

Sado's *Satoyama* in Harmony with Japanese Crested Ibis *The Sado GIAHS Project*

Koichiro Takano
Mayor, Sado City

1. Overview of Sado

Sado is an island located in the Sea of Japan, some 40 kilometers northwest of the coast of Niigata Prefecture. The island has an area of 855 square kilometers and its 280 kilometers of coastline is rich in variety. Much of the island has been designated either as a quasi-national park or prefecture natural park. Sado Island is blessed with a rich and beautiful natural environment; recently released Japanese crested ibis (an internationally protected bird known in Japanese as “*toki*”) wing through the skies and the cedar forests of the northern Osado area sway in the sea breezes.

Sado’s population, based on the 2010 census, is 62,724 people; the population is decreasing by about 1,000 people each year, and the ratio of elderly inhabitants (those over 65 years old) significantly exceeds the national average of 23.1 percent.

The city's gross economic product is over 200 billion yen; rice farming accounts for the bulk of the island's primary industry, at 7.4 billion yen out of the total of 10.8 billion yen for primary industries. Agriculture as a whole accounting for 22 percent of total employment, and can be said to be one of the island’s key industries.

2. Sato's Agriculture—History, Biodiversity, and Traditional Arts

Rice cultivation on Sado is thought to have started approximately 2000 years ago. Rice farming took place mainly in the wetlands in Sado's central region, but with the long period of gold mining—which began with the discovery of alluvial gold deposits and ended with the closure of the Aikawa gold mine—Sado's population increased, with the result that farming expanded into the wetlands in the island's valleys. During the period of alluvial gold mining, people also moved into and built villages in upstream valleys; as villages grew in size, those having limited areas of land built small-scale terraced rice fields to meet their needs for food.

In the 17th century, gold was discovered at the Aikawa mine, which began operations. Thereafter, the feudal (national) government came to directly administer the gold mines, which supported the national finances over a 300-year period. This had major impacts on the people living on the island at the time.

With the “gold rush” that accompanied the development of the mines, people from throughout Japan came to Sado seeking riches, and the population grew explosively. The rapidly growing population stimulated the development of new rice fields, giving rise to Sado's characteristic landscape of terraced rice fields, which were cultivated deep into the mountains.

In addition, because Sado was lacking in water resources, irrigation was conducted by utilizing over 1,000 reservoirs; mining technologies were employed for water management and land reclamation engineering efforts. Technologies for pumping water included the Archimedes' screw, a technology for lifting water imported from Europe; the use of such technologies made Sado's rural landscapes develop a distinctive character.

Sado's farmers also had high incomes, due to selling a variety of marketable commodities in addition to rice—such as agricultural products, firewood, and products made from straw—that came to be in high demand; even though they cultivated rice fields on a small scale, they had good livelihoods. The island's wealth at the time brought about rapid changes, creating a money-based economy and consumer society not seen elsewhere in Japan. For this reason, one characteristic of Sado's agriculture was that there was rapid growth in the number of part-time farmers who were very wealthy despite operating on a small scale.

Thereafter, income from non-agricultural sources fell as a result of the decline of the mines, but because Sado was an island and had no other industries to rely on, agricultural lands were carefully maintained. Even as the times changed, agricultural lands remained small in scale and efficient land improvement activities were not undertaken, leaving ponds and earthen-bank ditches where a variety of species could live.

In addition, because farmers' usage of agricultural chemicals remained low, the area's abundant biodiversity was preserved; as a result, the crested ibis was able to survive on Sado longer than anywhere else in Japan.

Also, the development of the mines supported rich agricultural livelihoods in Sado's farming villages, giving rise to a unique farming culture that included a variety of cultural practices and traditional arts connected with praying for abundant harvests and which have been passed down as agricultural rituals. These traditions were treasured and preserved, being passed along to succeeding generations within each village, such that even now many people follow and enjoy the area's ancient customs.

Noh play, an art form that is recognized as a Masterpiece of the Oral and Intangible Heritage of Humanity, was enjoyed by farmers as a votive ritual at Shinto shrines, and Noh stages were built in various villages; Sado is said to account for one third of all Noh stages in Japan. Moreover, activities for the preservation and continuation of the traditional art of *Oni-daiko* (Oni drumming) are not only carried out by the residents of various villages, but are also supported by the government and nonprofit organizations.

In this way, Sado's traditional arts and rituals not only bring together people in farming villages; they also promote cooperative agricultural activities, preserving traditional farming practices and agricultural lands.

3. The Crisis of Biodiversity and the Creation of a Biodiversity-Conserving Agricultural System

However, the effects of modernization began to have a major impact on agriculture; the crested ibis, which long fascinated people and once had been found in great numbers throughout East Asia—and which had even become an indicator of biodiversity—gradually died out.

Many people who valued the beautiful Japanese crested ibis worked to preserve it, and farmers made efforts to reduce their usage of chemical fertilizers and pesticides, but in 1981 the last ibises remaining in the wild were captured; they were kept in cages until Japan's last crested ibis died in 2003.

