October 26th, 2018

Flying Cranes Project | Final Report

General Information

- Theme: Sustainable Development
- Location: Tran Van Thoi District (Ca Mau Province, Mekong Delta)
- Duration: April to September 2018
- Supported by: The U.S. Consulate in Ho Chi Minh City, through a sub-grant from the Stimson Center's Southeast Asia Program
- Host organizations: Mekong Environment Forum (MEF) in association with Can Tho University

Background

The majority of farmers and young people in the Mekong Delta have failed to cope with changing economic and environmental circumstances. Water insecurity, caused by both the impacts of upstream Mekong mainstream dams and sea level rise due to climate change, is threatening local livelihoods and ecosystems. A lack of knowledge on environmental changes and more climate-resilient farming techniques among local communities is another obstacle to a sustainable transition away from traditional farming practices towards climate-resilient development models that could meet people's economic needs without degrading local ecosystems or increasing social disorder.

The lack of community capacity-building strategy impedes government climate-response policy and community efforts in coping with environmental changes in the project site specifically and the Mekong Delta in general.

Project Evaluation

The Flying Cranes Project aims to:

- Build and develop community capacity in response to environmental changes through "learning by doing" and "transformative learning" (T-learning) approaches taught through a series of citizen science training workshops that promote knowledge sharing and technology transfer;
- Raise awareness of climate smart agricultural production, environmental protection, and sustainable development in local communities;
- Inspire a sense of responsibility, obligation and duty among young professionals towards disaster-prone communities by encouraging and employing their expertise in host villages.

To meet these objectives, we have implemented the following activities:

- 2 experts and 6 volunteer students from Can Tho University worked together to teach local farmers and youth new technologies and mobilize them to use these techniques in their day-to-day work. The goal was to gradually shift participants' livelihoods from traditional farming practices to a modern, eco-friendly agricultural model that promotes local economic self-reliance and biodiversity conservation. 20 small-scale shrimp farmers were selected to engage in T-learning under the supervision of experts and volunteers.

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- A 2-ha "sample field" was set up by the project to employ a climate-resilient polyculture model. This model enables farmers to diversify their crops, shifting from intensive shrimp production to polycrop in the same pond. Thus, it helps increase household incomes and economic self-reliance since farmers can harvest different profitable crops (seagrass, fish, crab) day-to-day while waiting for the main crop (shrimp). The polyculture model encourages farmers to restore the mangrove cover in the shrimp ponds to reduce impacts from weather extremes (high temperatures, cyclones), increase the local ecosystem's ability to absorb waste, and offer natural food and shelter for marine species (shrimps, fishes and crabs).

  In the sample field, land-owners were supervised by experts to do farming in a sustainable manner while other smallholders were invited to visit and observe how new techniques work, how water quality is naturally purified by the restored seagrass and mangroves, and how the polyculture improves revenues through add-on crops. Three field-based meetings have been organized at the sample field – a kind of informal "school" where participants met regularly to share information, make regular field observations, and learn new techniques by doing.

  Farmers were asked to compare what they learned from the field-based school with their own past experiences in order to better understand how eco-friendly farming practices enable them to meet economic needs without degrading the local environment. Most participating farmers agreed that the mangroves and seagrass help reduce their spending on food for shrimp and fertilizers for water treatment. They also learned that the polyculture may bring less shrimp productivity than they expect, but it demonstrates the potential to offer much more stable and sustainable income sources than traditional shrimp farming would. The polyculture model is a solution for the ecological conflict between mangrove conservation and shrimp farming in Mekong Delta coastal provinces. Their responses provided feedback to the team of experts and contributed to revisions of the model that will help this approach be more effective if it is applied elsewhere. The process also provided useful field experience for experts and students and will contribute to their professional development and future research.
- The team also organized 2 community workshops to raise awareness on environmental changes, water insecurity, and sustainable development concepts among local community members. Before each workshop, the team carried out surveys to collect information and understand the local urgent needs. After the workshops' completion, participants were asked to fill out a questionnaire with close and open questions. Our comparison of the results from the first and the later surveys shows that locals' awareness of the role of mangroves in environmental protection and local water security was significantly improved. A few weeks later, the team came back to assess how well local farmers apply new knowledge, techniques and skills learned from the workshops into their work and life. We recognized that local farmers have begun to change their perception and habits. Some tried to sustain the last piece of mangroves in their ponds while some others agreed to diversify their crops with high-yield marine species. They also used water monitoring techniques more frequently to observe water quality of both river and groundwater. Understanding the negative impacts caused by wastewater discharged from neighboring intensive shrimp ponds, some farmers raised their concerns over the current policy that encourages intensive shrimp farming, but lacks serious consideration for environmental justice.

