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ABDC-10/6.1
Current Status and Options for Biotechnologies in Fisheries and Aquaculture in Developing Countries

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ABDC-10/6.1 Current Status and Options for Biotechnologies in Fisheries and Aquaculture in Developing Countries

1. Fisheries and aquaculture: historical background

A. Stocktaking: Lessons from the Past

2. Overview of main areas

3. Current status of application

4. Case studies

B. Looking forward: Preparing for the Future

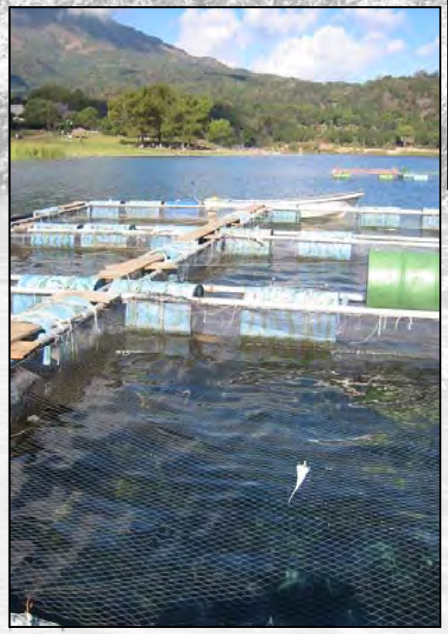
5. Key issues

6. Identifying options

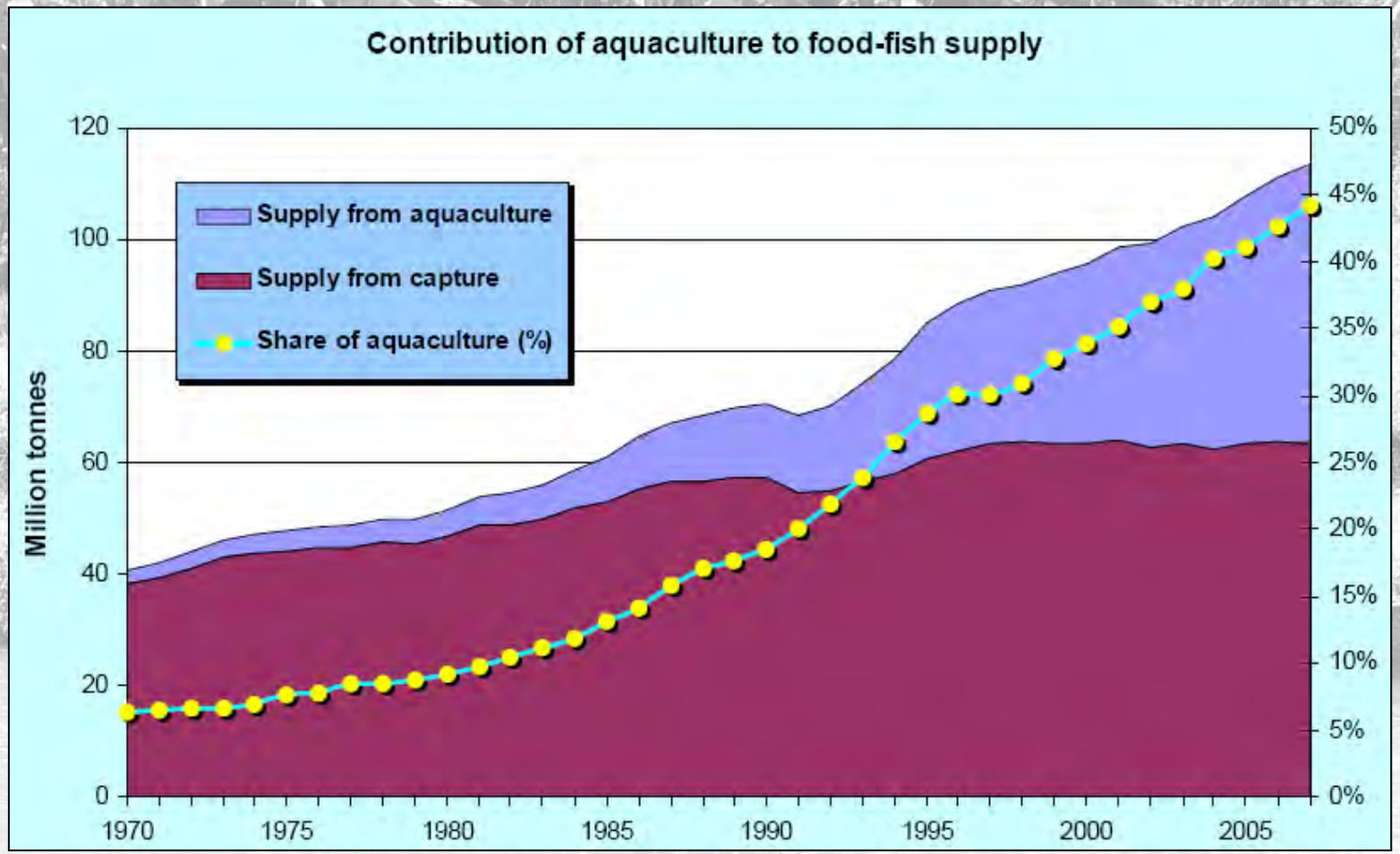
7. Identifying priorities for action for the international community

