Climate change adaptation in tilapia cage culture in Thailand

Chanagun Chitmanat [1], Phimphakan Lebel [1, 2], and Louis Lebel [2]

[1] Faculty of Fisheries Technology and Aquatic Resources,
Maejo University, Thailand

[2] Unit for Social and Environmental Research, Faculty of Social Sciences, Chiang Mai University, Thailand

Aquaculture

- Food Security
- Local consumption
- Additional Income – Rural Development
- Export - Economic Development



Limitation

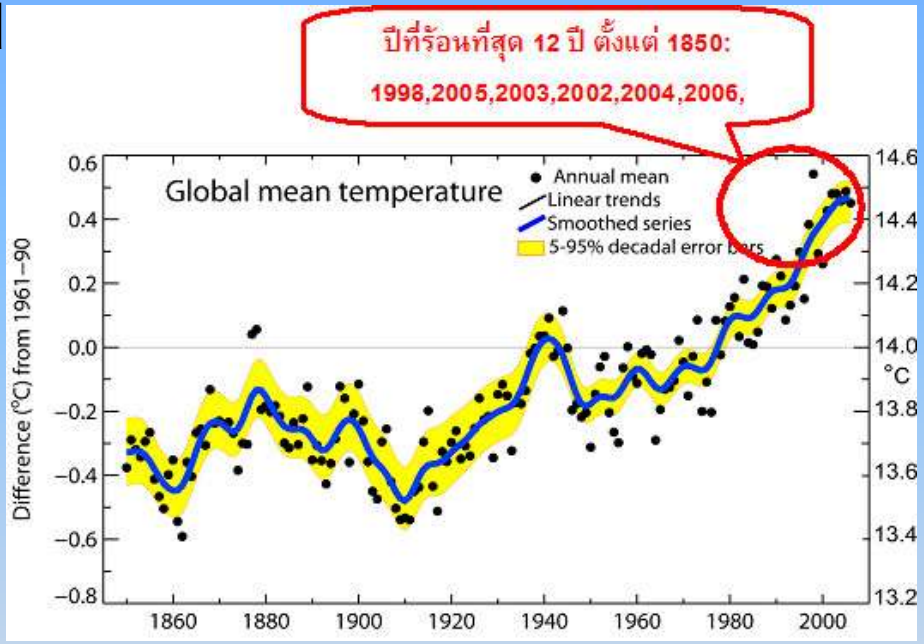
- Knowledge / Techniques
- Technology / Cost
- Diseases
- Environment
- Access to the land

Tilapia cage culture

- Tilapia is the second most economically important fish cultured in Thailand.
- Cage farming : off-flavor problems
- A serious obstacle to the sustainability and development of tilapia cage culture is the frequent occurrences of mass mortality.

Climate Changes / Uncertainties

- One of the most serious environmental threats ecosystem around the world



Effects of climate change on aquaculture

- Increase in temperature
- Drought
- Flooding
  - Precipitation is more variable with more frequent intense rainfall events.
- Disease susceptibility
  - In northern latitudes, occurrence and transmission of aquatic parasitic diseases are driven by temperature and primarily take place during the warm summer period Rintamki-Kinnunen *et al*., 2005).

