
- Research will be carried out in four Asian countries (Fig. 1) in different disciplines: life cycle assessment, social and economic development, food safety and public health, and environmental pollution and modelling
- Wageningen University and Research centre will focus on the Environmental Risk Assessment of chemicals used in Asian aquaculture



- Antibiotics
- Disinfectants
- Fertilizers
- Immunostimulants
- Oxidizing agents
- Pesticides
- Probiotics
- Water/soil treatment compounds



Targeted produce



Consumers



Aquatic ecosystems

Fig. 2 Chemicals and biological products used in aquaculture and potential risks

### Research needs

- Detailed information on types and quantities of chemicals that are currently applied
- Studies that relate current chemical application patterns to environmental pollution and biological effects on aquatic ecosystems
- Development of a methodology to assess the environmental risks posed by the use of chemicals in aquaculture in the tropics

### Planned research

1. A preliminary risk assessment will be performed to identify the most hazardous compounds for the targeted produce, consumers and aquatic ecosystems
2. Environmental pollution will be monitored in order to assess the distribution and fate of chemicals in aquatic ecosystems
3. Laboratory and semi-field experiments will be conducted with Asian indigenous species to get a better understanding on the potential (toxic) effects of chemicals on local aquatic ecosystems
4. New risk assessment methodologies will be developed and recommendations will be provided in order to minimize the environmental impacts of aquaculture pollution



Fig. 1 Countries and aquaculture species covered by the SEAT project

### Potential risks of aquaculture chemicals

- Aquaculture production in Asia has intensified through the use of a wide array of chemicals and biological products to control water quality and treat disease outbreaks and parasites in the cultured species (Fig. 2 and 3)
- Chemical use may result in risks for:
  - Targeted produce: side effects may appear when chemicals are not applied according to recommendations
  - Consumers: toxicity (i.e. pesticides and disinfectants) and resistance (i.e. antibiotics) by chemical residues in seafood
  - Aquatic ecosystems: direct and indirect toxic effects (i.e. pesticides and disinfectants) and resistance (i.e. antibiotics) from effluent and sediment discharges

### Current Situation

- The lack of technical support and disease diagnostic are the main causes leading to the incorrect use of chemicals in Asian aquaculture
- Detected residues of banned chemicals in seafood products have led to export market rejections, increasing the sensitivity of producers on chemical use issues (i.e. antibiotics)
- Actors controlling chemical use in Asian aquaculture (e.g. government institutions, certification schemes, etc.) lack a scientific framework to assess environmental impacts from different chemicals and use patterns
- To date, environmental monitoring and toxicity studies have mainly focused on marine aquaculture in temperate regions



Fig. 3 Aquaculture farms in Asia



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