

# Vulnerability and adaptation to climate change for improved polyculture farming systems in the Mekong Delta, Viet Nam: Policy and institutional adaptation measures

Policy brief



# Key Messages

- **FOOD BASKET OF THE MEKONG DELTA:** Shrimp production accounts for 75.74% of national production, most from small scale farming systems. The industry is important for the food security and employment of 17 million people.
- **IMPACTS OF CLIMATE CHANGE:** Aquaculture and also other industries have been threatened by high temperature, storm and typhoons, sea level rise and irregular seasons.
- **THE NEED TO ADAPT TO CLIMATE CHANGE:** Adaptation measures are identified to increase resilience and enhance adaptive capacities of small-scale aquaculture farmers to the impacts of climatic change.
- **POLICIES FOR COPING WITH CLIMATE CHANGE:** Policies and institutional measures are suggested for policy makers to support local farmers to adapt faster and more efficient to the impacts of climate change.

# Policy recommendations

- **PROVIDE FUNDING TO IMPROVE INFRASTRUCTURE AND ECOSYSTEM MANAGEMENT:** Funding is required to improve maintenance and repair of critical infrastructure such as sluice gates, dykes, supply and effluent canals and thereby reduce the impact of floods and sea level rise on small scale farms. The provincial government, communes and farmers should be involved in implementing this measure. A national policy already exists for protecting coastal ecosystems, but needs planned implementation and funding.
- **TRAIN FARMERS, WOMEN'S GROUPS AND EXTENSION WORKERS IN SUSTAINABLE IMPROVED POLY CULTURE:** Training will reduce environmental impacts on improved polyculture farming systems and vice versa, while at the same time improving the adaptive capacity of farmers. In the first step, extension workers should undergo medium/ long term training on environmental, technical and climate smart polyculture issues. Extension officers should in turn train farmers and women at the commune level. The Department of Agriculture and Rural Development (DARD) should be responsible for organising and implementing the training, designed in cooperation with research institutes such as the Research Institute for Aquaculture No. 2 (RIA2).
- **SET UP STANDARD PROCEDURES FOR MONITORING WATER QUALITY AND PROVIDING EARLY WARNING:** Regular monitoring (for pH, alkalinity, oxygen, salinity, etc) and providing timely information to farmers on water quality and flows, warnings for extreme weather through mass media and other sources will help farmers to be more effective in managing improved polyculture farms. DARD should be responsible in each province for implementing this measure together with pond managers and farmers.
- **ESTABLISH FARMER COOPERATIVES BY REORGANISING THE EXISTING FARMERS ORGANISATIONS:** These cooperatives if properly organised and functioning can help farmers to cooperate on various farming issues, infrastructure development and maintenance, exchange of information, joint planning and scheduling improved polyculture farming activities, marketing of product and addressing impacts from climate change and adaptation. The support of DARD and the Planning section at the district level can enable farmers in establishing cooperatives.
- **PROVIDE CROP INSURANCE TO SMALL SCALE IMPROVED POLY CULTURE FARMERS:** Crop insurance is important for small scale farmers and can cover losses to farms in the event of droughts, storms, floods and other extreme events and will help to overall improve the farmers' adaptive capacity. Crop insurance policies for the agriculture sector is currently being discussed within MARD. DARD should cooperate and discuss with private insurance companies and banks to provide such insurance for polyculture farmers as well.
- **INCREASE COORDINATION AND COOPERATION BETWEEN STAKEHOLDERS, INCLUDING GOVERNMENT DEPARTMENTS, TO ADDRESS CLIMATE CHANGE IMPACTS AND ADAPTATION IN AQUACULTURE SECTOR:** A well-coordinated body at the provincial level will be useful for better planning and implementation of the adaptation measures. Such coordination is possible under the new Action Plan Framework on adaptation to climate change for the Agriculture and Rural Development Sector, Period 2008 – 2020. To begin with, a working group with representatives from various relevant departments should be set up at the provincial level under the supervision of DARD for initiating such cross sectoral co-ordination for climate adaptation.
- **ENHANCE ROLE OF WOMEN IN SUSTAINABLE IMPROVED POLY CULTURE FARMING INITIATIVES:** Women play an important role in managing economics and technical implementation in improved polyculture farming systems. Therefore it is important to increase their skills and knowledge on book keeping, farm accounting and technical adaptation measures, through specific training for women's groups at the commune level.

# Polyculture farming systems and climate change

This brief summarises the results from the interdisciplinary study conducted within the Aquaclimate project in Ca Mau and Bac Lieu provinces of the lower Mekong Delta looking at the impacts of climate change on small scale improved polyculture farming. The brief further provides guidelines for policy development to address the climate change impacts on small scale improved polyculture farming systems in Vietnam and how adaptation measures should be implemented in the region. The guidelines are based on recommendations from stakeholders including farmers.

