

Coastal Zones Need Both Mangrove and Shrimp

ALEGAMS Policy Brief

ALEGAMS is a Project to **A**ssess the **L**earning **E**ffects of **G**ames on the **A**ttitude of **M**ekong Delta's **S**takeholders on **S**ustainable **S**hrimp Farming.

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CONTEXT

The Mekong Delta coast is lined with mangrove forests of varying depth and quality. Behind and within these forests, shrimp farms dominate the landscape and contaminate each other with diseases. Rising sea levels and more intense storms from climate change damage dikes and reduce water quality. Groundwater pumping to control maximum temperature and salinity levels in monoculture shrimp ponds is resulting in serious land subsidence.

Mangrove forests have an important role in mitigating these threats. Mangroves also contribute to sustainable shrimp farming and the wild-capture fisheries, which are profitable livelihoods for local households.

Currently the Vietnamese government is stimulating intensive monoculture of shrimp farming which threatens mangrove forests. This friction between the need for more resilient coastal protection and economic development, challenged by disease outbreaks and urban/industrial pollution, is becoming increasingly difficult to manage.

This policy brief is directed at Vietnamese national and provincial decision makers and non-governmental organisations who are concerned with shrimp farming, coastal protection and mangrove forest conservation.



Intensive shrimp farm in Tra Vinh.



Mangrove-shrimp farm in Long Khanh, Tra Vinh.

SEARCHING FOR SOLUTIONS

From 2015 to 2018, Can Tho University, Wageningen University & Research, and the International Union for the Conservation of Nature (IUCN) collaborated with the provinces of Ben Tre and Tra Vinh, Vietnam through the ALEGAMS project. The project aims to contribute to mangrove conservation and sustainable shrimp farming. Under the project, they have developed 2 key outputs to support decision-making by farmers and policymakers.

ALEGAMS has delivered:

- A high-quality role-playing board game that enables players/farmers to simulate four different shrimp culture systems to help them learn about the financial effects of their decisions;
- An agent-based model based on farmers' knowledge and logic which can help planners to explore policies and development scenarios.



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KEY RESEARCH FINDINGS

Outcomes of Good Shrimp Farming Game

- ✓ The more often farmers played the game, the less losses and the more profits they made during the game.
- ✓ Playing made farmers aware of the risks of intensive shrimp monoculture.
- ✓ Playing the game resulted in farmers consulting with each other more often but less with salesmen of antibiotics.

THE ROLE PLAYING GAME

The game mimics the four main shrimp farming systems of Vietnam's Mekong Delta:

- Improved Extensive (*Extensive*);
- Intensive Monodon (*Monodon*);
- Intensive Vannamei (*Vannamei*);
- and Mixed mangrove shrimp (*MMS*).

The game also allows players to:

- ✓ Practise Hybrid systems, i.e. culture *Monodon* or *Vannamei* on part of their *Extensive* or *MMS* farm. But, *MMS* should keep half of its land as forest.
- ✓ Buy technology to reduce risk, and buy or sell land.
- ✓ Become member of a cluster or group of farmers (cooperative) to increase benefits.



Farmers have fun while playing the game in Ben Tre

Outcomes of the Agent-Based Model

- ✓ Intensive shrimp culture lessens the farms' financial robustness and increases their chances of bankruptcies.
- ✓ Under present technology, the intensive shrimp monoculture system has almost reached its maximum total yield and income.



ALEGAMS Good Shrimp Farming Game

THE AGENT-BASED MODEL (ABM)

The model, representing individual shrimp farms on a GIS map, simulates the effect of environmental and policy changes on farmer's practises, systems and production in the three areas. For the four systems, this ABM explores three development scenarios:

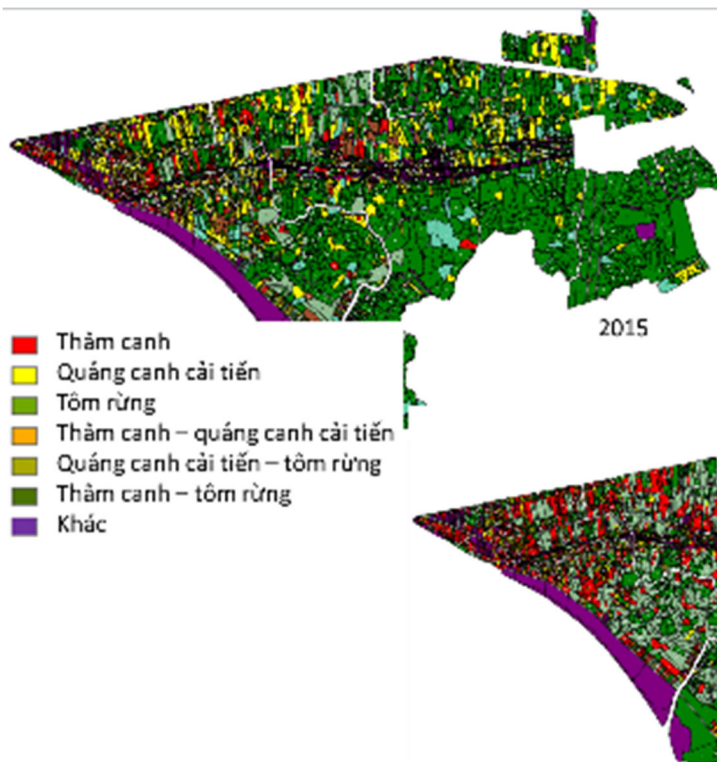
- (1) the current trend of intensification and mangrove conservation,
- (2) the effects of climate change,
- (3) an organic farming scenario.

The ABM mimics in detail the present shrimp farmers' decision-making and its consequences. The model also simulates development of land use (see figures), the number of farmers/farms, the total shrimp yield and total revenue.

RECOMMENDATIONS

ON THE ROLE PLAYING GAME

- ✓ Playing the game helped farmers to recognise the different risks between the systems and to explore the long-term effects of their decisions.
- ✓ Such games can help decision-makers to better understand local dynamics and conditions, and attitudes, needs and decision-making of shrimp farmers.
- ✓ This game created space for learning and stimulated exchange among fellow farmers, and can be useful in training programs for shrimp farmers.



ON THE AGENT BASED MODEL

- ✓ Decision-makers can use the ABM to explore, share and discuss the pros and cons of policy measures regarding desired or expected changes.
- ✓ Stimulating an organic farming scenario appears to increase the planting of new mangrove.
- ✓ Focus on intensive farming should be reconsidered. The simulations show that:
 1. minor changes in risk of disease and yield, due to climate change, threaten shrimp farms' stability;
 2. increasing intensification leads to higher production, but also to higher risks and income vulnerability for the individual farmers.

The expected change under the present policy of intensification in the distribution of Tra Vinh's shrimp farming systems between 2015 and 2035 (grey area is urban and other infrastructure).

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