In 1999, China's President Ziang Zemin presented the Emperor of Japan with a pair of crested ibis, and in the same year the long-awaited first chick was born as a result of artificial breeding. Thereafter, starting in 2008, experimental releases were conducted in order to reintroduce the crested ibis to the wild—but biodiversity had been lost as a result of human activities giving priority to economy and efficiency, such as the expansion of agricultural lands, the inappropriate usage of chemical fertilizers and pesticides, and the concreting of waterways. As a result, the area of suitable habitat for the crested ibis, which depends on paddy fields as its main feeding grounds, was insufficient.

As the Japanese crested ibis was reintroduced to the wild, we therefore decided to undertake efforts to preserve this symbol of biodiversity—through expanding the area of paddy fields that are rich in biodiversity, as well as improving the environmental added-value of rice cultivated in these paddy fields and preserving agricultural lands by increasing farmer incomes.

Sado City is working to promote diffusion throughout the region of a certified environmentally friendly farming system (the program for Certified *Toki* Brand Rice; See “Requirements for Certified *Toki* Brand Rice” on page 3.). This involves assessing rice cultivation techniques that aim to preserve and restore ecosystems—such as utilizing greatly reduced inputs of chemical fertilizers and pesticides—and promoting these as “farming techniques that nurture biodiversity.” Other activities include farmer-led community revitalization activities based on a consideration of biodiversity, such as the implementation of biological field surveys. Through such activities, we hope to preserve traditional paddy fields and pass them on to future generations.

Biological field surveys are being carried out not only by farmers but also by the children of Sado, as they are the ones who will carry on related activities in the future; these activities deepen their appreciation of the role of biodiversity.

These activities help to clarify that the role of agriculture includes not just “food production” but also “biodiversity conservation”—as has been sought through the creation of this brand of rice. This has brought about significant economic benefits, with the result that the area managed under the certified rice program has tripled in the three years since it began, and now encompasses 20% of Sado's total area under rice cultivation.

Requirements for Certified *Toki* Brand Rice

- (1) Implementing farming techniques that nurture biodiversity through restoring ecosystems and increasing populations of small organisms, such as frogs and loaches, that serve as prey species for the Japanese crested ibis (including creating swales where water can collect, installing fish passages, flooding fields in winter, and establishing biotopes)
- (2) Reducing by at least 50% the inputs of pesticides and chemical fertilizers (as compared with conventional farming practices)
- (3) Participants must be certified as Eco-Farmers by Niigata Prefecture
- (4) Biological field surveys must be conducted twice a year

Efforts Related to the Program for Certified *Toki* Brand Rice

	Flooding Fields in Winter	Creating Swales	Installing Fish Ladders	Biotopes, etc.	Total Area	No. of Participating Farming Households
2008	352 ha.	73 ha.	1 ha.	1 ha.	427 ha.	256
2009	666 ha.	192 ha.	2 ha.	2 ha.	863 ha.	510
2010	891 ha.	326 ha.	12 ha.	5 ha.	1,234 ha.	695

4. A Variety of Factors Contributing to Sado's Biodiversity

To promote Sado's biodiversity-conserving agriculture and activities for nature restoration, we are working to expand collaborative efforts involving corporations through their CSR activities, as well as exchange programs through which city dwellers can experience Sado's history and culture.

In order to sustain the traditional terraced rice fields in Sado's semi-mountainous areas, a terraced rice field ownership system has been created. Under this system, city dwellers interested in the preservation of terraced fields and the conservation of biodiversity become owners of the fields and grow their own rice, thereby working to preserve the natural environment and the landscapes that arose with the development of the Sado Mines.

In addition to these efforts, in order to scientifically assess biodiversity conservation efforts and the populations of the Japanese crested ibis, cooperation is being undertaken with Niigata University for the development of assessments based on a "Biodiversity GIS" system. This will allow for an improved understanding of species populations in Sado's paddy fields and clarification of the effects of biodiversity-conserving agricultural techniques; by overlaying data regarding the feeding activities of the Japanese crested ibis, effective efforts can be made to improve their living environment.

5. Launching Sado's GIAHS Project

Sado is an island of gold and silver. These precious resources have been mined over a 1200-year span of time, and are believed to have even influenced the world economy and Marco Polo's accounts of the Orient; they have also greatly influenced the formation of Sado's agricultural system.

The riches that were unearthed eventually became distributed among Sado's farmers, giving rise to the precious culture found in the island's agricultural villages. The money-based economy and consumer society that arose on Sado—which was so unusual for its time—was made possible by the cultivation of the limited land that was available to those on the island. As we keep this in mind, we resolve to preserve for the future the rich agricultural livelihoods and landscapes of Sado, which arose as a result of the wealth that our ancestors shared, and which have been passed down to us in coexistence with nature and biodiversity.

As we launch Sado's GIAHS project, we pledge to continue our efforts to preserve the cultural traditions of Sado's farming villages, which have been passed down through the ages, and to continue to support the economic activities of farmers, working to find a balance between the economy and the environment.