

Analyzing of Integrated Mangrove-shrimp System for Sustainable Development in the Mekong Delta of Vietnam

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1. Introduction

Shrimp aquaculture began to develop in the 1980s and increase at a dramatic rate in the 1990s including farming areas and diversified farming systems¹⁾. In turn, mangrove forests also decreased seriously in this time, especially in the Mekong Delta (MD). In fact, from 1953-1995, mangrove clearance for shrimp farming was a major issue in the MD. According to the report of Department Agriculture Rural and development of Minh Hai province in 1996 (at present divided into 2 provinces including Ca Mau and Bac Lieu provinces), nearly 162,000 ha of mangrove forests had been destroyed.

To deal with the massive decrease of mangroves, an integrated mangrove-shrimp farming system has been an optimal solution to protect mangrove forests as well as to develop the shrimp industry.

In its efforts to promote mangrove rehabilitation and protection, the Vietnamese government considered integrated mangrove-shrimp farming as a strategy to develop the shrimp industry. This is also the main goal of the People's Committee of Ca Mau Province in promoting the development of shrimp aquaculture. The integrated mangrove-shrimp system has been identified as the type of rising to increase economic value and sustainable development for shrimp farmers in the coastal area. At the same time, it also solves the problem of the impact of climate change because Ca Mau is one of five provinces heavily

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affected by this phenomenon. However, this system is starting to reveal the major shortcomings affecting local farmers' decision to cling to mangroves. Especially in the last 3 years (from the end of 2016 and now), this model has not been effective in productivity, only 80-250 kg/ha/year^{2,3)}

2. Research questions and objectives

With the aim to investigate this issue, the question needs to be answered here: *Which factors are enabling and hindering for sustainable development of an integrated mangrove-shrimp farming system in Ca Mau province?*

The paper begins with describing the current of the integrated mangrove-shrimp farming system in Ca Mau province. Then the research finds out the problem of an integrated mangrove-shrimp farming system. From that, it suggests some solutions to ensure sustainable development of shrimp aquaculture and mangrove forest in integrated mangrove-shrimp systems.

3. Methodology

The research was conducted from July to August 2019 using both qualitative and quantitative methods throughout the field trip in Ca Mau province of the MD (Fig. 1) because this province has the largest mangrove-shrimp farming area in the MD particularly and in Vietnam generally. The two communities of Nam Can district in Ca Mau were selected using. Before focusing on the household level through structured interviews, we held about 4 in-depth interviews and two focus group discussions to gain more understanding of the current development of this system. Then, a total of 82 households in 2 villages including Bong Sung and Trang Lon were interviewed. Finally, informal talks were also used to confirm information collected by other methods. Secondary data on the issues

related to integrated mangrove-shrimp were retrieved from reports of government offices at the national and provincial levels such as MARD, GSO, CDARD.

