

## **AQUACLIMATE TECHNICAL BRIEF**

*REDUCING THE GAP BETWEEN SCIENCE AND POLICY DEVELOPMENT: CREATING  
SCENARIOS TOGETHER WITH CATFISH FARMERS IN THE MEKONG DELTA, VIETNAM  
ISSUE NO.2*



*A major focus of the AQUACLIMATE project is on the involvement of stakeholders in the development of scenarios and adaptation models for sustainable aquaculture in the respective case study areas. Scenarios can provide a means to map possible future situation and the measures necessary for sustaining aquaculture production. Involvement of stakeholders in the development and validation of scenarios, can provide insights not readily available for policy-makers.*

## *Reducing the gap between science and policy development: Creating scenarios together with Catfish Farmers in the Mekong delta, Vietnam*

**2010**

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### **Abstract**

The project AQUACLIMATE is utilising a range of methodologies to encourage stakeholder participation and gain from their experience, while developing adaptation measures. Scenarios are one tool that is being used to map stakeholder priorities and interests. In the Mekong delta, Vietnam catfish farmers and other stakeholders were well aware of the risks from climate change. Catfish farmer groups actively participated in mapping possible impacts and future developments in the catfish farming sector in the event of climate changes. Four likely scenarios were identified by farmers and in the process, they were able to prioritize the most serious risks, the likely impacts, and measures that would be necessary to be taken up by different agencies to address the risks. A shift in rainfall and temperature patterns were seen by farmers as the most serious climatic risk, that affects the water quality, increase the risks of fish diseases and meat quality. The different

### **Fact box**

According to the Inter-governmental Panel for Climate Change (IPCC), the lower parts of the Mekong River Delta and other plains in Vietnam will be affected seriously by extreme variability in climate. It has been predicted that, annually, from January to April, these regions will suffer from dry and hot weather, a shortage of water, northeast wind, the encroachment of salt water, early droughts, thunder and lightning. Between May to June, the region will face drought, floods in July and August, landslides, floods and flood-tides in September and October, and towards the end of the year the region will be affected by storms and cold weather in November and December (<http://english.vietnamnet.vn>).

A majority of the small farmers in the Mekong delta are likely to be affected by climate change. Currently, farmers are practicing some adaptation measures. However, these are not adequate enough to protect them from the likely risks due to extreme climate events that they are currently facing. The Government of Vietnam, at the national level, has initiated planning for adaptation in various sectors. Integration of efforts, knowledge and resources of different stakeholders is the needed to sustain aquaculture in the Mekong Delta.

measures suggested by farmers will be further evaluated in terms of feasibility in the region.

## Introduction

One of the major constraints in research is the weak linkage with policy development and the incorporation of scientific results into policy making. Majority of the scientific research ends up in reports and rarely used by policy makers. This can be due to a number of reasons such as: 1) Scientific research is often formulated without taking into consideration the needs of stakeholders; and 2) Scientific results thus generated may be of academic interest and not useful in policy formulation. It is only in recent years that there has been a shift in thinking towards integrating stakeholders in research and further in developing policies. However, in practise there are a very few projects which are able to demonstrate and actively bring together scientific community, managers, policy makers and farmers. Unless the stakeholders are genuinely involved in developing adaptation measures and scenarios, research results will not be of much use in policy making. In the climate change debate, there is an increasing demand for stakeholder participation both from national and international agencies. In some cases, stakeholders themselves are showing interest to be part of policy development.

The challenge now is to develop methodologies to include stakeholders and the public in policy making. According to Gooch and Huitema (2007) a number of methods are available to enable stakeholders to participate in environmental management, including, citizen juries, stakeholder panels etc.

However these methods may not be able to include all sections of the society who are affected by climate change. One way of engaging stakeholders and the farmers in the formulation of possible futures is through the use of scenarios. Scenarios are projections of possible futures (Alcamo 2001; Shell 2003), not necessarily the most likely futures.

