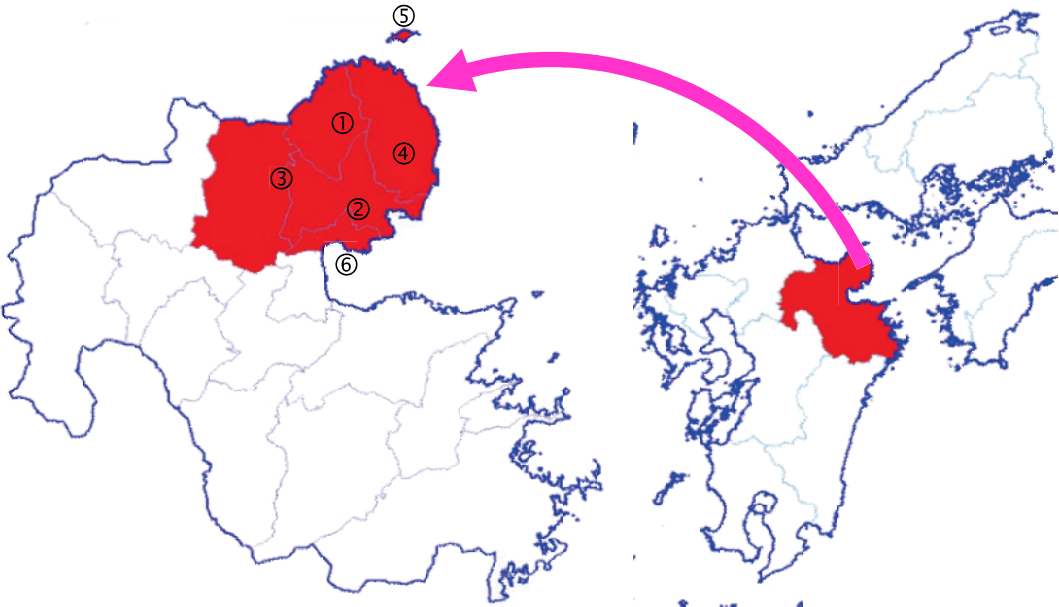


<p>Name (Title of the Proposed GIAHS Site) Kunisaki Peninsula Usa Integrated Forestry, Agriculture and Fisheries System</p>
<p>Applying Organization GIAHS Promotion Association of Kunisaki Peninsula Usa Area</p> <p>Cooperating Organizations Ministry of Agriculture, Forestry and Fisheries, United Nations University, Ritsumeikan Asia Pacific University, Research Institute for Humanity and Nature, Oita University, Beppu University, Nippon Bunri University, Oita Prefectural Government</p>
<p>Country/Area/ Site Japan, Oita Prefecture, Kunisaki Peninsula Usa Area (Bungotakada City①, Kitsuki City②, Usa City③, Kunisaki City④, Himeshima Village⑤, Hiji Town⑥)</p>  <p>The Kunisaki Peninsula Usa Area is located in north-eastern Kyushu in south-west Japan. The peninsula extends into the southern edge of the Seto Inland Sea, and is comprised of 4 cities, 1 town and 1 village where the distinct geographical features, ecosystems, and agricultural culture are preserved.</p>
<p>Access to the Site from Capital City and Other Major Locations Air travel is the main transportation method. Oita Airport is located in the Kunisaki Peninsula. To get there it takes 1 hour 35 minutes from Tokyo(Haneda) Airport and about 2 hours from Tokyo(Narita) Airport.</p>
<p>Area 1,323.75 km²</p>
<p>Agricultural Ecosystem Zone Temperate, rice paddies and forest zone</p>

