Outline

• Aquaculture diversity and production trends
• Initiatives in promoting prudent and responsible use of veterinary medicines
• Lessons from 5 of top 10 aquaculture producing countries (China, Viet Nam, Thailand, Norway; Bangladesh)
• Recommendations from the 2009 Expert Consultation on Prudent and Responsible Use of Veterinary Medicines in Aquaculture
Aquaculture Diversity

- **Species:** finfish, crustaceans, mollusc, aquatic plants
- **Systems:** water-based; land-based; recirculating; monoculture; polyculture; integrated
- **Environment:** freshwater, brackish water, marine; inland, coastal and oceanic; temperate to tropical
- **Type of operation and scale:** small-scale to commercial
- **Management:** extensive, semi-intensive, intensive
Trends in fish supplies

Capture Fisheries

Aquaculture
Aquaculture production 2010

[Million Tonnes]

Asia 91%

China 61%

Americas, Europe, Africa, and Oceania Combined. 9%
Why prudent use of AM in aquaculture??

- **Protection of animal health**
  - Prevent and treat diseases caused by pathogens; assure healthy stocks; maximize production; effective management response to emergencies caused by infectious agents

- **Incentive for aquaculture producers**: reduce environmental impacts, improve food safety and subsequent public health, increase income and profit of producers; resilient stocks

- **Public health**: residues, bacterial resistance

- **Trade**: product rejection; compliance with WTO/SPS Agreement, Codex Alimentarius
Initiatives on Responsible and Prudent Use of Veterinary Medicines

- FAO/SEAFDEC “Use of Chemicals in Aquaculture in Asia = Aquachem”, May 1996
- FAO/AAHRI Expert Workshop on Improving Biosecurity through Prudent and Responsible Use of Veterinary Medicines in Aquatic Food Production, December 2009
- STDF Project: Building Trade Capacity of Small-scale Shrimp and Prawn Farmers in Bangladesh – Investing in the Bottom of the Pyramid Approach
- Ad-hoc training course on use of veterinary medicines in aquaculture
China: (Xinhua & Chen, 2012)

- **2009**: ranked no. 1; 34.7 million tonnes valued at USD 54.7 billion
- **2008**: total volume of international trade in aquaculture 6.8 million tonnes (USD 16.02 billion)
  - Export: 2.9 million tonnes (USD 10.6 billion)
  - Import: 3.8 million tonnes (USD 5.4 billion)
- **3 phases in the management of vet medicines in Aq**
  - **1950-1970**: use of single products, traditional medicine
  - **1970-1990**: use of human and veterinary medicines, agricultural chemicals and water treatment agents
  - **after 1990**: development of drugs specifically for fish and shellfish supported by research
China: (Xinhua & Chen, 2012)

- **Administrative organization**
  - Bureau of Animal Husbandry and Veterinary Medicines and Bureau of Fisheries (Ministry of Agriculture): Bulletin of Fish Drugs Management in China

- **Regulations and standards**
  - Regulation on Feed and Feed Additives (revised 2001)
  - Regulation on Veterinary Medicines
  - Drug Surveillance: very strict and with high attention to food safety
    - Fish Drug Surveillance Department (2005) under the National Fishery Extension Centre
    - Bureau of Animal Husbandry and Veterinary Medicines
    - Bureau of Quality, Inspection and Surveillance
China: new trends (Xinhua & Chen, 2012)

- **Licensed fish vet doctors**
  - Certification for fish vet doctors through training and examination

- **Licensed drug stores**
  - Sell approved/registered drugs; licensed/certified sellers

- **Fish disease clinics in fishery communities**
  - Excellent facilities for disease diagnosis and staffed by licensed fish vet doctors
  - Services offered include: diagnosis, prescriptions for disease treatments; difficult cases are referred to other laboratories; on-site inspection and guidance during emergencies
China: new trends (Xinhua & Chen, 2012)

- **Ecological aquaculture model: Multi-tropic aquaculture**: combination of inorganic extractive (e.g. seaweed) and organic extractive (e.g. shellfish) aquaculture to create balanced systems.

- **Improved information network service to fishfarmers**: “Nong Xin Tong”
  - organized by extension experts supported by an info database on disease prevention and veterinary medicines
  - use of mobile text messaging to obtain info on prevention and treatment; farmer pays < 1USD/mo on service charge
  - other communication media: television, radio, newspapers and publications by fishery associations
Viet Nam: (Tai, 2012)

- **2009: ranked no. 3; 2.5 million tonnes valued at 4.8 billion USD**

- **State management:**
  - **Before 2007:** MoF: National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED)
  - **After 2007:** under MARD
    - Dept. Animal Health (drugs)
    - Dept. Aquaculture (chemicals)
    - Research Institute for Aquaculture (RIAs)/CEDMA, DoSTe, Extension Center, Universities (monitoring, research, extension)
Viet Nam: (Tai, 2012)

- **Drugs and chemical use:**
  - before 2004: 1262/1893 products were registered (e.g. chemicals for water and bottom treatment, fertilizers, disinfectants, antibiotics, probiotics, vitamins, additives, hormones, etc)
  - 2007-2009: two categories, i.e: drugs and environment treatment chemicals

