

## Rural development with animal conservation using the local farming practices in Japan

Nobuhiro Ohnishi

Faculty of Bioenvironmental Science, Kyotogakuen University, 1-1 Nanjyo Otani, Sogabe cho, Kameoka City, Kyoto, Japan, 621-8555, E-mail: ohnishin@kyotogakuen.ac.jp

**Abstract:** The tradition of the rice paddy coexisted with many kinds of animals and plants. These animals and plants are not only the richness of the biodiversity but the important food resources in the paddy growing area. The biodiversity of the paddy is degraded in Japan. The many actions are launched to recover the complex of the paddy and the nature with the wisdom of the traditional practices. The coexistence of wildlife is the good indicator of the safety food. This feature will be the additional value of the local products. The rural development with re-evaluation of the local resources is in progress. The local traditional practices should be evaluated from a multiple viewpoints.

**Key words:** Paddy, biodiversity, storks, *Parabotia*.

### Introduction

The paddy ecosystem is consisted of variety of animals and plants (Hidaka, 2005). The farmers maintain their paddy for the rice production, not for the conservation on the animals and plants. However, the biodiversity is rich in the paddy, because the paddy is the good habitat for the varieties of animals and plants (Hidaka, 1998). The animals and the plants of the paddy ecosystems are very important food resources in South, Southeast, and East Asian countries where the paddy distributes (Ohishi *et al.*, 2001).

In Japan, the animals are expunged in the paddy because of the use of pesticides, the land reclamation, and the improved irrigation system. Japanese people had stopped eating the fishes from the surrounding area of the paddy. Because the intensive use of the highly toxic pesticide made the chemical pollution and the malformation in freshwater fishes in 1960s. The tradition of how to catch fishes and how to cook these fishes are lost in our society. Some people wondered the freshwater fishes are edible or not. The animals of the paddy ecosystem are not important for Japanese, now.



**Fig. 1.** Oriental White Storks *Ciconia boyciana* on the winter irrigated paddy in Toyo'oka City, Hyogo Prefecture, Japan.

But, some extinct animals are reintroduced to the paddy ecosystem for the biodiversity. Two species of birds, Oriental white storks *Ciconia boyciana* (Fig.1) and Japanese crested ibis *Nipponia nippon*, are reintroduced with the individuals that were artificially reproduced

(Naito *et al.*, 2011). These actions were supported with a huge amount of the money (over one million US dollars per year for Oriental white storks (Hyogo Prefectural Government, Japan, 2001)). Reintroduced Oriental white stork is dwelling in the paddy of Toyo'oka City (Hyogo



Prefecture, Japan) and starts reproduction in natural condition. Agricultural Extension Office proposed “Storks growing farming” and certificate the rice being produced in the paddy where Storks visiting. This farming system reduced amount of the chemical fertilizer and the pesticide and introduce the winter irrigation (usually paddy is dried out in winter), for growing up fishes and frogs for the prey of the storks (Agricultural improvement guidance center, Tajima District administration office, 2009). The consumers consider that the certificated rice grown with storks can proof the safety and the reliable. And some people consider doing for the environmental issues. These people also will be a good customer for these products. The storks can be the symbol of the safety farming products and environmental issues. The storks rice is priced 724 yen/kg (9 USD/kg) in 2009. The price is higher than ordinary rice in Japan (Ministry of Agriculture, Forestry and Fishery, 2013). This high price is reflected these consideration of customers. This is the famous example of the rural development with the conservation action.

### Results and Discussion

#### Trial in Hozu town

Hozu town is located in Kameoka City, Kyoto Pref., Japan. The population is 1846 with 748 households in 2012 (Kameoka City, 2013). Kameoka City located on the west side of Kyoto City. Kyoto was the ancient capital of Japan

in 8<sup>th</sup> century. Kameoka area provided the rice, the crops and the variety of products from farming land and Satoyama (small mountains nearby the villages) to the capital (Kameoka City, 1995). Farming is continued over 1,200 years in Kameoka.

