

Social Development and Regional Regeneration through Re-introducing Oriental White Stork and Enhancing Biodiversity of Rice Paddy in Toyōka, Japan.

Hitoshi MIYAGAKI, Toyōka city

1. What is happening in Toyōka

Toyōka city is situated in the Western part of Japan closed to Kyoto. Despite the fact that this city is rather small city with a population of just 880,000, it is working on rehabilitation of our ecosystem through re-introduction of Oriental White Storks. For a large bird like Oriental White Stork, which once became extinct, to survive in the nature, an environment with rich biodiversity is required. Reintroduction of this species meant not just a restoration of ecosystem but also reconsideration of life style itself because the Oriental White Storks live close to human dwelling.

Since 2005, Toyoka city has been working on re-introduction of Oriental White Storks. This means to release a bird which has been bred under captivity in the wild. Currently there are 48 Oriental White Storks flying around the sky of Toyoka.

This project to reintroduce this bird species has started to spread into various fields, such as agriculture, forestry, private sector, education, tourism and culture, spilling over from re-introduction of extinct species or ecosystem conservation. Currently it involves various diverse stakeholders, such as farmers, citizens, private sectors, NGOs, researchers, technicians, and local governments.

In the following section, we will discuss the key component of our project, the restoration of ecosystem in the paddy fields which is the feeding ground of the Oriental White Storks.

2. The Oriental White Storks

The Oriental White Storks are large carnivorous birds. From wing to wing, this bird measures over 2 meters. Currently there are 2000 storks scattered around China and Russia. This species is listed as an Endangered Species according to red list provided by IUCN. These birds nest on Japanese Red Pine Tree and feed on riverine fishes, such as loaches and carps, frogs, locusts, and snakes which are found in the wetlands, paddy-fields, rivers and grass-lands. They are known to be big eaters since they eat more than 400g of food per day under the captivity. Because storks requires ecosystem with abundant biodiversity which provide abundant food, storks are considered as flagship species. The storks breed in middle to lower reach of Amur River and migrate to the south during the winter,

especially to the Yangtze River, Poyang Lake, and south-east part of China. The stork is migratory birds but some of them have known to stay all around the year in one place if they find a good habitat.

3. Re-introduction of Oriental White Storks

i) What is re-introduction?

Reintroduction is defined as ‘an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct’ according IUCN. For these re-introductions to be successful, it requires various conditions, such as establishment of viable population under captivity, preparation of release site and techniques for catch and release.

It was not easy to decide on the release site because Japan does not have large scale wetland. In Japan, the storks historically lived in the close vicinity of human livelihood. This meant that the reintroduction of this species will have interference on human livelihoods. The reintroduction of Oriental White Storks is, inevitably, not just a biological project which aims at rehabilitation of ecosystem but also a sociological project which aims at rehabilitation of our livelihood and our lives.

To this end, we consider that this project is a ‘whole package’ for social development and regional regeneration. Reintroduction is not just a sheer restoration or creation of natural habitat for the Oriental White Storks but also an opportunity to reconsider our relationship with Oriental White Storks and nature.

ii) Extinct to the wild

In 1971, Oriental White Storks became extinct in Japan due to overhunting and degradation of habitat during the 19th century and 20th century. The major reasons for this extinction were decrease of wetland-like environment, such as paddy-fields and river banks, decrease of Japanese Red Pine Tree which were the nesting ground, and the decrease of biodiversity due to the chemical pesticide usage and the loss of genetic diversity due to inbreeding.

Toyoka was the last habitat for the storks in Japan. It was in 1955 when the population of this bird dropped to less than 30, when this city started a conservation movement, involving both civil society and public sector. 10 years later, the population of the storks continued to drop and the breeding

under captivity was introduced as an emergency measure. There were only 12 birds left.

This breeding under captivity faced back-to-back failures and in 1986, Japanese population of the Oriental White Storks became extinct. However, in 1989 the first chick hatched under captivity from an Oriental White Stork brought in from Russia. After this, population under captivity has steadfastly increased and it counts to 95 in 2012.

In 1999, Hyogo Prefectural Homeland for Oriental White Storks opened as a hub for the reintroduction project and in 2000, Toyoka Municipal Storks Centre opened as a hub for environmental awareness activities. Finally in 2005, 5 storks were released in the wild. Currently, Oriental White Storks are bred under captivity and reintroduced to the wild with the cooperation between multiple diverse stakeholders, Toyoka Municipal Government as well as Hyogo Prefectural Government and Cultural Affairs Agency.