- **Challenges**
  - overlaps in government management system
  - too many commercially registered products available in the market
  - difficulties in the practical use of veterinary medicines by farmers, delivery by retailers and management by the government
Viet Nam: (Tai, 2012)

- Both large- and small-scale producers have become more prudent in the use of veterinary drugs
  - registered products
  - less antibiotics and more probiotics, premix, vitamins, minerals and locally mixed herbs for improving health
  - environmentally friendly chemicals for enhancing water quality

- Shift towards improving AAH and aquaculture environment
  - GAqPs and BMPs

- Strengthened local partnerships
  - Provincial departments, extension centre, processing plants, agents/retailers, farming communities
Thailand: (Baoprasertkul et. al., 2012)

- **2009: ranked no. 5;** 1.3 million tonnes valued at 2.4 billion USD

- **Change in culture systems:** shift from semi-intensive to intensive and super-intensive = improper farm management and misuse of veterinary drugs

- **Competent authorities:**
  - Food and Drug Administration (Ministry of Public Health)
  - Department of Livestock
  - Universities
  - Veterinary Council of Thailand
Thailand: (Baoprasertkul et. al., 2012)

- Competent authority:
  - Department of Fisheries (DoF)
    - Research Development Bureaus (Coastal Fishery; Inland Fishery)
    - Fishery Inspection and Quality Control Division

- Regulations and policies
  - Use of antimicrobial agents (approved and prohibited agents)
  - Use of chemicals (e.g. Hazardous Substance Act)
  - Use of aquatic animal feeds (feed mill inspection, HACCP)

- Only licensed veterinarians can prescribe veterinary medicines; DoF officers provide assistance and advice during disease outbreaks and appropriate use of drugs
Thailand: (Baoprasertkul et. al., 2012)

- Role of DoF
  - farm registration and inspection
  - monitoring programme for antimicrobial agents, chemicals, aquafeed
  - environmental monitoring (e.g. heavy metals, pesticides)
  - training and enhancing knowledge of extension officers and aquaculturists
  - increasing the numbers of service diagnostic units
  - use of alternative approaches: GAqPs, organic farming, improving farm level biosecurity, development of disease-resistant strains, vaccines
Norway: (Gudding, 2012)

- 2009: ranked no. 7; 0.9 million tonnes valued at 3.6 USD billion
- 40 yrs experience on modern aquaculture: Aquatic animal disease legislation = cornerstone on disease prevention = fundamental for sustainability
  - classification and notification of diseases
  - approval of establishments
  - regulations on trade, import and movement of fish
  - science-based surveillance of the population
  - prevention, control and eradication
  - contingency plans, zoning and fallowing of sites
  - disinfection of water and farms; safety of feed
Norway: (Gudding, 2012)

- industry cooperation and public communication
- vaccination – single most important preventive measure

- 2009: ranked # 6: 1.6 million tonnes; USD 2.3 billion
- Shrimp (*Penaeus* spp., marine) and prawn (*Macrobrachium* sp., freshwater): important commodities exported to EU and the USA; worth USD 564 million; 2nd most important export next to textiles
- Small-scale producers: mainly extensive farming; poor farming practices lead to disease and misuse of veterinary drugs
- RASFF (Rapid Alert System for Food and Feed): Between 11/2008 and 01/2010 - 54 RASFF notifications for residues of nitrofurazone in freshwater crustaceans = voluntary ban

- **STDF Project**: Building Trade Capacity of Small-scale Shrimp and Prawn Farmers in Bangladesh – Investing in the Bottom of the Pyramid Approach

- **Expected outcome**: Increased international market access for shrimp and prawn products originating from small-scale farmers in Bangladesh.

- **Registered clusters**: Small-scale shrimp and prawn farmers are organized into registered clusters, totaling 40 farm/farmer clusters (20 shrimp and 20 prawn) involving approximately 1000 small-scale farmers.

- **BMP/GAPs**: complement FAO Aquaculture Certification Guidelines, FAO CCRF and Bangladesh National Code of Conduct on Responsible Aquaculture and support implementation of Codex and OIE standards.
Recommendations: 2009 consultation

- Authorities and industry must be well-organized and have the right competence at all levels
- Legal instruments (national regulations and standards) and effective enforcement
- Extension/outreach, innovations and research on alternative methods
- Local partnerships
- Difficulty of implementing international standards, therefore build capacity

Recommendations: 2009 consultation

- Prevention and BMPs/GAqPs based on good biosecurity are best tools to reduce disease outbreaks
- Empower farmers based on understanding of risks and enhancing their capacities to manage the risks and special consideration for small-scale producers
- Use risk assessment process during the drug approval process

Recommendations

Issues in aquaculture:

- MRLs for aquaculture drugs
- Low number of veterinary drugs approved for use in aquaculture
- Residue testing methods
- Drug prescription standards
- Susceptibility testing for bacteria as targets of antimicrobial treatments = protocols & criteria
- Use of vetmed based on correct diagnosis
- Illegal use of antimicrobials
- Clear and harmonized regulatory environments
- Ideally, a full “tool kit” of medicines and diagnostic services

Teach a man how to catch fish and he will have food for the day and teach him how to grow fish and he will have food for life – a Chinese Proverb

Thank You

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