Viet Nam is one of world's top five most vulnerable countries to sea level rise and the most vulnerable area to climate change impacts in the Mekong Delta. Mapping impacts and vulnerability, devising adaptation strategies at the national and local levels and strengthening the capacity of rural farming communities to manage the impacts of climate change are now a matter of urgency. This is more relevant for vulnerable sectors such as aquaculture which provides employment to a large number of small scale farmers and poor households.

Improved polyculture in the lower Mekong delta is practiced through different production systems ranging from large scale intensive, semi-intensive and extensive. The extensive or "improved extensive" system where some modifications/improvements have been made to the pond system, is the largest production system type, both in area and production in the lower Mekong Delta. About 90% of production in Ca Mau and 55% in Bac Lieu province come from the improved extensive farming system. It is characterised by small-scale farmers and vulnerable to climate change.

Improved polyculture farming in both provinces plays an important role for food security and employment. Income from improved polyculture farming accounted for 77% of the total household income.

## Climate change impacts in the Mekong Delta in 2020 and 2050

The average monthly rainfall in the Mekong River catchment area will be similar to the present rainfall in 2020. However the total rainfall in the Mekong River Delta area will not change significantly but the intensity of rainfall will increase. Saltwater will intrude further into the Mekong River Delta and river salinity will increase from December to March. However, peak rainfall is predicted to be 10% higher in August, potentially increasing the peak river flow. This together with rising sea level could increase the intensity of floods, and increase the area affected slightly. Sea level is also projected to increase substantially. It may rise about 28 – 33cm by 2050 and about 65 – 100cm by 2100. There would be 12.8% flooded area of the Mekong Delta

under sea level rise at 65cm scenario; 19% (sea level rise at 75cm scenario) and 37.8% (sea level rise at 100cm scenario).

Average monthly maximum temperatures are predicted to increase by 0.7°C by 2020 and 1.32°C by 2050 respectively. There will also be hot weather spells for longer periods. The present peak average temperature, which occurs in April, will be exceeded for two and a half months and the present average maximum monthly temperature in April is predicted to be 1.5°C higher than present which poses significant risks. However, increased temperature between July and February will be positive for improved polyculture farming leading to better food conversion rate and faster growth rate.

Inundation maps of the Mekong Delta for different sea level rise scenarios show 12.8% of the Mekong Delta will be flooded under a sea level rise at 65cm scenario; 19% under a 75cm sea level rise and 37.8% under a sea level rise of 100cm. Salt water usually penetrates further inland during the dry season, up to 60km, specifically from March to May. This may impact the farming systems and productivity in the coastal region in both negative and positive ways. Storms and typhoons will happen more frequently and be stronger.

**The Aquaclimate Project** is a three year initiative to strengthen the adaptive capacities of rural farming communities to the impacts of climate change. The project focuses on small-scale aquaculture in Vietnam, the Philippines, India and Sri Lanka. The project is coordinated by the Network of Aquaculture Centres in Asia-Pacific and funded by the Ministry of Foreign Affairs, Norway, through the Royal Norwegian Embassy, Bangkok, Thailand. The project was undertaken by international partners Bioforsk, Norway, Akvaplan-niva Norway, Kasetsart University, Thailand and local case study partners. The local partner for this case study was the Department of Aquaculture, Research Institute for Aquaculture No. 2, HCMC, Vietnam.

## Policy and institutional measures

### Maintenance and improving infrastructure and ecosystem management

There is a need to strengthen coastal protection and river banks to cope with increasing sea level rise and river level rise, increasing frequency and severity of storm surge.

This policy measure will help to improve the maintenance of key water management infrastructure such as sluice gates, dykes, canals and thereby reduce the impact of floods and sea level rise on small scale farms. The main outcome of the measure will be reduction in the losses to farms and property. In some cases, the dyke systems

have to be upgraded (higher and stronger), and in others, mangroves have to be planted to protect coastal pond farms, especially in Ca Mau that has a long exposed coast line.

The provincial government and farmers should be involved in implementing this measure. A national policy already exists for protecting coastal ecosystems, but it needs planned implementation and funding.

### **Training farmers and extensions workers in sustainable improved polyculture**

Education and training plays an important role in farm profitability and making the farmer more resilient in the face of predicted stronger climate changes.

Training programs can help in reducing climate change impacts on improved polyculture farming and vice versa, while at the same time improving the adaptive capacity of the farmers. In the first step, extension workers should be provided with need-based training on environmental, technical and climate smart improved polyculture issues and practices. The extension officers should train farmers at the commune level. Training and providing information on new technologies and climate adaptation measures has direct correlation with farmer's income. Also, it should provide training for young people in school on impacts and adaptation of climate change.