4. Agriculture and Biodiversity in the paddy fields

The most suitable site for reintroduction of Oriental White Storks inside Toyoka was the Toyoka Basin. The plain of this basin provides an ideal feeding and nesting ground for these birds. The surrounding hills provide the Japanese Red Pine trees where the storks can use as their nesting ground; whereas the Marutaya River which runs through the centre of basin, creates a wetland like ecosystem which the storks can use as their feeding ground.

Above-mentioned ecosystems were largely lost over the years. Toyoka city is working on the restoration of these ecosystems, especially that of paddy fields, the feeding ground for these birds.

i) Restoration of ecosystem in paddy fields

The current ecosystem of paddy fields is very different from that of 1950s when the Storks were still surviving in the wild. This is mainly due to usage of chemical pesticides and fertilizers and consolidation projects. Following actions were taken to restore this ecosystem:

- a. Creation of wetland-like ecosystem for biodiversity
 - Restoration of the paddy fields which were abandoned for rice cultivation
 - Water pooling during the winter, i.e. the off-seasons for rice production¹
- b. Reconnection of the water networks among the river, paddy fields and irrigation channels

¹ Usually during the off-season for agriculture, the paddy fields are drained and dried.

- Instalment of Fish path which enables the fish to move from paddy fields to irrigation channels (Currently there are 110 fish paths inside Toyoka City)
- Elimination of surface difference between river and irrigation channel
- c. Instalment of hiding ground for various creatures
 - Instalment of small pond beside the paddy fields so that the aquatic creatures can escape when the paddy fields are drained.

ii) Sustainable agriculture

To enhance the biodiversity in the paddy fields, securing the sustainability of agriculture, especially the rice production, was crucial. Thus the project has worked in the following issues:

- a. Safe and reliable rice production
 - Creation of Environmentally Friendly Farming Method through reconsidering the conventional agriculture method which solely focuses on enhancing the productivity and efficiency
 - Introduction/ establishment of new organic farming method which can reduce the cost and the labour of rice production
- b. Improvement of farming method and creation of network among the farmers
 - Establishment of a study group for new farming method by deploying agricultural adviser to each district
 - Strengthening the network among the farmers for circulation of information on new method and its improvement
- c. Toward a farming that can ‘make money’ not just depending on subsidies
 - Establishment of certification system for products which are produced through Environmentally Friendly Farming Method (The certification system was named as ‘the Dance of Storks’)
- d. Restoration of multi-functionality of paddy fields
 - Commissioning the farmers to restore the abandoned paddy fields as a biotope (Commission fee is JPY 27,000 (around USD 340)/10a. per year. Currently there are 12.2ha of biotopes)
- e. Establishment of Environmentally Friendly Farming Method
 - Establishment of farming method which minimize the usage of chemical fertilizers and pesticides. The farmers who practice this type of farming are subsidized. (Subsidy is JPY 40,000 (around USD 500)/ 10a. annually and it was paid until 2007).

5. Virtuous cycle between environment and economy

The conventional view on environmental conservation must be revised. It is often thought that

environmental conservation is implemented at the cost of economic development. Rather Toyoka city believes that it is possible to create 'harmonious' relationship between environment and economy and have developed a 'Sustainable Development Strategy: towards 'harmonious' relationship between environment and economy'.

i) Rearing biodiversity through practicing 'Storks Friendly Farming Method'

Without securing the sustainability of agriculture, it is not possible to ask the farmers to engage in practice which enhance biodiversity or restoration of ecosystem in the paddy fields. For securing the sustainability of agriculture, it was important to raise awareness among the general public. The city has promoted the notion that the paddy fields are not just a place for rice production but also a place where biodiversity is nurtured. And now the consumers are willing to buy rice at a higher price than that of rice produced in conventional method knowing that it is safe and good for their health.

This new method of producing rice was systematized as 'Storks Friendly Farming Method' in 2005. To reduce the negative impact on the environment (especially to the ecosystem), this method do not use any chemical fertilizers and use only 25% of chemical pesticides used in conventional method or less.

To further enhance the biodiversity inside the paddy fields, there is non-binding target to implement water-pooling during winter season and install fish-path.

This method is beneficial for the farmers as well. The rice produced with this method is sold at premier price, 60 to 100% higher price than that of conventional method. Moreover, the fact that the rice is sold at the premier price contributes to create their prides as farmers and willingness to continue rice production.

At the consumer side, they are buying this rice at a premier price knowing that this rice is good for their health and knowing that they are contributing to the conservation of ecosystem and Oriental White Storks through the purchase of rice.

By creating this method of agriculture, Toyoka city is simultaneously enabling two activities, i.e. the rice production which is one of the essential economic activities in this region and the conservation of eco-system which is essential for re-introduction of Oriental White Storks.