<p>Landscape Characteristics</p> <p>A peninsula with mountain ridges extending radially from the central lava dome, between which rivers flow rapidly and directly, with level grounds spread out in the north-western area.</p>
<p>Climate Type</p> <p>Temperate humid climate, Warm</p>
<p>Population</p> <p>180,572 people, among which 14,842 people are engaged in agriculture, forestry and fisheries</p>
<p>Livelihood Sources</p> <p>Agriculture, forestry and fisheries, and manufacturing industries of precision instruments in areas adjacent to the Oita Airport</p>
<p>Ethnicity, Indigenous Population:</p> <p>None</p>
<p>Summary Information of Agricultural Heritage System :</p> <p>The proposed GIAHS in the Kunisaki Peninsula Usa area is a system where forestry and agricultural production are made possible and are sustain by the connected system of Sawtooth Oak forests and multiple interlinked irrigation ponds.</p> <p>Mushrooms have significant nutritional and medicinal values and have the potential to make significant contributions to nutritional and livelihood security where arable land is limited. Mushroom cultivation decomposes biomass and supports nutrient cycling in the ecosystem. Log wood cultivation of Shiitake mushrooms is a traditional system of agriculture in Japan and remains an important livelihood for many Japanese farmers. The traditional system depends on sustainable forestry to produce quality log wood. The proposed GIAHS in the Kunisaki Peninsula Usa area exemplifies the traditional system of Shiitake cultivation using Sawtooth Oak log wood where arable land is limited. The Sawtooth Oak is planted and managed on a 15 year cycle of sustainable logging.</p> <p>The Sawtooth Oaks (or “Kunugi” in Japanese) provide a necessary source of nutrients to the growth of Shiitake mushrooms and produces the log wood cultivated Shiitake food product, in addition to stimulating the forest’s metabolism and recharging the water resources, as well as maintaining the unique agriculture and forestry industries such as rice paddy agriculture and conserving the various ecosystems.</p> <p>This area is located in north-eastern Kyushu, and is comprised mainly of the circular shaped peninsula in the center, extending out to the southern edge of the Seto Inland Sea. Topographically, the region is characterized by mountain ridges radiating from the central elevation of Mount Futago, and deep ravines and valleys situated in between the ridges. Many rivers of this area are short and steep, and the soil is highly porous volcanic soil that absorbs rain water easily, which meant that locals struggled with the provision of water from ancient times. Based on the</p>

above-mentioned conditions, local communities in the region have been planting Sawtooth Oak widely in the Satoyama (rural areas), because they are an important resource for log wood cultivated Shiitake and charcoal and firewood making, and at the same time conserve water resources.

Even when cut down, the Sawtooth Oak has the characteristic of shooting from the stump and re-growing in 15 years, and by making use of this excellent property of circulating lumber resource log wood cultivated Shiitake production is being carried out actively. In particular, a unique characteristic of this region is the “bright Hoda-ba”, where high quality log wood cultivated Shiitake are being produced.

The production of log wood cultivated Shiitake brings forth nutritional food from forest resources, which contributes to global food security by expanding alternative sources of food and livelihoods from land unsuitable to arable cultivation. Furthermore, the cycles of the logging and regeneration of the Sawtooth Oak stimulate the metabolism of the Sawtooth Oak forests and contributes to the realization of the common pool resource function which the forest holds.

Furthermore, there are approximately 1,200 small scale irrigation pond constructed in this region and the Sawtooth Oak forests in the vicinity that recharge the water of the irrigation pond bear a unique scenery that exists throughout the region. In addition, the water supplied by the Sawtooth Oak forests and multiple irrigation ponds is used in the paddy agriculture of rice crops and Shichitoui crops.

In this area, based on local governments and regional residents focusing on agriculture, forestry and fishery households, the cyclic system of lumber and water resources is being preserved and the promotion of agriculture and forestry industries is being planned whilst preserving the various living creatures that exist here.

I Characteristics of the Proposed GIAHS

Global (Domestic) Importance

a. Natural Environment of the Kunisaki Peninsula Usa Area and Historical Background

Most regions of Japan fall into a ‘temperate zone’ with four clearly defined seasons and have a warm, humid climate.

In particular, as the Kunisaki Peninsula Usa area is located in north-eastern Kyushu of south-west Japan, on the southern edge of the Seto Inland Sea, the annual mean temperature is around 16°C, and the coastal areas receive around 1,500 mm



Image 1: River View of Oita

of precipitation a year which is much less than the national average of around 1,700mm. In particular, this area has a characteristic of low rainfall in winter. The peninsula is terrain formed by the central lava dome^① that makes up the Futago mountain system, with mountain ridges that extend out radially from the peaks of the mountain ranges and the deep valleys between them that has taken form with the distribution of differing volcanic rock, erosion and deposition after the Miocene epoch^②. As a result, it can be said that it is a characteristic region with a compact, circular collection of geological features, geographical features, and differing active structure^③ terrains (central mountainous area, rocky ridge area, sandy beach coastal area, Ria coast area).