The National Agricultural Extension Center and DARD should be responsible for organising and implementing the training, designed in cooperation with the local Universities and research institutes such as RIA2.

### **Standard procedures for monitoring farms and providing early warning**

There is a need for more systematic and standardised environmental monitoring of farms at the provincial level and climate monitoring and forecasting so that the farmers have early warning of potential risks and can take action to reduce the risk.

Undertaking regular monitoring of improved polyculture farms (pH, alkalinity, oxygen, salinity, seed, pond design suitable to future climate changes) and providing timely information to farmers on water flows together with widespread dissemination of forecast irregular or extreme weather warnings to help farmers to be more effective in managing their farms and risks associated with climate change.

The provision of technical advice on the careful use of chemicals and other inputs will also reduce environmental impacts and can reduce input costs to farmer significantly.

DARD in cooperation with RIA2 should be responsible for implementing this measure together with pond managers and farmers. RIA2 has already established a network of monitoring stations in the MRD.

### **Establish farmer cooperatives by reorganising the existing farmers organisations**

Organisation of farmers into cooperatives or farmer groups can improve production practice through implementation of better management practices, improve profitability through bulk purchasing of input material and joint implementation of adaptation measures.

These cooperatives if properly organised and functioning can help farmers to cooperate on various farming issues, infrastructure development and maintenance, exchange of information, joint planning and scheduling improved polyculture farming activities, marketing of product and addressing impacts from climate change and adaptation.

The support of DARD and the Planning section at the District level can provide help to farmers in establishing the cooperatives.

### **Crop insurance against extreme events to small scale improved polyculture farmers**

Farmers are experience strong and more frequent extreme events that disrupt or even stop production. Small scale farms often do not have the financial resources to recover or restart production.

Crop insurance is important for small scale farmers and can cover losses to farms in the event of droughts, storms, floods and other extreme events. This will help to overall improve the farmers' adaptive capacity. Weather based crop insurance policies for the agriculture sector are currently being discussed within MARD. DARD should cooperate and discuss with private insurance companies and banks to provide crop insurance for improved polyculture farmers as well.

### **Co-ordination and cooperation between stakeholders**

There are a number of agencies involved with the planning and management of aquaculture and a number of initiatives in developing adaptation measures for climate change. There is a need for better co-ordination and cooperation of agencies and initiatives.

A well-coordinated body at the provincial level will be useful for better planning and implementation of the adaptation measures, pulling the resources from different departments together and avoid duplication of work and efforts by different departments.

MARD should be responsible for introducing such coordination possible under the new Action Plan Framework on Adaptation to Climate Change for the Agriculture and Rural Development Sector, period 2008 – 2020. To begin with, a working group with representatives from various relevant departments should be set up at the provincial level under the supervision of DARD for initiating such cross-sectoral co-ordination for climate adaptation.

### Increase women's role in sustainable improved polyculture farming initiatives

Women play an important role in managing accounts on farms, seed production and processing in improved polyculture farming systems. Therefore it is important

to increase their skills and knowledge in these skills for increasing their efficiency. Women themselves can also be trainers and help in organising courses for farmers on sustainable polyculture farming practices.

Training materials should be developed and a training programme offered on book keeping, farm accounting and technical adaptation measures, in cooperation through women's groups at the commune level.

The role of women can also be seen in research and education on issues related to impacts of climate on polyculture, developing new strains of fish and shrimp, pond designs and livelihoods. It is important to diversify farmers' livelihoods to increase local farmer's resilience to climate change.

## Summary of recommendations for key stakeholders

Stakeholder group	Recommendations
Policy makers (MARD) DARD, Planning section at the Province level Communes	<ul style="list-style-type: none"> <li>• More funding for infrastructure development</li> <li>• Training on sustainable shrimp farming systems</li> <li>• Improving coordination and cooperation between agencies on climate adaptation programs</li> </ul>
Women's groups	<ul style="list-style-type: none"> <li>• Training on book keeping, accounting and improved technical culture systems for profitable and sustainable shrimp farming</li> </ul>
Research and Development (Research Institutes (like RIA 2)	<ul style="list-style-type: none"> <li>• Development of training materials, designing courses and facilitating training and capacity building for extension officers and farmers</li> </ul>
Private sector insurance companies and commercial banks, export/import agencies	<ul style="list-style-type: none"> <li>• Provide crop insurance policy</li> <li>• Facilitate credit for small scale farmers</li> </ul>





Stakeholder meeting.