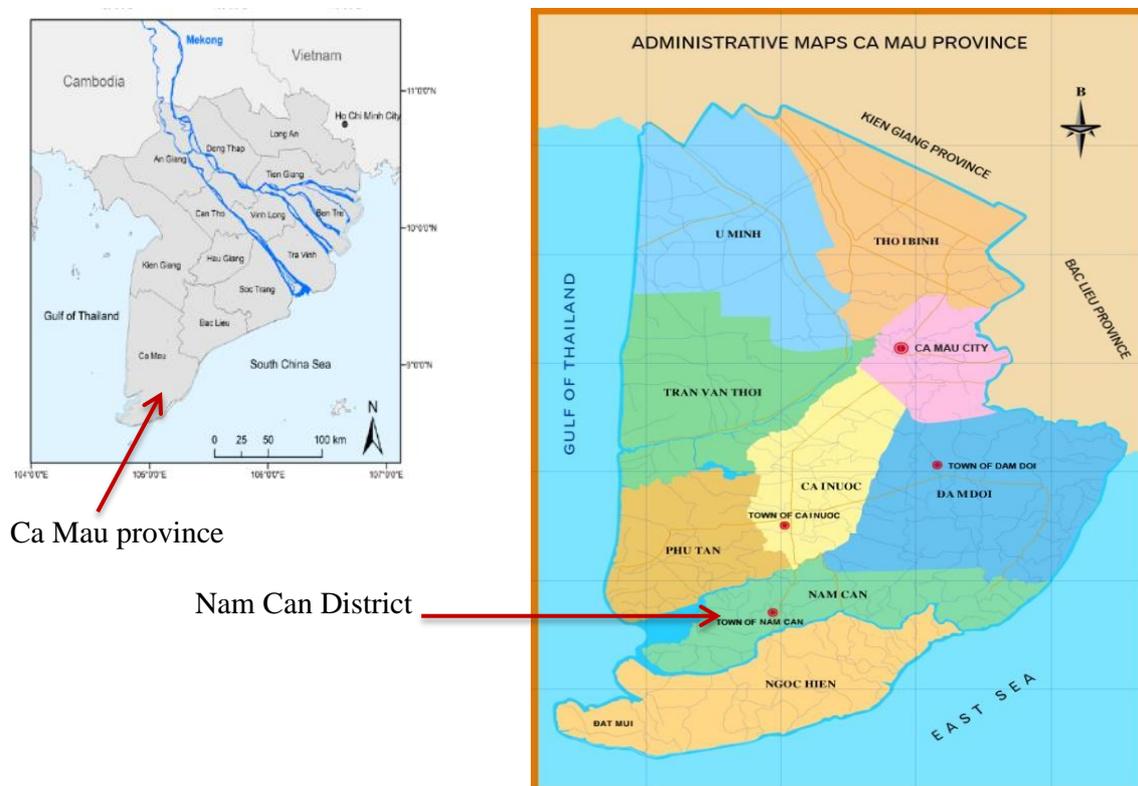


Fig. 1 Map showing the Mekong Delta and the research site - Ca Mau province

(Source: Ca Mau People's Committee, 2019)

The paper continues with outlining the theoretical framework of the production model and historical development of mangrove-shrimp farming. The subsequent mainly two sections discuss the current situation of mangrove-shrimp farming and analyze the problem of this system.

4. Current situation of mangrove-shrimp farming system in Ca Mau province

In this part, the study will show the real situation of integrated mangrove-shrimp farming system in Nam Can district of Ca Mau province through 82 household interviews. We used theoretical framework of production including capital, labor, fishing ground and market to

build the questionnaires with the aim to investigate which factors promote or hinder the development of this system. After researching, we point out that this system has lower profitable than other systems such as intensive system. The total profit is only 3.331 USD/ha/year in comparison with intensive systems 23.957 USD/ha/year. Hence, this has a strong impact on local farmers' livelihood as well as the development of this system in the long-term. For this reason, we conducted in-depth analysis of factors that directly affect the development of the model in the next section of the study.

5. Analysis the problem of mangrove-shrimp farming system

Based on the current situation of mangrove-shrimp farming system, we found some factors that have negative impacts on this model. Besides of low productivity, there are other reasons such as farmers' lack of capital, unable to access financial support, lack of knowledge to apply techniques in their farms, the quality of seed or shrimp price in the market, and shrimp diseases. More important thing is that most shrimp farmers are small-scale production and bases on their own experiences, so they do not have any linking in organization production. Meanwhile, organizing production is an indispensable step that contributes to the success of the model to enhance the value chain of mangrove-shrimp as well as create more opportunities for farmers during the culture. Thus, it is necessary to address this problem to ensure sustainable development of the integrated mangrove-shrimp farming in the future.

6. Conclusion

1. Integrated mangrove-shrimp farming system is suitable for local farmers' conditions as well as sustainable development of the shrimp industry in the future.
2. However, this system has brought economic efficiency as expected because of some

reasons such as lack of capital, quality of breed shrimps, limitation in techniques, shrimp diseases, etc.

3. The government as well as the competent authorities should have appropriate policies and solutions to solve these problems with the aim to ensure sustainable development of integrated mangrove-shrimp farming in particularly and Vietnam's shrimp industry in generally.

NOTES

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