  Many in-depth interviews undertaken by 2 post-graduate students and Hau Giang TV reporters during the final workshop highlight the local peoples' great demand for sustainable water and farming techniques.

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Beneficiaries

- 20 low-income households and young farmers;
- 2 ha of formerly unproductive shrimp ponds that are now productive polyculture sites.

Outcomes

- A 35% increase in productivity and economic efficiency:
  - After four months in the Flying Cranes Project, participating farmers have harvested 3 different crops from the same pond: fresh crab, shrimp and fish.
  - The average income per monoculture crop (4 months) of each household before participating in the project was VND 12,600,000 (approximately US$560).
  - The average income after the first polyculture crop harvested in early September 2018 was VND 17,000,000 (approximately US$ 756). With the polycrop, farmers can harvest some kinds of fish inhabiting the mangrove and seagrass in the shrimp pond on a daily basis. The fish species are natural inhabitants from the river and grow up by themselves thanks to the food and habitat provided by the mangrove and seagrass.
- Cost savings and additional revenues:
  - In a traditional 4-month monoculture crop, a 1-ha shrimp pond needs VND 4,500,000-6,000,000 (approximately US$ 200-300) for fertilizers and pesticides;
  - Mangrove, seagrass and new techniques improve the water quality, reducing the costs for fertilizers, waste water treatment, and preventing common diseases. Participating farmers have invested VND 1,300,000 – 2,000,000 (less than US$ 100) per polyculture crop for fertilizers to stabilize pH and water quality in response to weather uncertainties.
  - Shrimp is the main crop, but harvesting crab, seagrass (bulrush), and fish from nature provides additional daily income for shrimp pond owners while they await shrimp growth.
- Environmental protection:
  - Before participating in the project, most local farmers developed intensive shrimp farming in which they had to invest a lot of money, much of which came from loans from banks, on food for the shrimp, fertilizers, and other chemicals to use in the pond to ensure productivity. To provide more space for shrimp farming, mangroves were cleaned out. The overuse of fertilizers and chemicals and the huge deforestation have had negative impacts on local environment, causing serious water pollution. As a result, local farmers were unable to sustain their shrimp ponds due to frequent epidemic diseases caused by low water quality as well as changes in weather patterns due to climate change. Many farmers had to sell their ponds to pay debts and migrate to big cities in search of off-farm jobs because they were unable to make ends meet with traditional shrimp-raising methods.
  - The combination of using mangrove, seagrass, and polycrop techniques appears to be a viable alternative to help local community meet their economic needs and maintain their livelihoods while reducing pressure on ecosystems. Significant reduction in fertilizers and pesticides reduces the polluted waste water from shrimp ponds (*see Figure 1 and 2*). Mangrove and seagrass help to naturally purify water and filter pollutants in the shrimp ponds. Participating farmers also learned that fish and sick shrimp are also a major food source for crabs. Without crabs in the pond, some ill shrimps could fuel a possible epidemic

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disease that would wipe out the whole shrimp pond. However, crabs will eat the sick shrimp and can help prevent outbreaks. They concluded that the polycrop method results in fewer epidemic disease risks than intensive shrimp ponds would. Since all pond owners discharge waste water directly into the river – which is the major water source for the whole village – switching to a polyculture model is an important investment not only for farmers but their communities more broadly.