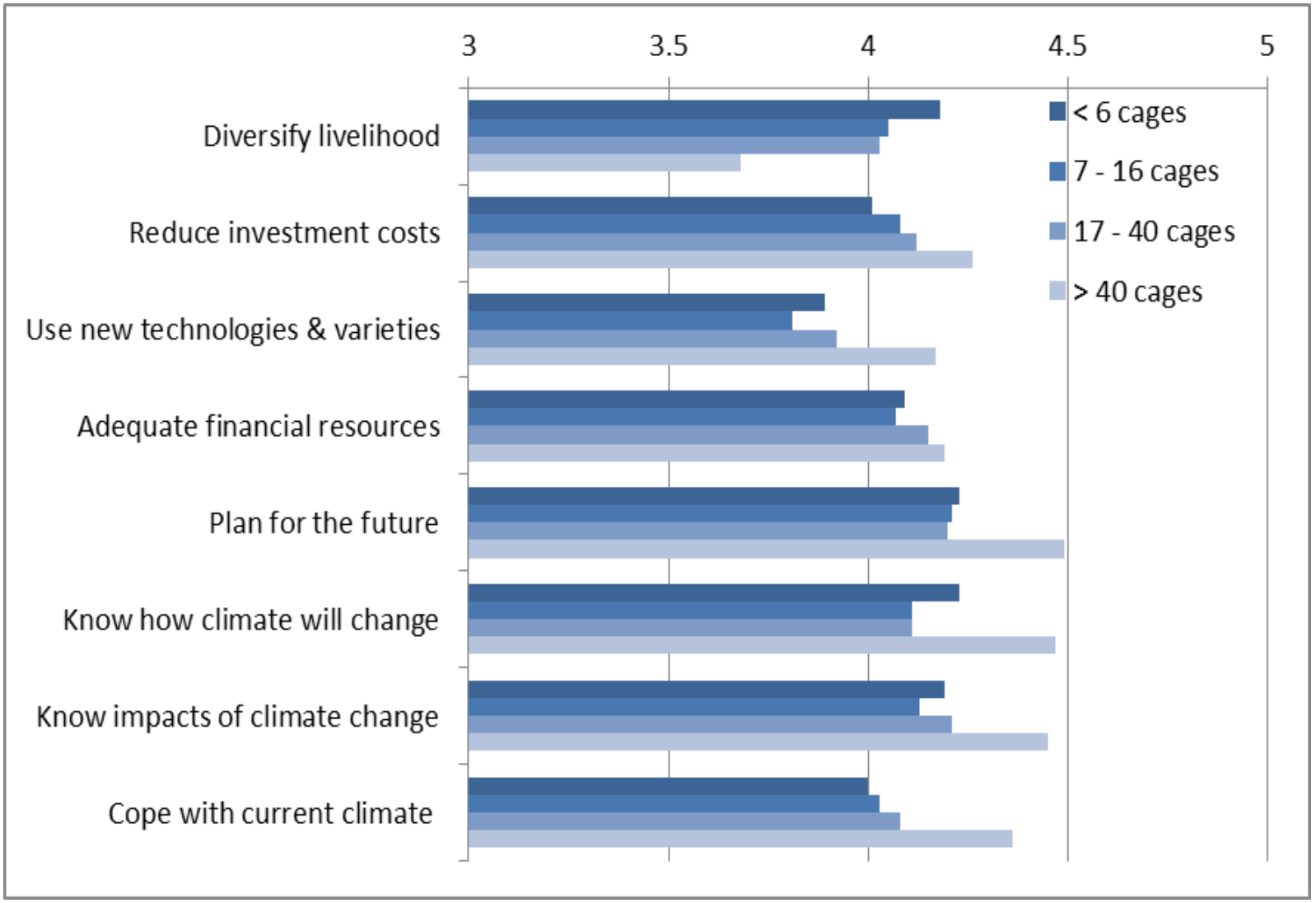
Climate affects fish diseases

- Temperature
  - Pathogen growth
  - Dissolved oxygen
  - Fish immunity
- Precipitation
  - Habitat (water flow / water quality)

Production risks in tilapia cage culture

- Location
- Climate uncertainties → Temperature / Precipitation
  - Water quality → Temp / DO / phytoplankton
  - Water quantity → Flood / low flow
- Knowledge / experiences / adaptation
- Antibiotics / Chemical / Immunostimulants / Vaccines
- Fingerling quality / size
- Feed (cost / quality / feeding ?)
- Death / Diseases / Knock (massive death)
- Marketable price

Adapting fish farming to climate change



Averages scores of 662 fish farmers on a scale of 1 (disagree completely) to 5 (fully agree)

Adaptation on multiple time and space scales

	Short term Hours-days	Intermediate Weeks-months (crop)	Long Term Years (multi-crop)
Farm-level			
Technical	Cage movement Aeration Immunostimulant application Emergency harvest	Adjust stocking date and density Adjust feeding	Find the suitable location / zoning
Financial	-	On time loan payments	Multiple income sources
Social	Share warning information	Share rearing knowledge	Brainstorms with experienced farmers/ scholars
River-level	Flow and early warning information systems	infrastructure operation and improvement Seasonal water allocation decisions	Engage in water and basin management activities Operating rules and procedures for infrastructure
National level	Financial support/relief decisions	Emergency compensation	Infrastructure development River restoration Aquaculture insurance

Acknowledgement

- The International Development Research Centre, Ottawa, Canada
- Unit for Social and Environmental Research
- AQUADAPT team

IDRC CRDI