Capture fisheries

Aquaculture

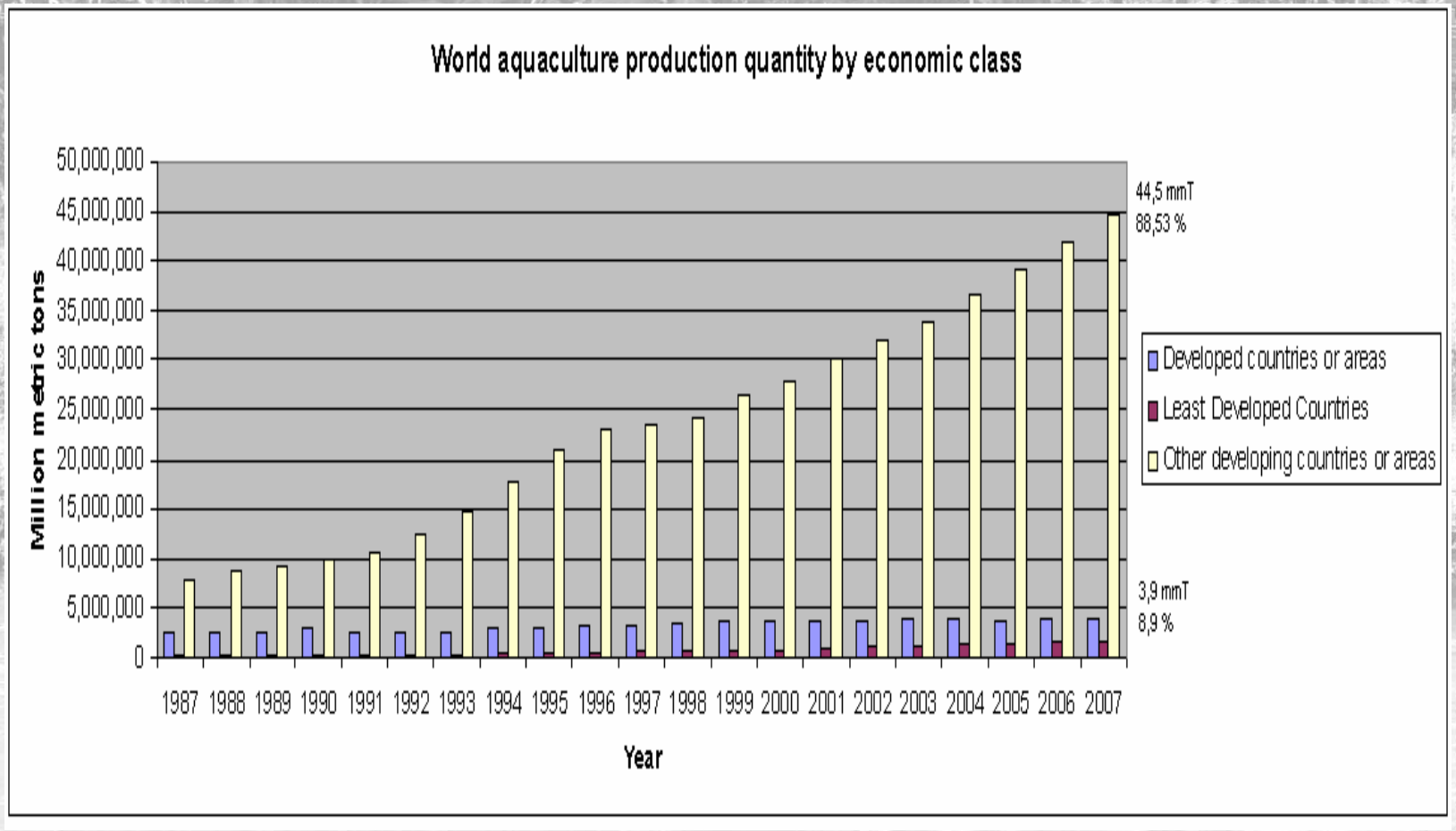


Introduction



Contribution of food fish supply from capture fisheries and aquaculture from 1970 to 2007 (FAO FishStat and FAO, 2009).

Total world aquaculture production by major economic country groupings



Main areas of biotechnology applications in fisheries and aquaculture

1 Genetic improvement and control of reproduction

2 Biosecurity and disease control