Even the planes and the mountains are used intensively, the richness of the biodiversity is held in Kameoka (Iwata, 2006a, Tsugaru, 2008, 2009, 2010). Giant Salamander *Andrias japonicas* and Ayumodoki (a kind of a loach) *Parabotia cruta*: Cobitidae (Fig. 2) are distributed in Kameoka. These animals are designated as the natural monument in Japan (Kyoto Prefecture 2008). Especially, *P. cruta* only survives in Kameoka among Biwako-Yodogawa watershed area (Watanabe et al., 2008). The reproductive ecology is strongly related to the paddy farming (Iwata, 2006b). The paddy has irrigation systems for the water supply in Japan. The weirs are set to the irrigation canal for the water supply on the paddy. The water level increases with the weir. Then, the water flows into the paddy from the canal. The water level is held for three and half months. This operation of the irrigation makes the temporal water area on the upstream of the weir. The varieties of freshwater fishes use this temporal water as the reproductive and nursery habitat. Because of this traditional irrigation system, *P. cruta* can continue to reproduce the generations in Kameoka. The complex of the paddy and the nature is a feature of Kameoka area.



Fig. 2. *Parabotia cruta* in Kameoka City, Kyoto Prefecture, Japan.



The resident's association of Hozu town (Kameoka City, Kyoto Prefecture, Japan) designed the future plan of their community in 2010. They made the branch committee "Furtherance Committee of Vision of Hozu Town Management". Some of the members planed the vision named "Suitan Farm Plan - Town Management with Coexisting with Lives (Fig. 3)" following the feature of

the paddy and the nature in Kameoka. Suitan is a coined with water (sui in Japanese) and border (tan in Japanese). Suitan is the symbol of the geographical feature of Hozu town that located nearby Hozu river. They tried to coexist the varieties of animals as the symbol of the unpolluted environment (Hozu town, 2010).



Fig. 3. The future plan of the Suitan Farm. The agricultural school, Jacoda, The rebuilt watermill are included.

Kyoto prefectural office runs the river improvement against flood in Hozu River that is running through Kameoka city (Kyoto Prefecture, 2010). The committee of Hozu offered their plan to incorporate with the river improvement plan. Suitan Farming Plan included many actions, the remake of the fish growing paddy called Jacoda, the agricultural school, the study tour for historical places of the habitat, the rebuilding of the water mill house and so on.

**Jakoda (in Japanese): the fish growing paddy**

Formerly, the farmers used the river bunk as the paddy for increasing production; even the flood attacked this area year by year. Farmers knew the paddy where the freshwater fishes occurred much. This paddy is called "Jacoda" that means the paddy (ta: sometimes pronounced as da in Japanese) with small fishes (jaco in Japanese). Jacoda is the traditional practice of their farming and

fishing complex. This practice coexisted with natural freshwater fishes. Thus, Jacoda is the symbolic action of coexistence with animals.

**The agricultural school**

Farmers adjust their farming techniques against the local environmental condition. So, people who try to cultivate crops need the knowledge of the farming adjusted against the local environment. The participants of the agricultural school learn the farming technique from the farmer, the master of the agriculture. They can enjoy seedling, caring their plants and harvesting crops.

We expect the byproducts of the agricultural school. The school has the harvest festival. Grandmothers of Hozu come to teach their local dishes with local crops. The rural society is consisted of the senior persons, because of aging of local society in Japan. In other hands, younger generations live in the big city without the relationships

with the senior parsons. As a natural consequence, the younger generations are difficult to inherit the wisdom of daily life from elder persons. The agricultural school provides the new relationships among generations.

The study tour for historical places of the habitat. The temple, the ancient building of the school (named Terakoya: built in 19<sup>th</sup> Century), the small canal running through the habitat for water supply,

#### **The rebuilding of the water mill house**

There were many water mills in Kameoka city. All of them are disappeared with the introduction of the rice mill machine. The resident's association of Hozu town rebuilt the water mill with the fund from the local governments. The water mill is the symbolic building of Suitan Farm. The rice that were milled by the water mill is favoured by consumers, because the heat of the rice mill machine will damage the quality of the rice but not the water mill.

The plan is consisted of the natural, the cultural and the historical resources of the township. The coexistence with wildlife will be a good indicator of the safety for the local agricultural products. Thus, ecoaware customers consider to chose these products. This provided additional value for the products and the profit for farmers. And, some people enjoy the local culture and the local history. These cultural stories also provide the additional value for the products. The water milled rice is considered as the good quality and good taste one. Some are feeling the nostalgia for the old time by the water mill. The local nature, culture and history attract people from outside of the township. These actions stimulate to organize the new local community among residents and outsiders as the activities developed.

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