The rivers of this region are short, steep, and with the particular terrain of narrow flat plains, the rivers flow rapidly into the sea. In addition, the region is comprised of volcanic soil that absorbs rainfall easily and poses a challenge for irrigation^④ from rivers in this region (Image. 1).

Historically, the 6 hamlets of Musashi, Kunawa, Kunisaki, Tashibu, Aki and Imi were founded along the ravines extending out radially from the Futago mountain system, and came to be known as the 'Rokugo'^⑤.

The Kunisaki Peninsula is known as the region where of the formation of Kyushu's largest manor^⑥ by the priests and monks of the Usa Hachiman shrine and its associate temple Mirokuji, from which the Rokugomanzan culture's syncretic ideal of fusing Shinto and Buddhist philosophies^⑦ flourished. This Rokugomanzan culture has been established as a unique religion among the unity of the Kunisaki Peninsula region with the central Futagoji Temple playing a leading role. Moreover, together with historical assets mentioned later on, traditional culture is still being handed down to this day.

Ancient inhabitants of this landscape tried to open up farming areas in the peninsula, and with the guidance of the Usa Hachiman shrine and the Mirokuji Temple they made use of the natural geographical conditions and achieved the most sensible formation possible. A particularly well-preserved site which has retained its landscape appearance since the 15th Century can be found at the "Tashibunoshō Osaki Agricultural Landscape" (Fig. 1).



Fig1: Tashibunoshō Osaki agricultural landscape, Important National Cultural Landscape

In the zone of the bases of the mountains surrounding Tashibunoshō are the Sawtooth Oak (*Quercus acutissima* Carr.) forests that support the region's industry as log wood for Shiitake

① Lava dome: dome-shaped terrain formed by the expulsion of highly viscous lava from a volcano

② Miocene epoch: a geological age representing the period from approximately 23 million years ago to 5 million years ago

③ Active structure: terrain of which activity has been seen in relatively recent ages, such as active faults and active folds etc.

④ Irrigation: the use of water that is taken from rivers and puddles around rivers, lakes and marshes

⑤ Rokugo were the six ancient administrative areas

⑥ Manor: Land owning system of lords, shrines and temples coming into existence in Nara Period which continued to exist until Edo Period.

⑦ Syncretization of Shinto with Buddhism: Fusing and harmonizing Shintoism with Buddhism.

(Lentinus edodes) cultivation. They are managed appropriately and as a result the recharged water resources cultivate the agricultural production and livelihood and biodiversity, thus the beautiful landscape of the Satoyama and agricultural community is formed. Additionally, aided by an abundance of historical background, research institutions and many tourists visit the area.

b. Japan's Largest Sawtooth Oak Forest and its Multipurpose Role

As previously mentioned, due to a number of special geographical conditions in this region, the rich forest environment and agricultural and forestry industries have a close connection.

The broadleaf forests centering on the Sawtooth Oak vegetation in the intricately extending ridges grow thickly, and the “water” and “log wood” that is supplied by these forests are cultivating the region's special produce and ecosystem.



Fig2: Sawtooth Oak forest

The total stock volume of Sawtooth Oak (Fig. 2) in Oita ranks as the largest in Japan, with about 22% of the national stock volume found in this prefecture which is 1.4 times the volume of the next largest: Miyazaki Prefecture. The percentage of Sawtooth Oak forests in this region is 11.2%, higher than the prefectural average of 10.5%. The main reason behind the areal extent of the forests is that Sawtooth Oaks were planted widely across the Satoyama landscape due to their usefulness as log wood^① for Shiitake cultivation and source for charcoal and firewood. Though its utilization as a charcoal source has diminished, it is still the largest Sawtooth Oak forest in the country today and sustains the production amount and quality of log wood cultivated Shiitake which is famous throughout Japan.

Even when cut down the Sawtooth Oak sprouts from the stump^② and re-grows within 15 years, meaning that the forestry resource has the excellent property of circulation. Moreover, the fallen leaves and the discarded logs used in log wood cultivated Shiitake are humified, then become soft and swollen and take the form of a water retention layer.