3 Environmental management and bioremediation

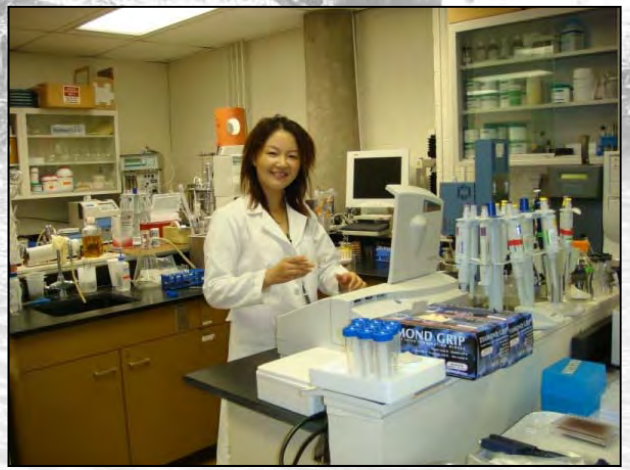
4 Biodiversity conservation and fisheries management

Current status of application

- **Genetic improvement and control of reproduction**
- Polyploidy
- Gynogenesis and androgenesis
- Controlling time of reproduction
- Development of monosex populations
- Cryopreservation
- Application of genomics
- Genetic modification
- Molecular markers
- Conventional animal breeding