In the Aquaclimate project ([www.enaca.org/aquaclimate](http://www.enaca.org/aquaclimate)), there is a focus on the involvement of stakeholders and the public in the development of scenarios and adaptation models for sustainable aquaculture in the respective case study areas. Scenarios provide a means to map the possible future situation and the measures necessary for sustaining aquaculture production. Scenarios can also be used as a tool for improving stakeholder participation. Involvement of stakeholders in the development and validation of scenarios, can provide insights not readily available for policy-makers.

## Scenario as a policy tool

Scenarios essentially describe possible future situations and the path that may make it possible to arrive at such a future situation.<sup>1</sup> They are a useful tool to look

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<sup>1</sup> Masini, E.B. & Vasquez, J.M., "Scenarios as Seen from a Human and Social Perspective", 65 Technological Forecasting and Social Change 49-66 (2000), at 52. 'Scenarios' has been defined as "a sequence of emerging events, an account of a projected course of action or events" (Webster's Ninth Collegiate Dictionary,

at possible paths of development, to illustrate how alternative policy pathways can raise awareness about the future environmental problems, pinpoint priority issues, identify the main actors in relation to the key variables and their strategies, and provide education and operational strategies.<sup>2</sup> Scenarios are verbal picture of a situation or a phenomenon based on certain assumptions and factors (variables). Scenarios are used in estimating the probable effects of one or more variables, and are an integral part of situation analysis and long-range planning.

Scenarios can be made up of (i) a base year -usually the current year, which provides a starting point for assessing scenarios; (ii) time horizon -the most distant future year or end year covered by a scenario; (iii) pathways -description of the changes that may take place from the base year to the end year; (iv) drivers - the main factors or determinants that influence the pathways described in a scenario; and (v) storyline - a narrative description of a scenario which highlights its main features and their relationship to the driving forces.

### Advantages of developing scenarios together with stakeholders

1989); the IPPC define “scenarios” as “images of the future, or alternative futures that are neither predictions nor forecasts, but an alternative image of how the future might unfold” (Alcamo, J., “Scenarios as tools for international environmental assessments”, Experts’ corner report, Prospects and Scenarios No. 5, European Environment Agency, Copenhagen 2001, at 7).

<sup>2</sup> Massini, *supra* note above, at 51.

1. The experiential knowledge of stakeholders together with the scientific knowledge will be useful to develop most realistic scenarios.
2. Scenarios are useful tools to integrate knowledge from various disciplines and sectors.
3. Stakeholder inputs would be useful to develop more meaningful adaptation strategies, as they would be aware of the resources and limitations and the immediate needs.
4. The scenarios thus developed would be of direct use to managers and decision makers and easy to implement.
5. Scenarios developed through active participation can increase awareness of the issue amongst stakeholders and at the same time build trust between the scientific and civil society.



Fig 1. Farmers Focus Group Meeting

### Constraints in the development and use of scenarios

1. Stakeholder involvement can be time consuming, as it requires several meetings, workshops, and interactive sessions, before trust is developed.



2. Identification of relevant stakeholders is one of the key constraint and often a cumbersome process. Selection can be biased and in the process potential stakeholders can be left out
3. In some situations it is difficult to communicate with local agencies and farmers due to language barriers.
4. Stakeholders might build some expectations when asked to participate and projects like Aquaclimate may not be able to meet the expectations. It is better to inform about the purpose of their involvement and the project limitations.

### Development of scenarios for catfish farming in the Mekong delta, Vietnam

In Aquaclimate project, scenarios will map possible future situations in Aquaculture, under different conditions influenced by changing climate. The main concern now is the extreme variability in climate that will impact aquaculture sector, production and livelihoods. However, there is a lot of uncertainty in the predictions of climate scenarios, which implies that adaptation measures have to be developed for at least the most possible scenarios. The development of adaptation measures should be done in close consultation with relevant stakeholders, since the latter would be aware of the resources that would be available within their limits and also measures that would be most acceptable and needed. In practise, it should be much easier for policy makers to understand and accept the scenarios developed jointly by stakeholders.