As log beds for cultivating mushrooms (or Hoda-gi in Japanese), Sawtooth Oaks provide a necessary source of nutrients for the production of Shiitake, and are used for log wood cultivated Shiitake production for 3 to 4 years. Sawtooth Oak forests provide the food ‘log wood cultivated Shiitake’. That is to say, the fact that food is produced from forestry resources fulfills an important role of increasing food options, and even from the view of contributing to global food security as Japan is the world's largest producer of Shiitake mushrooms.

Through the production of log wood cultivated Shiitake, logged Sawtooth Oak forests re-grow, the forest's metabolism is stimulated, and in addition to sustaining the recharge^③ of water resources.

① Log wood: wood used for the inoculation of Shiitake mycelium (Sawtooth Oak is the most used wood in Oita Prefecture)

② Stump: the base of cut Sawtooth Oak trees

③ Recharge: groundwater (rainwater and river water) is slowly absorbed and becomes underground water.

Maintenance of the Sawtooth Oak forests also reinforces the value of the forests as a common pool resource and contributes to the overall sound environment in the Satoyama landscape.

Downpours of rain in this region absorb into the soil where fallen leaves etc. have accumulated and become spring water containing organic matter and nutrient salt^①, sustaining paddy agriculture and coastal fishing with nutrients for the growth of phytoplankton and seaweed. In addition, sake breweries using the superior quality ground water have long been developed in this region, with 18 breweries existing at present.

c. Log Wood Cultivated Shiitake

Shiitake is a type of mushroom cultivated mainly in Japan, China and Korea for consumption worldwide, and can be found as widely spread as the mountainous areas of south-east Asia and New Zealand.

As Japan has a warm, humid climate suited to Shiitake, these mushrooms have supported the food culture as a precious ingredient from ancient times. Furthermore, not only does drying increase the preservative qualities of log wood cultivated Shiitake, but they are an indispensable ingredient in cooking and soup bases in Japanese food, used to increase the amount of guanylic acid which serves as one of the main three taste components of Japanese cuisine. Shiitake are also widely used in the cuisines of other countries such as China, and recently the need for ingredients for Japanese cuisine has increased in Europe, demonstrating that the food culture of Shiitake usage is also popularizing and expanding globally.

It is no exaggeration to say that the key to cultivating high quality log wood cultivated Shiitake lies in the Hoda-ba^② and the water that are used. Although the log wood cultivated Shiitake Hoda-ba is generally placed in conifer forests like the Japanese cedar (*Cryptomeria japonica*) in other parts of Japan, the Kunisaki Usa region uses “bright Hoda-ba” deciduous broadleaf forests which provide ample temperatures and sunlight in a region marked by little rainfall and cold temperatures during winter to early spring (Fig. 3).



Fig3: ‘Bright Hoda-ba’ in broadleaf forests

More than half of the large scale Shiitake farmers using deciduous broadleaf forests as Hoda-ba in Oita Prefecture are in the area.

d. Water Supply System with Multiple Interlinked Irrigation Ponds

As farming communities began spreading rice agriculture, the main problem was the securing of water resources. As explained above, due to the volcanic soil, swift, short rivers and narrow valleys,

① Nutrient salt: the general term for silicate nutrients such as phytoplankton and seaweed, phosphate, oxalic acid, nitrite salt etc.

② Hoda-ba: the place where log wood cultivated Shiitake is grown

low rainfall and the difficulty of river water utilization, irrigation ponds (or Tameike^① in Japanese) were imperative to the stable practice of paddy agriculture. In addition, the geographical conditions prevented the construction of large scale irrigation ponds so that ancient farmers established the technique of multiple ‘interlinked’ small irrigation ponds to provide the necessary amount of water.

In this region, on average there are 4 small scale irrigation ponds for every valley and water supply system interlinking them was constructed in each river, and through the shared operations and management of residents, the necessary water for agricultural use was secured.

