

Research No.: 32- E-12 ODA Loan Joint Research

Date: 16/Oct/2020

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| 1 | General Title | Adaptation Strategies for Sustainable Uses of Natural Resources in The Context of Climate Change and Environmental Degradation |
| 2 | Core Members | CTU: : Associate Prof. Dr. Nguyen Hieu Trung (project leader), Dr. Dang Kieu Nhan, Associate Prof. Dr. Van Pham Dang Tri, Dr. Nguyen Dinh Giang Nam (secretary) Japanese Universities: Dr. Yuji Tanaka (Tokyo University of Marine Science and Technology) |
| 3 | Duration | Jan 2019 – Dec. 2021 (3 years) |
| 4 | Main Objectives | To recommend suitable natural resources governance of the Mekong Delta to adapt to climate change and environment degradation. |

Topic 1: Adaptive management strategies for agricultural land resources

| Methods | Results | Conclusions |
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| <ul style="list-style-type: none"> Sites: Six districts of two provinces: (1) Chau Thanh, (2) Mo Cay Nam, (3) Ba Tri (Ben Tre province), (4) My Tu, (5) Ke Sach and (6) Tran De districts (Soc Trang province) (Fig. 1) Data collection through participatory community appraisals with local farmers, agricultural extension staff and agro-service suppliers at district level. | <p>1 Shifts of farming systems differs with agro-ecological zones and goals of farmers at two contradictory directions (Fig. 1):</p> <ul style="list-style-type: none"> Freshwater agro-ecology: taking place in areas close to freshwater zone with farmers inclining with farming diversification and income stability; Saline water agro-ecology: in areas close to saline water zone with farmers aiming at higher farming income and dealing with economical risks through shrimp farming. <p>2 Constraints of the shifts:</p> <ul style="list-style-type: none"> The shifts taking place at small scale; Conflicts over water uses between freshwater and saline water domains within communities; Increasing groundwater extraction for agricultural production in both freshwater and saline water agro-ecological zones. | <p>The shifts:</p> <ul style="list-style-type: none"> As a result from both natural driver (salinity intrusion) and socio-economic driver (governmental policy shift); Needing to be consider at the landscape level to produce agricultural commodities with ecological advantages rather than farm scale. |

Topic 2: Surface water governance challenges in the Vietnamese Mekong Delta at the time being and future physical changes

Objectives

- To study changes on the current surface water resources governance (in terms of efficiency, effectiveness and transparency) related to risk management in the coastal areas of the Vietnamese Mekong Delta, and
- To propose changes on water-related risks governance to meet the current and future challenges.

| On going work | Methodology | Study case | Results | Future works |
|--|-------------|--|---|---|
| <ul style="list-style-type: none"> Field survey Collection of secondary data To assess the current status of saline water intrusion affecting agriculture and aquaculture To assess surface water resource management To evaluate the comprehensiveness of surface water resources management based on the criterion No. 4 of the assessment framework according to the "Water-use and Quality Assessment Criteria on Issues of State Management Document" To evaluate the readiness of management of surface water resources based on Article 5 principles of developing and promulgating legal documents of the Law on Promulgation of Legal Documents in 2015 | | <ul style="list-style-type: none"> To assess the impacts of drought, salinity intrusion and surface water resource management on agriculture and aquaculture in the Soc Trang Province from late 2019 to early 2020 period. | <ol style="list-style-type: none"> Saline intrusion in the late 2019 and early 2020 periods has affected agricultural production and aquaculture in Soc Trang province. The prolonged heat has increased the demand for water for production, both in agriculture and aquaculture. State management of surface water resources has achieved comprehensiveness and timeliness in the direction on surface water resource management. Besides the positive achievements in state management, cooperation between government and local residents still limited, leading to shortcomings of practicing of state regulations and solutions. | <ol style="list-style-type: none"> To review documentaries based on the OECD assessment framework to assess water resource management in the context of drought and saline intrusion the end of 2020 and early 2021. To assess the consistency and efficiency of the water resources legislation and policies in Soc Trang province |

Publication: Ha Tan Linh, Duong Thi Truc and Van Pham Dang Tri. 2020. Effects of salinity intrusion and water resources management for agriculture and aquaculture in Soc Trang province 2019 – 2020 period. Vietnam Journal of Agricultural Science and Technology. 8

Topic 3: The development of a decision support system for groundwater management in coastal areas in MD

- To develop a decision-makers tool on evaluating groundwater resources changes.
- To propose groundwater related governance to meet current and future challenges.

| Quality Assessment and building the salinity map for Ba Tri's Aquifer in Ben Tre | Developing the salinity maps and assessing the quality of groundwater in the Vinh Chau, Soc Trang |
|--|--|
| <p>The study also found that the Holocene layer of water was not salty to ensure the use of the local people. However, the Pleistocene layer has high salinity, ranging from 4ppt to 9ppt, and in some areas the salinity is up to 17ppt.</p> <p>Purpose of using the exploitation well in Ba Tri, Ben Tre</p> | <p>Monitoring results during the dry and rainy seasons at many points of the study area showed that the salinity was not evenly distributed, ranging from 0.43 to 3.16 ppt. Salinity gave low value in Ward 1 and high value in Hoa Dong in Vinh Chau town, Soc Trang province. Meanwhile, at the beginning of the dry season in 2020, the salinity in Hoa Dong commune decreased slightly to 2.79 ppt</p> |

Topic 4: Climate and environmental disaster management

| <h4>4.1. Temporal hazard assessment</h4> <p>Tropical cyclone tracks (1951-2019)</p> <p>Maximum salinity are critical levels that reduce rice yields of 25%, 50% and 75% respectively</p> <p>Comparison of extreme weather occurred in the last 15 year</p> <p>15th Risk Index (Risks)</p> <p>Hazard indexes of tropical cyclones and salinity</p> | <h4>4.2 Vulnerability and impacts</h4> <p>Vulnerability index of a rice crop</p> <p>Cropping calendar of rice-based farming systems and rice vulnerability index</p> <p>Impacts of extreme weather to animal husbandry, agriculture and aquaculture</p> | <h4>4.3 Multi-hazard risk</h4> <p>Monthly risk of rice to multiple hazards.</p> <table border="1"> <tr> <th>Month</th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> </tr> <tr> <td>Risk</td> <td>0.10</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.24</td> <td>0.37</td> <td>0.15</td> <td>0.19</td> <td>0.42</td> <td>0.63</td> <td>0.34</td> </tr> </table> <p>Very low, Low, Moderate, High, Very high</p> <h4>4.4 Local responses to hazard</h4> <p>Awareness of community to the extreme weather</p> <p>Autonomous adaptation of agriculture and aquaculture to hazard:</p> <p>Autonomous adaptation of other land uses to hazard:</p> <p>Livelihood models of the local communities (%)</p> | Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Risk | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.37 | 0.15 | 0.19 | 0.42 | 0.63 | 0.34 |
|---|---|--|-------|------|------|------|------|------|------|------|------|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | | | | | | | | | | | | | | | |
| Risk | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.37 | 0.15 | 0.19 | 0.42 | 0.63 | 0.34 | | | | | | | | | | | | | | | | |

6 Comments