

Participatory Simulations of Competing Aquacultural and Agricultural Land Use In Bac Lieu Province, Mekong River Delta, Vietnam

The resource management context

- Market oriented economy and decentralization in land management provides household autonomy in their land used decision making.
- Black tiger shrimp production become an attractive enterprise in coastal area of Vietnam due to high income.
- Shrimp production is still facing high risk due to disease outbreak frequently.



Figure 1: Study site in the Mekong Delta, Vietnam

Table 1: Rice & shrimp areas in Mekong Delta (MNRE, 2002)

Area (ha)	Year 2000	Year 2002
Shrimp	230,000	370,000
Rice	970,000	800,000

The study site: land use and water conflicts

- Rice and shrimp are co-practiced in Northern areas of Bac Lieu province, Mekong Delta, Vietnam.
- Shrimp producers can be competed with rice growers on land use due to their different water quality demands.
- Conflicts among shrimp producers would be happen due to co-existing different intensified levels of shrimp production.
- All rice and shrimp producers must seasonally decide their production based on (i) water quality, (ii) household capital availability, (iii) shrimp seed quality and other material inputs, (iv) market price of output products.

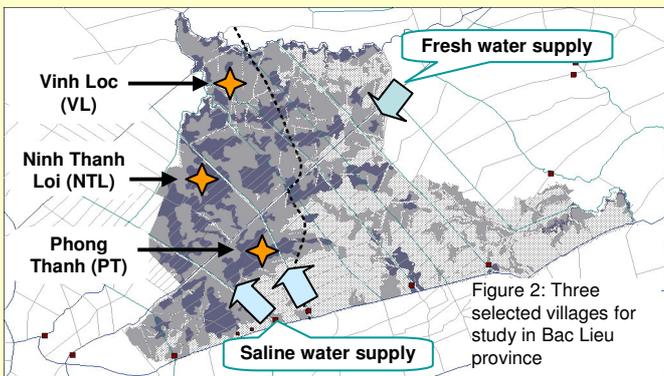


Figure 2: Three selected villages for study in Bac Lieu province



Research objectives

- To understand individual decision making on choosing between rice and shrimp production under complex biophysical and socio-economic conditions at farm level.
- To provide a supportive tool for promoting dialogue about water demanded from both rice and shrimp producers at different villages in different parts of the province.



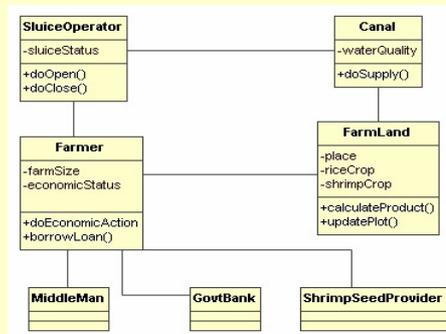
Players get loans from the Banker



Players draw ball of risk before harvest their shrimp

Companion Modeling for collective learning

- Companion Modeling (ComMod) is an innovative approach combining Multi Agent System (MAS) and Role Playing Game (RPG) for collective management of renewable resource (<http://www.commod.org>)



- A first series of three RPG was conducted in 2006 in three representative villages of PT, NTL and VL, Bac Lieu province with involved stakeholders.

Figure 3: Simplified class diagram of the model

- Early and late scenarios of saline water supplied for shrimp production at each villages are set for the RPGs.

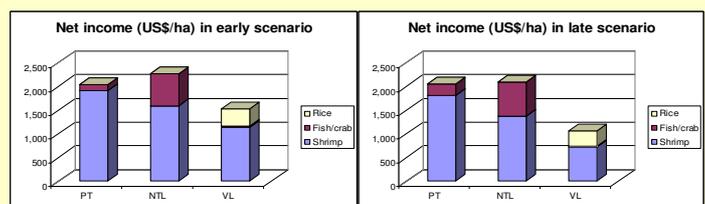
Results and discussions

- People in PT and NTL villages have used their land in innovative way. Instead of the proposed shrimp-rice rotation, shrimp monoculture and shrimp-fish/crab are practiced. Saline water is prolonged for shrimp duration in the fields.

Table 2: Duration in month of shrimp raised in the field

Scenarios	PT vil.	NTL vil.	VL vil.
Early	10.5	11.2	6.0
Late	10.6	10.2	5.6

- Total net income in VL village was much lower than that in the PT and NTL villages under both saline water scenarios, and income from rice contributed about 24-31% of that total income. Moreover, the late saline water supply to this village caused a sharp decline in the total net income due to a great lost in shrimp production while income from fish/crab was minor (1-2%) and income from rice was almost unchanged.



Conclusion

- The results reveal adaptability of players to the change of environmental factors by reflection of different decisions on shrimp, fish/crab and rice production by different villages and two saline water scenarios.
- The results also expose the competition between aquaculture and agriculture.

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