Best Practices in Aquaculture Supply Chain Management

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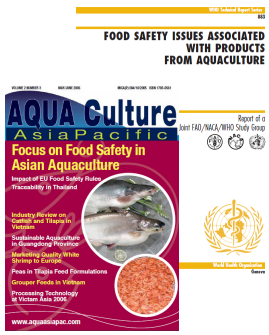
Summary

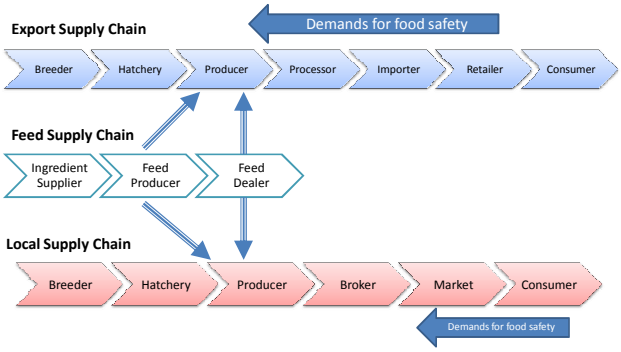
- Review aquaculture supply chains
- Managing aquaculture supply chains
- Food safety management in aquaculture supply chain
- Case studies

Aquaculture & Food Safety

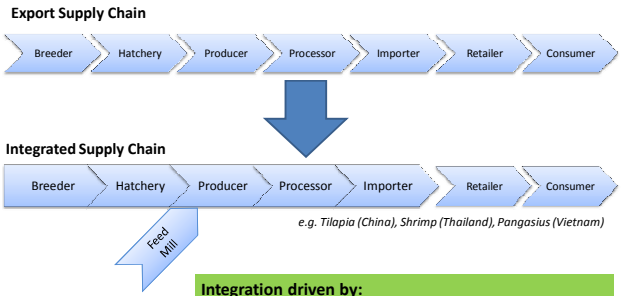
- Modern aquaculture is only around 30 years old
- Until recently demand outpaced production for most farmed species
- Developing economies:
  - heavily dependent on local demand
  - predominantly characterised by small-scale, independent farmers
  - Lack of effective regulation and/or enforcement led to use of medication to resolve production and disease problems
- Food safety traditionally regarded as someone else's responsibility (*"Caveat emptor"* or "Buyer beware")



Aquaculture Supply Chain



Export Supply Chain



Integration driven by:
- Desire to secure sources of raw materials
- Desire to safeguard supply chain (esp. food safety)

Managing Aquaculture Supply Chains

- As seafood supply from aquaculture increases, oversight is stricter in line with other food industries
- International seafood industry increasingly focuses on supply chain through "farm to fork" or "pond to plate" programmes
- Domestic seafood demand is more focused on price and availability
- This is changing but faces major challenges in the structure of the industry
- The supply chain is only as strong as the weakest links:
  - Number and scale of producers
  - Role and responsibilities of brokers

Managing Export Supply Chains

- Consumers expect retailers to take responsibility for food safety
- Retailers focus on building distinct brand identities
- Brands have distinct value and are strongly protected through the supply chain
- As aquaculture product moves from "anonymous" to "branded" products brand owners need to protect their brand
- Weaknesses are identified and steps taken to manage the risk to the brand

Managing Local Supply Chains

- Consumer awareness and demand for food safety generally weaker
- Price and quality (value) are main buying criteria
- Traditional purchasing through wet markets or direct from producers
- Traders focus on building personal reputation not brands
- Individual traders lack sufficient scale to drive suppliers
- Complex logistics make supply chain management more difficult