This farming method is currently spreading outside of Toyoka.

Currently this farming method is practiced in 234.1ha (2011) inside Toyoka.

- ii) Stimulating consumption of rice
 - a. Utilization of rice produced with above mentioned method at school dinner
Provision of rice to school dinner (twice per week) to stimulate the regional consumption
 - b. Development of various product using this type of rice
 - Rice wine and distilled spirit called '*Shouchu*'
 - Cakes that use rice flower
 - Various product development

6. Reconstructing multi-functionality of paddy fields

Paddy fields are not just a place for rice production but have multiple functions and multiple values which are precious to different stakeholders.

By collaborating with different stakeholders, Toyoka city is enhancing the sustainability of our project:

- i) As a field for environmental education

Biotopes which are created from abandoned paddy fields are an ideal place for environmental education. The city has developed an environmental education scheme.

 - a. Utilizing paddy fields for environmental education in collaboration with NGOs

The NGO 'Civil Group for Oriental White Storks' hosts a 'School for Paddy Fields' in the biotope which is created by Toyoka municipal government. There are many citizens who participate in this activity. This biodiversity survey is extended beyond the biotopes to the whole Toyoka basin. The data collected here are utilized as base-line data for creating various environmental education schemes.
 - b. Utilizing paddy fields for environmental education in collaboration with primary school and local community

The municipal government has created 30 biotopes in each school district so that the children of each local community can play in this rich environment. In these biotopes, biodiversity survey and various environmental education activities are conducted in collaboration with primary schools and local communities. Moreover, there were induction workshops for teachers as well.
 - c. Utilizing paddy fields for environmental education in collaboration with private sector

With the support of ENEOS, Japanese Oil Company, Toyoka city has implemented an education programme of school pupils. This is not just a part of Cooperative Social Responsibility and collaboration of public and private sector, but also it offers an opportunity for parents to learn about the ecosystem in wetlands and its biodiversity.

ii) As a field of cultural exchange

To raise awareness of multi-functionality of paddy fields, the paddy fields are utilized as a locus for cultural exchange:

a. Biodiversity survey in paddy fields

In collaboration with Japan Co-op, a biodiversity survey in paddy fields was conducted inviting the consumers from urban areas. This opportunity has raised awareness among consumers on the fact that safety of rice and the multi-functionality of paddy fields.

b. Collaborative Workshop with Sado-region

By collaborating with other region which works for enhancing biodiversity, Toyoka city has created an opportunity to nurture the next generation with environmental awareness through cultural exchange among different region. By collaborating with different region, these events aim to emanate the original message from Toyoka and to expand the network of supporters.

iii) Common property for regional regeneration

Oriental White Storks came down to a small district called Tai in 2008 and fed on its abandoned paddy fields. The resident of this district came to notice the value of abandoned paddy fields. Since they stopped rice cultivation, the paddy fields were considered as 'useless' and 'meaningless'.

Moreover in these paddy fields, a rare plant species which became near extinct in other parts of Toyoka was found. The residents started to work with the NPO to utilize these abandoned paddy fields so that these fields can function as feeding ground for the storks. The residents have build ditches to pool the water, to create a wetland like ecosystem and to enhance the biodiversity. This work, which started with couple of volunteers, now became an event where all the households are involved.

The resident found new value to the paddy fields which were abandoned from various reasons and deemed as 'no-value'. These events have empowered the district by providing an opportunity to work together and to ensure their identity as a community. At the same time, these events have provided an opportunity to work together with diverse stakeholders who come from outside the district and hold different values.

Currently the district has formed its own tour guide group which guides their cultural, natural and historical heritage.

The biodiversity created through these activities does not produce economic revenue. Moreover it is

not certain how far these activities are sustainable. But by creating these activities, the district is trying to create its own future.

This small activity started in small village in Japan may provide one type of solution for creating a new community based on regional livelihood and multiple values.

7. Multiplicity and diversity of value created through Oriental White Storks

Toyoka has long relationship with Oriental White Storks and with its conservation. Through these projects, various diverse stakeholders are starting to be involved. For the sustainability of agriculture in Japan, which is faced with many difficulties such as lack of next successors, low rice price, it is crucial that various stakeholders get involved in solving these difficulties and supporting the agriculture. The very fact that various different stakeholders who hold different values and interest are involved requires a new common awareness to be shared among the different stakeholders through creation of new communal resources. This may create new type of problem however what is shown through the projects in Toyoka is a new possibility; diverse stakeholders creates new possibility with new diverse values.