For example in the Tsunai area of Kunisaki City there is a system of 6 interlinked irrigation ponds from the Edo period that are still in operation today (See Appendix d). The furthest upstream irrigation pond “Takaoike” is installed for water usage in the latter period of wetland rice growing. During this time, the three mid-stream area irrigation ponds, and the two downstream irrigation ponds are interlinked and refill one another with water for agricultural use. Furthermore, open water ways are stretched around the mountainsides that connect the irrigation ponds, and schemes are being carried out in order to collect even more rain water in the irrigation ponds.

e. Sawtooth Oak Forests and Multiple Irrigation Ponds, and the Agriculture and Forestry Industries and Various Creatures that They Nurture

Paddy agriculture such as wetland rice (*Oryza sativa*) and Shichitoui (*Cyperus monophyllus* VAHL.) is cultivated with the previously mentioned irrigation supply system, and the Sawtooth Oak forests play a large role even here. The fallen leaves and the discarded logs used in log wood cultivated Shiitake are humified then become soft and swollen and take the form of a water retention layer. As well as recharging the water resources of the irrigation ponds, it produces water rich in minerals and nutrients. Stored in the irrigation ponds, from the mountainous areas to the paddy fields downstream, this water creates a nature where a variety of creatures can live.

As large scale paddy agriculture was not developed in this region, it became necessary to cultivate a commodity that complemented wetland rice. At present the region has a rich diversification of agricultural livelihood options, including beef cattle, Shironegi or ‘Welsh Onion’ (*Allium fistulosum*), Konegi or ‘small Welsh onion’ (*Allium fistulosum*) and house-mikan or ‘mandarin oranges grown in greenhouses’ (*Citrus unshiu* Marc.). In the past, farmers used to manage a combination of rice-agriculture and log wood cultivated Shiitake production.

Previously, Shichitoui was cultivated widely across the prefecture. Shichitoui can be cultivated in the same fields used for rice paddies as the busy harvesting and cropping seasons are different. Shichitoui is a durable material used for ‘tatamiomote^②’ which used to have a high demand. Today the number of producers has diminished due to the improvement of ‘tatamiomote’ weaving machines using Igusa (*Juncus effuses* var. *decipens*), but Kunisaki City is famous as the only producing area in all of Japan. To this day, the biodiversity of the creatures of this area has been

^① Tameike: artificial irrigation ponds equipped with water drawing capabilities, predominantly for storing water for agricultural irrigation

^② Tatamiomote: sheets affixed to tatami used as Japanese style flooring

preserved relatively well.

Endemic species including plants such as the Kobanoikubigoke (*Diphyscium perminutum* Takaki), fish such as Akaza (*Liobagrus reinii* Hilgendorf) and Kubohaze (*Gymnogobius scrobiculatus* Takagi) can be found here. The region is also home to the Oosanshou or ‘Japanese Giant Salamander’ (*Andrias japonicus*) (Fig. 4), which is listed as a national Special Natural Monument and the Kabutogani or ‘Horseshoe Crab’ (*Tachyleus tridentatus* Leach), which is recognized as a ‘living fossil’.



Fig4: The Japanese Giant Salamander (Oosanshou)

Apart from these, there are traditional products such as Mitori beans (*Vigna sinensis* L.) and Oita kabosu lime (*Citrus sphaerocarpa*). As in Figure 5, by means of adequate maintenance of Sawtooth Oak forests surrounding the irrigation ponds, a virtuous cycle of biological resources is created, a system which permits the continuation of traditional agriculture and forestry industries such as log wood cultivated Shiitake production is constructed. This system is being conserved to this day (Image 2).



