2016 Progress Report

Impacts of Climate Change and Adapting bio-security measures in aquaculture in northern Vietnam Project

Review meeting, Hanoi 18/5/2015
Project information

- **Title:** Impacts of Climate Change and Adapting bio-security measures in aquaculture in northern Vietnam Project
- **Time:** 12/2011-12/2016
- **Study areas:** Northern Vietnam, focus Nghe An, Hai Phong, Quang Ninh
- **Total grant:** DKK 4,774,689
- **RI:** Research Institute for Aquaculture No1
- **DPI:** Faculty of Health and Medical Science, University of Copenhagen.
- **Funding organization:** DANIDA
- **Supervision organization:** Danida Fellowship Center
Study area

Main aquaculture areas in the Northern Vietnam
Objectives

- **Ob1**: Assess the impact of climate change on infrastructure, environment and biosecurity of major aquaculture systems of Northern Vietnam.
- **Ob2**: Propose and disseminate mitigation measures of climate change for major aquaculture systems in Northern Vietnam to authorities, farmers and other stakeholders.
Outputs from objective 1

- A set of aquaculture GIS map.
- GIS predicting models.
- Impact of CC on biodiversity of the aquaculture pathogen species.
- 2 PhD and 3 MSc
Outputs from objective 2

- Policy recommendation for central and local governments
- Report of recommendation adapting measures for aquaculture farmers, local authorities, and other identified stakeholders
- Demonstrations for local farmers and official with the view of gender equality.
Collaboration with the Danish researchers

Danish Partner Institution
Anders Dalsgaard
Professor in Veterinary Public Health
University of Copenhagen
Faculty of Health and Medical Sciences
Section of Food Safety and Zoonoses
Department of Veterinary Disease Biology

Vietnamese and Danish partners keep close cooperation in implementing project activities especially for PhD research activities.
Collaboration with stakeholders and research outreach

- Danish Embassy
- Ministry of Science and Technology
- Ministry of Agriculture and Rural Development
- Department of Agriculture and Rural Development of Nghe An, Hai Phong and Quang Ninh provinces
- Section of Agriculture and Rural Development of districts of: Quynh Luu, Cat Hai and Dong Trieu
- Farmers at demonstration farms
- Farmers and all other stakeholders involved in research surveys
Main results and outcome of the project
GIS maps

Aquaculture maps of 13 provinces in Northern Vietnam. Aquaculture maps with scale of 1:5000 of shrimp areas in Quynh Luu, Nghe An and marine fish farms in Cat Ba, Hai Phong.

Available at:
http://ica.ria1.org/maps/
and installer packet for PC
GIS model

Model development for assessment of climate change impacts to aquaculture systems using 18 parameters from different groups of indicators in the model to analyses the vulnerable areas by climate change of aquaculture systems
Impact of climate change on biodiversity of the aquaculture pathogen species

- Study on impacts of climate change on biodiversity of the pathogens of major aquaculture species, 2013.
- Study on impacts of climate change on food safety, 2014.
- Study on the current use and recommended prudent practice of probiotic and antimicrobial in aquaculture, 2014.
MSc

All four MSc students have graduated

- Mr. Nguyen Hai Dang, **RIA1**, Shanghai Ocean University, China. Characterization of three glutathione S-transferases genes in Razor clam (*Sinonovacula constricta*)."

- Mr. Luu Van Dan, **Quang Ninh** DARD, Nha Trang University. Current situation of sustainable development of white leg shrimp (*Litopenaeus vannamei* Boon, 1931) in Quang Ninh.

- Mr. Ngo Xuan Ba, **Hai Phong** DARD, Nha Trang University. “Study on the effect of density and stocking size on growth and survival rate of clams (*Metrix lyrata*, 1851) in Kien Thuy, Hai Phong”.

- Mr. Truong Quang Toan, **Nghe An** DARD, Vinh University. “Effect of stocking density, feeds to the survival and growth of *Bagarius rutilus* cage culture in reservoirs in Nghe An”.

Two PhD students are scheduled to graduate at the end of 2016

- **Ms. Tran Kim Chi, RIA1 to Copenhagen University (PhD)**
  - Paper 1: Use practices of antimicrobials and other compounds by shrimp and fish farmers in Northern Vietnam
  - Paper 2: Quality of antimicrobial products used in whiteleg shrimp (Litopenaeus vannamei) aquaculture in North Vietnam
  - Paper 3: Farmer's knowledge and perception on the practice use of drugs and chemicals in shrimp farming in Nghe An and Quang Ninh.

