



Intensive export agriculture comes up against environmental limits

# Making choices in the Mekong Delta

Partly thanks to Wageningen, the Mekong Delta in Vietnam is a significant exporter of rice, shrimp and tilapia. But salinization and climate change are now forcing a change of course. A Dutch Delta Plan – once again, with input from WUR – is to play an important role in this, as *Resource* editor Albert Sikkema learned on a trip through Vietnam.

text Albert Sikkema photo Hollandse Hoogte

**O**n the top floor of the education building at Can Tho University, 10 small groups of provincial civil servants and students are bent over a map with stickers. During a tour of the Mekong Delta in Vietnam, I am a guest at the first trial of a new game called Good Shrimp Farming. Players throw a dice and confer about the best way to develop shrimp farming.

The aim of the game is to raise players' awareness of the options and the dilemmas involved in developing the delta. Shrimp farming here in the south of Vietnam has grown rapidly in recent decades, but is now coming up against environmental limits. The purpose of the game, developed by Can Tho University and Wageningen University & Research, is to help provincial governments and farmers develop new policy.

#### JUST AS FLAT

The Mekong Delta is just as big and just as flat as the Netherlands, and its population is about the same. But the 4900 kilometre-long Mekong, which rises on the Tibetan plateau, brings a lot more water down with it than the Rhine does to the Netherlands. In the rainy season, the upper reaches of the delta, near the border with Cambodia, are always under water. Just like the Netherlands, the Mekong Delta has seen a spectacular development of its agriculture. From 1975, after the Vietnam war, the region was developed with help from Wageningen (see inset). Soil improvement and irrigation meant farmers could go from one harvest a year to three. Vietnam also started importing improved rice varieties, enabling farmers to earn more, putting an end to famine and making Vietnam the biggest rice exporter after Thailand, explains Dang Kieu Nhan, director of the Mekong Delta Development Research Institute in Can Tho. He is joining in the shrimp-farming game today.

By 2000, Vietnam enjoyed food security but two problems were looming, explains Nhan. Export prices for rice were low, so farmers were not earning much in spite of farming more and more intensively. And salt water was infiltrating the coastal region of the Mekong. This salinization was affecting the rice crop, so the Vietnam government opted for diversification. Shrimp farming was established along the coast, while farmers

further inland started combining rice farming with freshwater aquaculture, mostly breeding tilapia.

Thanks to this development, which WUR researcher Roel Bosma assisted with, Vietnam has grown into a significant exporter of shrimps and tilapia. Bosma helped develop the game Good Shrimp Farming, and he too is present at its trial run in Can Tho.

#### ANOTHER TRANSITION

There is every reason to play this game, says Nhan, as the agricultural sector in Vietnam is on the eve of another transition. Intensive export agriculture is coming up against environmental limits such as pollution with pesticides, and falling biodiversity and soil fertility. It has got to give way to a more environmentally friendly way of farming that keeps an eye on food quality and consumer demand while addressing climate change.

The foundations for this transition are laid down in the Mekong Delta Plan, drawn up at the end of 2013 by a Dutch consortium of WUR, Deltares and consultancy



PHOTO: ALBERT SIKKEMA

▲ Dang Kieu Nhan: 'Vietnam has got to switch to a more environmentally friendly way of farming that keeps an eye on food quality.'

firm RoyalHaskoning DHV. Within this consortium, which was led by ex-minister Cees Veerman, WUR researcher Gerardo van Halsema was one of the main authors. Remarkably, this commission from the land of polders and dykes is not recommending raising the dykes. Instead, the idea is that Vietnam should adapt its use of land and water so that delta residents can cope flexibly with the impact of climate change.

This means that Vietnam should flood polders in the upper reaches of the Mekong to create more space for the overflowing river. The country should also adapt to the salinization in the coastal region by substituting shrimp farming and mangrove forests for agriculture and freshwater fish farming. The mangroves will help absorb the expected rise in seawater levels.

#### RAIN CAPE

During my travels through the humid Mekong Delta, temperatures reached 32 degrees Celsius every day. Actually it is supposed to be dry in December, as the rainy season is from June to November, but the innumerable scooter riders on the streets kept having to put on their rain capes. Climate change is already happening. The rainy season is shifting and it is raining more heavily, says Chau Nguyen Xuan Quang, director of the climate centre in Saigon. On the other hand, it rains less these days during the dry season in the spring. This means the delta is facing both flooding and water shortages, explains Quang.

Life is become more dangerous for delta dwellers too. The Mekong Delta suffered

extensive flooding in 2000 and 2011, but the damage in 2011 was much greater and more residents had to be evacuated, says Andrew Wyatt. He is delta manager of the International Union for Conservation of Nature, an international NGO which invests in nature management. That damage, Wyatt says, was a direct consequence of the construction of large dykes upstream over the past 15 years.

He shows me two satellite images. On the older image, the upper Mekong plain is totally inundated at the end of the rainy season because the floodwaters have washed over all the one-metre dykes around the rice fields. On the newer satellite image, half of the Mekong valley is dry, protected by three-metre-high dykes. Because of those polders, there is no more room for the floodwaters and the mass of water moves faster towards the coastal delta, resulting in floods and a lot of damage.

Wyatt, an American who has been living in Vietnam for 18 years and monitors water policy there closely, is very positive about the Dutch Delta Plan. 'This is a turning point. Before this plan, the Vietnamese government was not working on sustainability at all.' The serious flooding of 2011 helped bring about a change of heart. Adaptation is the key word in the new policy.

#### BREAKING DOWN DYKES

The first steps are now being taken in the upper reaches of the Mekong Delta, says Wyatt. Proposals are being drafted to break down the high dykes. 'Those high dykes enable farmers to get three rice harvests instead of two, but that third rice harvest brings down prices,

doesn't make the farmers much money, and has several downsides. The dykes block the deposition of sediment on the rice fields, causing soil fertility to drop. If you go back to lower dykes, you can manage the water better, without much loss of income.'