Current status of application

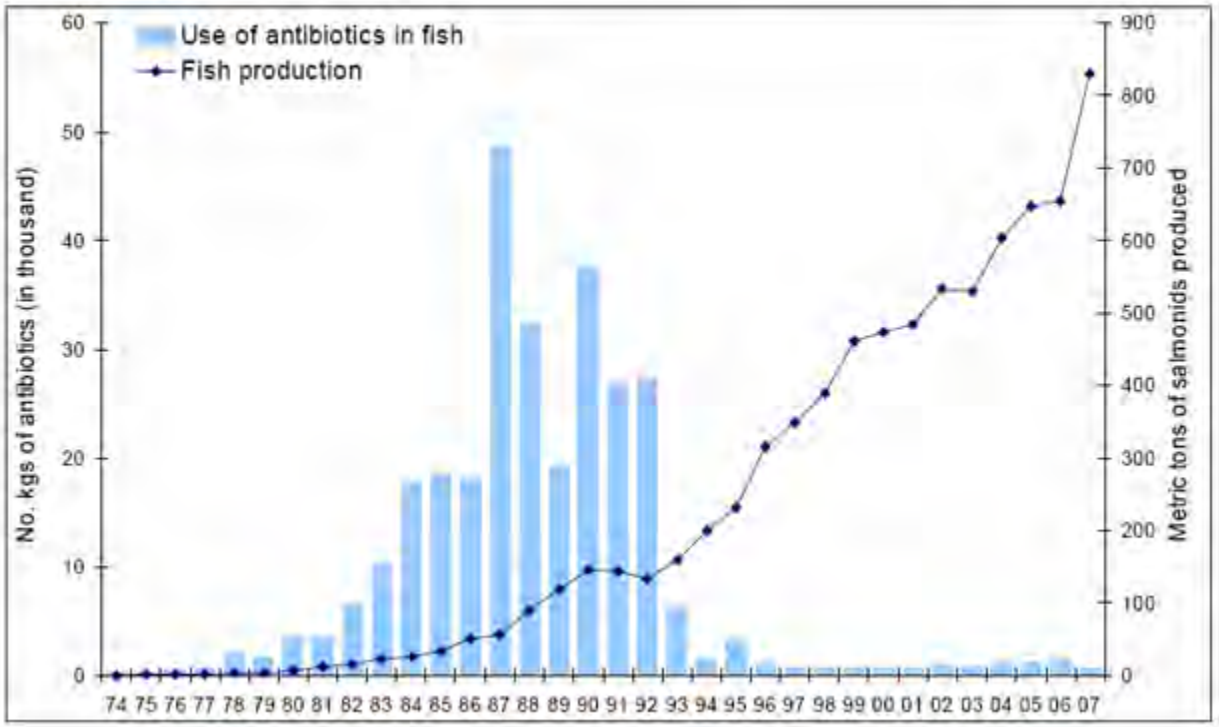
- **Biosecurity and disease control**
  - **Disease has become a primary constraint to the culture of many aquatic species.**
  - Pathogen screening and disease diagnostics



Current status of application

- **Biosecurity and disease control**
  - Disease prophylaxis: Vaccines

Figure 4. Use of antibiotics vs. production of fish in Norway from 1974 to 2008 (Prof. Tore Hastein personal communication)



Current status of application

- **Environmental management and bioremediation**
  - Degradation of hazardous waste to environmentally safe levels using aquatic micro-organisms, or other filtering macro-organisms
  - Use of probiotics
  - Use of vaccines
  - Detection of toxins due to algal blooms

Current status of application

- **Biodiversity conservation and fisheries management**
  - Restocking
    - Potential mainly from development of hatchery technologies
    - Stocking to restore spawning biomass - genetic variability of the fishery may be reduced
    - Stocking to restore the carrying capacity of the fishery
    - Concerns about inbreeding
    - Need for careful restocking procedures

The way forward

- **Key issues where biotechnologies could be useful**
  - Environmental sustainability
    - Molecular techniques for pathogen screening and identification
    - Insights into pathogenesis
    - Potential for disease control and prevention
  - Climate change
    - Adaptive capacity and resilience of aquaculture needs to be strengthened

The way forward

- **Identifying options for developing countries**
  - Collect and disseminate information, analyse adoption and socio-economic impacts
  - Develop low-cost simple technologies
  - More research to develop vaccines for tropical species
  - Create suitable policy environment for development and application

The way forward

- **Identifying options for developing countries (cont'd)**
  - Increase funding, particularly for capacity building
  - Establish efficient institutional structures and enforceable legal frameworks
  - Establish national biotechnology programmes with Special Committee for Aquatic Species

The way forward

- **Identifying priorities for action for the international community**
  - Recognize potential of biotechnologies
  - Assist developing countries to collect, collate and analyse information about the biotechnologies
  - Make efforts to maintain databases and information systems to assist countries access information
  - Dedicate an appropriate share of their assistance projects to promoting and strengthening aquatic biotechnology R&D in developing countries

The way forward

- **Identifying priorities for action for the international community (cont'd)**
  - Ensure effective and intimate links to strong breeding and extension programmes
  - Assist developing countries in strengthening capacities for biotechnology policy development, long-term planning, and for the national agricultural research systems
  - Assist developing countries in the development of adequate institutional capacities and in the development and enforcement of regulations related to use of biotechnologies in fisheries and aquaculture.

THANK YOU