- **Ms. Le Minh Hanh, IEBR to Copenhagen University (PhD)**
  - Paper 1. Farmer's dependence on aquaculture in North and North central Vietnam.
  - Paper 2. Climate variability and farmers' perception
  - Paper 3. Vulnerability of aquaculture in Nghe An and Quang Ninh
Policy recommendation, adapting measures

• Review of current aquaculture related policies to climate change and recommendation
• Climate change adapting measures recommendation for aquaculture.
• Handbook of climate change policy in aquaculture
• Climate change adaptation demonstration for aquaculture
Demonstration farms

1. Luu Van Dong, tilapia farm, Hoang Que, Dong Trieu, QN
2. Ngo Van Be, tilapia farm, Hoang Que, Dong Trieu, QN
3. Tran Van Thuong, shrimp farm, Quynh Luong, Quynh Luu, NA
4. Hoang Xuan Tin, shrimp farm, Quynh Bang, Quynh Luu, NA
5. Hoàng Xuan Tien, marine fish farm, Cat Ba, Cat Hai, HP
6. Bui Van Luyen, marine fish farm, Cat Ba, Cat Hai, HP
## Publications

<table>
<thead>
<tr>
<th>Publications</th>
<th>Status</th>
<th>Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Rural Development Journal, 24/2014; 116-122., NGUYEN HUU NGHIA, DO MINH PHUONG. Application of remote sensing technique to aquaculture area mapping in Northern Vietnam.</td>
<td>Published</td>
<td>Journal paper</td>
</tr>
<tr>
<td>Use practices of antimicrobials and other compounds by shrimp and fish farmers in northern Vietnam (Tran Kim Chi, Anders)</td>
<td>Submitted</td>
<td>Journal paper</td>
</tr>
<tr>
<td>Farmer's dependence on aquaculture in North and North central Vietnam (Le Minh Hanh, Martin, Phan Thi Van, Nguyen Huu Nghia)</td>
<td>Submitted</td>
<td>Journal paper</td>
</tr>
</tbody>
</table>
## Publications

<table>
<thead>
<tr>
<th>Publication</th>
<th>Status</th>
<th>Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Course on Climate Models, UNESCO/IOC-ODC Centre, Qingdao, China:</td>
<td>Published</td>
<td>Workshop proceeding</td>
</tr>
<tr>
<td>Climate change vulnerability assessment for aquaculture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Aquaculture conference 2015 &quot;Model development for assessment of</td>
<td>Published</td>
<td>Workshop proceeding</td>
</tr>
<tr>
<td>climate change impacts to aquaculture systems in Nghe An province, Vietnam&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handbook of impact of climate change in aquaculture and mitigating</td>
<td>Submitted</td>
<td>Book</td>
</tr>
<tr>
<td>measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handbook of climate change related policy for aquaculture</td>
<td>Submitted</td>
<td>Book</td>
</tr>
<tr>
<td>Response to climate change in aquaculture: A policy review and</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>recommendations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications</td>
<td>Status</td>
<td>Types</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Aquaculture mapping for northern Vietnam</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Marine farming map construction for Cat Ba, Hai Phong</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Shrimp farming map construction for Quynh Luu, Nghe An</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Climate change impact assessment model for aquaculture system</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Methods and primary results of application of Remote Sensing and GIS to develop spatial database, land use maps, and assess the impact of climate change to aquaculture in Northern Viet Nam</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Impact of climate change in aquaculture and mitigation measures</td>
<td>Published</td>
<td>Report</td>
</tr>
<tr>
<td>Publications</td>
<td>Status</td>
<td>Types</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Aquaculture map for northern Vietnam 1:50,000</td>
<td>Published</td>
<td>Online</td>
</tr>
<tr>
<td>Marine farming map for Cat Ba, Hai Phong 1: 5,000</td>
<td>Published</td>
<td>Online</td>
</tr>
<tr>
<td>Shrimp farming map for Quynh Luu, Nghe An 1:5,000</td>
<td>Published</td>
<td>Online</td>
</tr>
<tr>
<td>Packed all maps software and user guide</td>
<td>Published</td>
<td>PC installer packet</td>
</tr>
</tbody>
</table>
The 2nd International Conference on Climate Change & Social Issue, Malaysia, 2011
Implementing workshop 06/03/2012 Can Tho, 11/2012
GIS training course 04/2012
Data collection in Quang Ninh, Nghe An 2012
Map data collection Hai Phong 2012
Survey in Nghe An & Quang Ninh 2013
Climate model workshop, Quingdao, China 2014
Data processing and analysis

- Data standardization:
  - Convert non-spatial data to spatial data
  - Consolidation of format, coordinate system, map resolution
  - Score and weight parameters.
- Interactive model development; map overlay.
- Summary of vulnerability areas.
Training and workshop in Quang Ninh 2016
Study tour marine fish farming, Cat Ba 2016
Thank you