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Improved Water Cycle Systems for Sustainable Fisheries Production in Aquaculture

Implemented by the *Fund for the Promotion of Innovation in Agriculture* (*i4Ag*) as part of the special initiative *Transformation of Agricultural and Food Systems*

Context

Shrimp production has gained economic importance in Southeast Asia. There is great potential, as it has become a branch of the agricultural economy that generates jobs, income, food security and foreign exchange as an export product. Indonesia and Vietnam account for almost a quarter of global shrimp aquaculture production.

Shrimp has recently grown to be one of the most commonly consumed seafood products as it is low in calories but rich in nutrients. At the same time, the increasing demand for shrimp and other aquatic products is putting pressure on natural resources and ecosystems. Land is being converted for intensive, extensive and water extracting shrimp production. This has not only contributed to the decline of mangrove forests but has created wider issues of environmental pollution and food safety.

While the sustainability (or lack thereof) of the shrimp industry is receiving increasing attention at the political and operational level, innovations and technologies for shrimp production have not yet caught up. Unsustainable practices and water resource use prevail. Therefore, the adoption of innovative technologies for farming systems is the key driver of change towards the sustainable development of the shrimp sector, hence meeting global demand for fisheries products without harming local water resources and environment.

Objective

To safeguard jobs and improve environmental sustainability through more efficient and sustainable local value chains.

Name of the Project	Improved water cycle systems for sustainable fisheries production in aquaculture
Name of the Global Fund	Fund for the Promotion of Innovation in Agriculture (i4Ag)
Commissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)
Project Region	Viet Nam: Soc Trang and Ca Mau province Indonesia: North Kalimantan province
Implementing Partners	Ministry of Agriculture and Rural Development (MARD), Viet Nam Ministry of Environment and Forestry (MOEF), Republic of Indonesia
Duration	01.07.2021 – 31.12.2024

Approach

The Project “Improved Water Cycle systems for Sustainable Fisheries Production in Aquaculture” Viet Nam (i4Ag Viet Nam Project) strongly promotes innovations and technologies for sustainable farming systems. While the current format of farms ranges from intensive conventional farming to extensive farming, innovations in support of sustainability will only be as successful as the practices of the farmers themselves. How these farmers adopt the appropriate technologies and management practices to the specific farming systems and environment determines their success. Which is why the project’s approach is to test innovative farming systems to prove that most sustainable systems work successfully, even extensive or intensive farming systems that require a high level of farmer’s operational and management skills.

There is no unique system that can be identified as sustainable, and no single path to sustainability. Establishing a strong partnership between different actors in the shrimp value chain to achieve mutual economic and environmental benefits, the project works to meet demands for global food. Utilising the knowledge and expertise from academia and institutions, the innovations are tested before being disseminated through farmer education and training, advisory and information sharing.

Left: Mangrove-shrimp site in Mekong Delta, Right: Project Region

The Objectives in Figures

90 tons *of shrimp/ha/year (3 cycles of 30 tons/ha per year) are harvested.*

90% *of the wastewater is circulated.*

90% *of the resulting sludge is collected and used.*

The project contributes to the achievement of these Sustainable Development Goals (SDGs):

Business models for women in shrimp farming households are initiated and implemented to secure the income of female farmers and promote gender equality. All project activities are designed to support in shifting the balance towards economic efficiency with environmental and social sustainability.

The i4Ag Viet Nam Project promotes sustainable alternatives for established technologies in the mangrove-shrimp production in Viet Nam and Indonesia. Specifically, it:

- **Further improves water circulation systems:** A Recirculating Aquaculture System (RAS) is used to recirculate farming water. This helps to minimise water use, disease transmission, and to reduce other negative environmental impacts. So far, RAS has mainly been used by large enterprises as it requires significant initial investment, understanding of, and experience with the technology. However, in the first, the project will test the usability of RAS for medium-sized enterprises.
- **Applies innovative mangrove shrimp production systems**: Innovations in water quality improvement for mangrove shrimp production which help to reduce diseases transmission and improve shrimp growth will be promoted towards economic development and sustainable mangrove ecosystems.
- **Tests shrimp larval production:** Technologies to improve water quality in shrimp hatcheries will be tested to increase the survival rate of post-larvae.
- **Redesigns extensive shrimp pond areas:** An innovative aquaculture system with traditional shrimp ponds and hatcheries for mangrove crabs will be developed. Through intercropping, the water surface of ponds is reduced, and mangrove forest area increased.

In Viet Nam, this project undertakes important activities such as:

- Developing and implementing RAS in the medium-sized shrimp farms and hatcheries;
- Monitoring environmental indicators through Information and Communication Technology (ICT) solutions;
- Testing innovations on water quality improvement for extensive sustainable mangroves shrimp production;
- Organising workshops, forums, and training courses for farmers and stakeholders on the technology's application and the dissemination of experiences;
- Developing and implementing an accompanying gender strategy to promote gender-sensitive business models for higher income opportunities for women.

Sustainability

Shrimp farming communities are concentrated in the coastal and river delta areas of Viet Nam and Indonesia. Vulnerable to the impacts of climate change, the area has also been impacted by the rapid expansion of aquaculture, which has contributed to the decline of mangrove forests and non-sustainable use of water resources. All these negative impacts make it difficult for shrimp farming households, both those headed by men and those headed by women, to secure their livelihood. As a result, laborers tend to quit production, change jobs, or even move to other areas to live, leading to a population imbalance as well as a lack of qualified human resources.

By successfully testing shrimp farming renovations and business models, and improving environmental quality, the social security and stabilisation of living conditions for residents of the coastal communities is supported. In documenting the lessons learnt, farmers and their families are able to build long-term capacities and pass on the agricultural innovations and disseminate them in the Asian region. The focus is not only on technical issues but also on socio-economic problems and the sustainable use of natural resources.

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