Risk Awareness

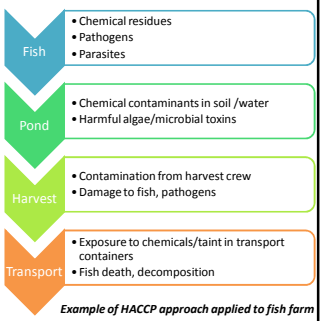
- Producers vary in individual acceptance of risks
- Producers risk acceptance may differ from that of their customers
- Producers may lack knowledge to balance food safety against risks to their livelihood (e.g. disease)
- When food safety issues affect producers livelihood, behaviours change quickly
- Education is a major component of this behaviour change

Food Safety Management

- Food safety management originally focused on manufacturing and processing operations
- A range of systems based on HACCP (Hazard Analysis Critical Control Point) has been used
- Extension to complete supply chain faces some significant challenges
- Several recent initiatives are addressing this area
- Include government schemes and 3rd party certification

Basic HACCP

- Break down process and identify critical food safety risks (internal and external)
- Establish specific controls and control points (CCP)
- Establish critical limits for CCP and identify corrective actions
- Routinely monitor CCP
- Maintain auditable records
- Establish routine audits for verification



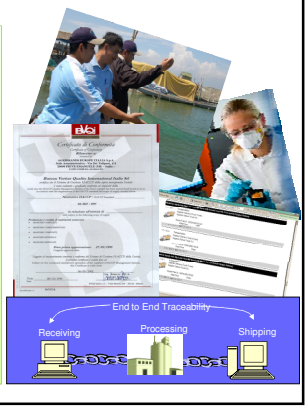
Example of HACCP approach applied to fish farm

Food Safety Best Practices

- Everyone in the supply chain shares responsibility
- Food safety is "front and centre"
- Focus on prevention, not "cure"
- Each link adopts an HACCP-type approach to identify their own hazards and controls
- Disciplined approach to maintain records and manage hazard risks
- Commitment to training of all involved employees in principles and implementation of HACCP

Managing External Risk

- Supplier qualification
  - Ensure suppliers commitment to food safety meets your standards
  - Regular monitoring of supplier compliance
- "Line of Sight" traceability through supply chain
  - Ensuring that inputs can be traced back to their source
  - If recall required, inputs and products can be traced backwards and forwards
- Product / Purchasing specifications
  - Clear indication of food safety standards required
- Communication
  - Ensure everyone clearly understands role and responsibilities

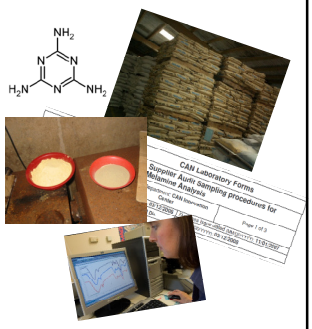


Food Safety Case Study 1

- Antibiotic residues in shrimp
  - Farmers used various antibiotics in efforts to reduce stock losses
  - Lacked awareness of the food safety issues associated with the drugs
  - Stock losses a more immediate issue affecting their profitability
  - Increased vigilance caused heavy losses due to rejection of tainted shrimp
  - Greater awareness of food safety and heavy consequences of their use
  - Combination of market forces and increased regulation resulted in dramatic reduction in use of antibiotics in farms

Food Safety Case Study 2

- Melamine in feed ingredients
  - Some high value feed ingredients are priced based on crude protein
  - This is typically estimated from the nitrogen content
  - Adulterants high in N can increase the apparent protein content
  - Inorganic N (eg urea) is easy to test, organic N (eg melamine) is much more difficult and time consuming
  - Cargill scientists worked to develop a simple, cheap, real time test
  - This test has been widely shared to improve surveillance and monitoring of melamine adulteration



Summary

- Aquaculture is a relatively new industry
- As aquaculture supply increases, greater emphasis is being placed on food safety
- Connected seafood supply chains are leading to more demands on producers
- This places challenges on fragmented supply chains and drives integration

- Food safety is a common responsibility requiring a disciplined approach at all levels
- Internal food safety controls have to be matched by external controls to safeguard supply
- Adapting existing food safety protocols to aquaculture producers will require heavy focus on communication and training