The farmers groups mapped possible impacts and future developments relevant to catfish farming sector in the event of climate changes. At the Focus Group meetings farmers were quite clear about the likely impacts and also the measures that could be used to address the impacts. The stakeholder workshops also helped identify immediate concerns in the catfish farming sector and who should be responsible to implement the measures. The process has demonstrated that the method can be a useful contribution to the development of adaption strategies policies for addressing impacts from climate change.

Four scenarios were identified by the participants, followed by the main impacts and measures necessary to address the impacts. The scenarios focused around the challenges posed by climate changes, adaptation to climate change and governance issues including a focus on integration between various department activities.



Fig 2. Cat fish farmer

### Scenario 1

Early rains and increase in air temperatures were seen by farmers as

the most serious risk to catfish farming from climate change. The impacts were observed on water quality, farming systems and a major reason for diseases. Farmers considered fish diseases as the most serious impact that affected the meat quality and production costs.

### Scenario 2

The increase in floods was perceived by farmers as the second most serious risk. Floods, according to them inundates the catfish ponds, especially those located along the river, delays culture operations and impacts the water quality. Farmers expressed concern about the outbreak of diseases during floods.

### Scenario 3

Occurrence of storms in the Mekong delta was perceived as the third most serious climatic risk by farmers to catfish farming. In their opinion, the incidence of storms has increased in the Mekong delta. Storms, according to farmers cause serious losses to pond infrastructure, culture systems and fish losses.

### Scenario 4

Sea level rise was the other major risk from climate change that farmers agreed could be a potential source of inundating the catfish ponds permanently and thereby reducing the total acreage and production of catfish in the Mekong delta region. Sea level rise was also projected as one of the most serious threats to coastal areas in Vietnam.

### Adaptation measures suggested by farmers

Currently, farmers are practicing some adaptation measures in an attempt to

address some of the impacts on catfish farming.

1. Water Quality - Farmers are using probiotic chemicals. They suggested that government should come up with measures to improve water quality through zoning and area plans. Similarly they wanted the scientific agencies to come up better culture systems.
2. Diseases - Farmers use antibiotics and other chemicals at present that increases the cost of production. Catfish farmers felt that private companies and scientific institutes should co-operate to come up cheaper chemicals, integrated management measures and better genetic material or fish fry to reduce the losses from diseases.
3. Production and growth - Improved technology options is thought to be needed, according to farmers to sustain catfish production and livelihoods of small scale farmers. Some specific measures, like reduced stocking rates, improved food quality and brood stock selection was suggested in the discussions with catfish farmers.
4. Meat Quality - Maintenance of water quality and better genetic material (fish fry) was seen as the best measures for keeping the meat quality. Farmers, currently use chemicals in an attempt to maintain meat quality. However, as poor meat quality and yellow flesh is caused by nutritional deficiencies these adaptation measures are sub-optimal to

providing nutritionally balanced feeds.

22 p., EU FP6 project  
([www.striver.no](http://www.striver.no)).

## Conclusions

Various measures that catfish farmers are using and those that are being planned by the government and other agencies have to be integrated at various levels. Given the limited resources at the disposal of the government, it would be useful to strengthen the ongoing initiatives of integration immediately, starting from the provincial level. The scientific community could provide Better Management Practices (BMPs) for catfish farming that would suit different scenarios that farmers perceive.

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#### **About AQUACLIMATE**

Aquacclimate is a three year project 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.

**Title of project:** Strengthening Adaptive Capacities to the Impacts of Climate Change in Resource-poor Small-scale Aquaculture and Aquatic Resources-dependent Sector in the South and South-east Asian Region

**Start date of project:** March 2009      **Duration:** 36 months

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