Vietnamese researchers I talk to do not share Wyatt's optimism, however. 'My biggest concern is how to involve farmers in the plans,' says director Quang of the Saigon climate centre. 'You might think we don't need those high dykes anymore, but a lot of farmers won't agree with you. Their houses and land will be under water. And as long as food prices fluctuate wildly, it is hard for them to invest in alternatives. We must draw on their knowledge and experience in the policy, but I don't know how yet.'

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#### GAMING WITH FARMERS

The Good Shrimp Farming game might offer a solution. The meeting with the provincial civil servants on the campus of Can Tho University was a success, says game designer Tran Thi Phang Ha afterwards. The civil servants were enthusiastic and they are thinking of playing the game with farmers as a step towards formulating their policy.

She explains how the game works. 'There is a map on the table, with farm plots on it. A player throws the dice, lands on a particular



PHOTO: SHUTTERSTOCK

plot and then has to deal with the situation described on that plot. The shrimp farmer learns about farming options, ecological constraints and market developments. This opens up new perspectives on ways of improving your local environment. You might want to produce more fish, for example, but you could also combine aquaculture with vegetable growing and with tourism.' Ha thinks this game has something to offer rice and tilapia farmers, too, by shedding light on their business strategy.

### RAKING

Around Can Tho, at the heart of the delta, thousands of canals connect the three main estuaries of the Mekong. Travelling through the area, you still see countless rice fields, in which the farmers are raking the wet soil after the last harvest, or ploughing it using a tractor or a buffalo. It is difficult to imagine that this region faces water shortages and even salinization in the spring. But it is already coming close to Can Tho, which is 60 kilometres away from the sea.

At first, Vietnam tried to keep out the salt water. But in spite of all the efforts, the delta water became brackish. Rice harvests declined. In the new policy, prompted by the Dutch Delta Plan, Vietnam accepts the salinization. Freshwater farming has to disappear from the coastal zone, partly in order to stop the fall in groundwater levels and secure the supply of drinking water. Vietnam also needs to keep hold of more of the fresh river water and arm itself by natural means against rising sea levels by reintroducing mangroves along the coast. Mangrove forests, which have been cut down for decades to make way for shrimp farming, provide natural coastal defences. A Wageningen-Vietnam project has researched how you can combine mangroves with shrimps.

The margins for change are not very big. Game designer Ha points out that many of the small farmers in the Mekong Delta are still poor. They have less than one hectare of land for rice and fish farming, and they earn no more than 15 million Vietnamese dong (600 euros) a year. That is barely enough to support a family, especially with the rising price of fertilizer and pesticides in recent years, and low prices on the export market.

### MORE QUALITY FOOD

For this reason, the Delta Plan includes a chapter on agriculture. Farmers should focus less on bulk crops and more on quality food for the growing Vietnamese middle class. Various interesting options are emerging in this area. Vietnam National University in Saigon is doing research on floating rice: rice plants that float on water and can therefore move with the changing height of the river. The problem is



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## FROM POOR REGION TO RICE BOWL

Thirty years ago, Wageningen made a massive contribution to the development of the Mekong Delta by tackling the problem of acid sulphate soils in which very little grows. In the mid-1970s, the Wageningen soil scientist Nico van Breemen brought to light the complex soil-chemistry process that causes the formation of acid sulphate soils. That knowledge led to new approaches to combatting soil acidification in polders and delta regions. The Wageningen soil scientist Tini van Mensvoort went to Vietnam, where he ran acid sulphate soil projects between 1980 and 1992. In the Mekong Delta, the ground was also becoming acidic because bacteria convert sulphate in seawater into sulphide, which in dry soil oxidizes into sulphuric acid. Working with Vietnamese researchers, he tested different treatment plans. His remedy: rinse the sulphides out of the soil with fresh water. This intervention changed the Mekong Delta from an impoverished region to the rice bowl of Vietnam.

that this variety of rice is not yet very profitable. The university in Can Tho is doing research on farming traditional local fish species for the Vietnamese market. There is also a new demand among well-off Vietnamese for more expensive, organic food. The big question will be: how will the Vietnamese government organize the transition to sustainability? The formerly communist government implemented economic reforms in 1986 in a shift towards a market economy, but is used to a top-down approach to policy. Now the ministries of infrastructure (the dam-builders), agriculture and environment need to work together. But the capital, Hanoi, is far away, say the people I talked to in the Mekong Delta. It is at the regional level that the various different interests need to be balanced in an integral plan. And that is not an area in which Vietnam has much experience.

### SPACE TO INNOVATE

The World Bank wants to implement the Dutch Delta Plan for the Mekong and has allocated 300 million dollars to investments. Forty million of this is earmarked for getting rid of the polders. WUR researcher Gerardo van Hal-

sema, one of the authors of the Delta Plan, is advising the World Bank on this. 'The first step has been taken at the political level,' he says. 'Now regional and local government must be brought into the decision-making process to work out the plan. That is time-consuming and for the Vietnamese it takes some getting used to.'

## 'Vietnamese agriculture is enormously dynamic'

Van Halsema is not afraid that the delta farmers will get a poor deal. 'Vietnamese agriculture is enormously dynamic. We have done research on land use in the delta, and that showed that there are changes in how 14 per cent of the land is used every year. That shows that the farmers are constantly adapting to the circumstances. The World Bank finances projects in the field of sustainable shrimp cultivation, but I am also seeing new environmentally friendly farming systems that we hadn't thought of. The great thing is: there is new space for the farmers to innovate. **B**