- Water security:
  - 20 households have been trained in water quality monitoring (rainwater, river and groundwater).
  - 20 water test kits were set up, some of which are connected to smart phones enabling farmers to observe the water quality frequently, especially during the high tide.

Outputs:

- Workshops:
  - 1 orientation workshop on 13 May 2018 brought together 25 participants from local authorities, farming union, women union and local farmers to learn the positive impacts of mangroves documented by experts. The experts also introduced cost-benefit analysis to participants in order for them to evaluate the difference between traditional farming models and polyculture;
  - 3 field-based transformative learning mini workshops for selected local farmers took place in June, July and August. About 7-12 farmers engaged in each mini-workshop in accordance with their interests.
  - 1 project-end workshop on 20 September 2018 brought together 57 participants from local authorities, farmers union, women union and local farmers, postgraduate students and reporters to: (i) raise the visibility of the deplorable environmental, economic and human rights impacts of climate change and non-sustainable practices; (ii) discuss some climate-resilient livelihood models, including the Flying Cranes Project, and success stories from farmers to promote alternative solutions and make recommendations for local government's development planning and policy making.
- Media coverage:
  - A visit by ARTE reporters in July 2018 to the sample field. Their visit aimed to understand how climate change is threatening local livelihood and how local farmers are coping with the climate hazards (https://www.arte.tv/sites/story/reportage/changement-climatique/).
  - The project was reported in TV features by Ca Mau Province TV and Hau Giang Province TV on 20 September and 21 September 2018 respectively.
  - An article by Gary Sands discussing the Flying Cranes Project as an alternative to coping with environmental changes in the Mekong Delta will be published soon in The Diplomat.
- Other outputs:
  - A guidebook consists of experience, techniques and hands-on skills made by farmers during their participation in the field-based meetings.
  - Water monitoring kits for local households.

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Lessons learned

- The combination of water monitoring, mangrove and polyculture farming appears to meet local needs to pursue sustainable livelihoods transition in coastal areas of Vietnam. The water test kits enable farmers observe the water quality to determine if they should use a particular water source. The mangrove and seagrass work to reduce pollutants and provide habitats and food for baby shrimp, crab and fish, increasing cost-savings for farmers during their crops and providing better returns on investment. The Flying Cranes Project helped people meet their economic self-reliance without degrading the local environment.

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Figure 1. Pollution caused by intensive shrimp ponds

Indicator	**Pollutant load**		**Per ton of shrimp** *(average 3.5 ton/ha)*		**Per ha of farming**	
	Value	Unit	Value	Unit	Value	Unit
Waste water	28,3 – 37,9	m^3/ha/crop	5,3 – 7,2	m^3/ton		m^3/ha
BOD content	0.042	kg/m^3	259	kg/ton	1,373	kg/ha
COD content	0.12	kg/m^3	769	kg/ton	4,077	kg/ha
TSS content	0.18	kg/m^3	1,170	kg/ton	6,202	kg/ha
Total N content	4.5	g/m^3	30	kg/ton	159	kg/ha
Total P content	0.6	g/m^3	3.7	kg/ton	20	kg/ha
N-NH3 content	0.7	g/m^3	4.8	kg/ton	26	kg/ha

Figure 2. Average water quality observed and calculated in different periods of polyculture farming

Indicator	**Pollutant load**		**Vietnam Standards (QCVN 11-MT:2015)**	
	Value	Unit	Value	Unit
Waste water(*)	0	m^3/ha/crop	--	m^3/ha/crop
BOD content	0.026	kg/m^3	0.039	kg/m^3
COD content	0.081	kg/m^3	0.117	kg/m^3
TSS content	0.102	kg/m^3	0.16	kg/m^3
Total N content	2.71	g/m^3	48	g/m^3
Total P content	0.32	g/m^3	15.6	g/m^3
N-NH3 content	0.04	g/m^3	0.1	g/m^3

Note: *Normally, water used in polyculture farming ponds is reused for the next crops. No wastewater, therefore, is discharged into rivers.

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