Global view of climate change and predicted pest/pathogens pressures

Aquaculture

Photo by Binsar Bakkara
Global seafood production (1950 – 2017)

Annual Production (mmt)

Capture Fisheries
Aquaculture

Data from FAO Fishstat 2019
High diversity in the aquaculture sector

2017 Production (by tonnage)

~401 Species

- Japanese kelp
- Eucheuma seaweeds nei
- Grass carp
- Cupped oysters nei
- Silver carp
- Whiteleg shrimp
- Gracilaria seaweeds
- Japanese carpet shell
- All others
- Fishstat 2019

Data from FAO Fishstat 2019
Pathogens in aquaculture

- Estimated $6 billion in losses per year
- Boom and bust cycles
Climate change impacts on aquaculture

- Temperature
- Sea level rise
- Acidification
- Eutrophication
- Salinity
- Growth
- Infrastructure
- Health

Klinger et al. 2017 *Proc. R. Soc. B*
Climate change impacts on host-pathogen-environment relationships

Snieszko 1974 *Journal of Fish Biol.*

Burge et al. 2014 *Annual Reviews of Marine Science*

<table>
<thead>
<tr>
<th>Changes in host</th>
<th>Climate factor</th>
<th>Changes in pathogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased susceptibility</td>
<td>1</td>
<td>• Increased activity</td>
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<tr>
<td>• Change in behavior</td>
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<td>• Change in virulence</td>
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<tr>
<td>• Invasions</td>
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<td>• New emergence</td>
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<tr>
<td>• Range shifts</td>
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<tr>
<td>• Increased susceptibility (?)</td>
<td>2</td>
<td>• Range shifts</td>
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<tr>
<td>• Change in larval survival/recruitment</td>
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<td>• Physical injury</td>
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<td>• Mixing/resuspension of particles</td>
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</tbody>
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Aquaculture management in the face of pathogens and climate change

• Management unit
  • Farm level
    • Avoidance, detection, anti-pathogen measures
  • Zonal/regional level
    • Communication, reporting, regulation

• Challenges
  • # of species and production systems
  • Small margins
  • Lack of consolidation

• Focus on resiliency

Conservation International 2018