Fig.5: Planted Sawtooth Oak in the upper reaches of Matusgasako Pond

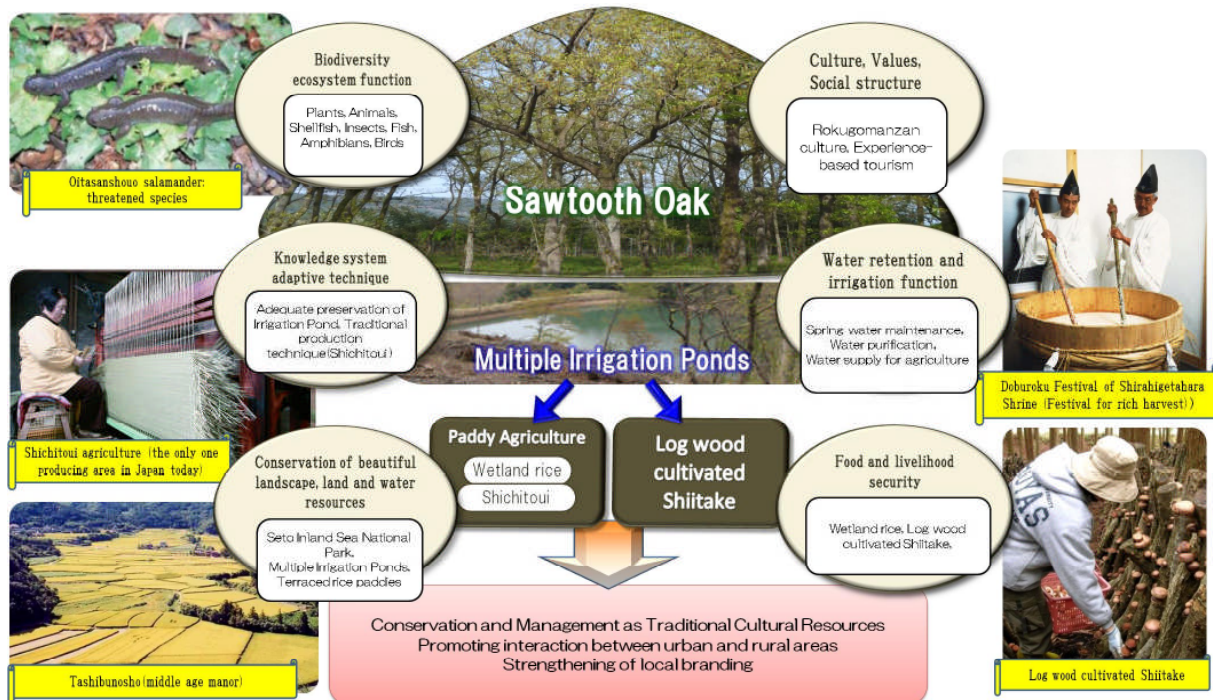


Image2: Agriculture system sustained by Sawtooth Oak forests and irrigation ponds

II. 1 Food and Livelihood Security

a. Agriculture

Paddy agriculture in the Kunisaki Peninsula Usa area constitutes three quarters of the cultivated acreage^① and occupies 15,034 ha. However flat plains are scarce and the average cultivated acreage per farm household is 1.4 ha which is lower than the national average of 1.8 ha. Local communities have traditionally used log wood cultivated Shiitake and Shichitoui as well as wetland rice for crop diversification in this area.

The fraction of households engaged in agriculture (out of the total number of households) in this area is 18.2% which is about twice the prefecture average of 9.1% and nearly 4 times the national average of 4.7%. Thus, agriculture holds a central place in local livelihood. In recent years, vegetables grown inside agricultural facilities in the Kunisaki Peninsula Usa area such as greenhouses, as well as fruit orchards and flowers have gained popularity, and farming income of the area accounts for 33% of the total prefectural farming income. Prominent vegetables grown here include Shironegi and Konegi, and fruit grown here includes kabosu limes (Fig. 6), house mikan and grapes (*Vitis* spp). Among flowers, the Wheel chrysanthemum (*Chrysanthemum* L. sensu ampl.) and Lisianthus (*Eustoma grandiflorum* (Raf.) Shinnery) are popular species.



Fig6: Oita specialty Kabosu lime

b. Forestry

The area of forest in Oita Prefecture is 449,862 ha, covering approximately 70% of the total area and retaining an affluent natural environment. The prefecture's forestry is generally classified into lumber production of Japanese cedar and Japanese cypress (*Chamaecyparis obtusa*), and Shiitake production. Of forestry output, Shiitake production accounts for a 37% share, thus Shiitake is an important commodity of Oita Prefecture.

Furthermore, compared with other regions, this region clearly has a high share of broadleaf forests. 38,185 ha, or 49% of the forest area is comprised of broadleaf trees, which in addition to contributing to the conservation of biodiversity, it also recharges water resources and acts as a flood defense. It demonstrates multifaceted functions and supports the livelihood of residents.

The dried log wood cultivated Shiitake^②, Oita Prefecture



Fig7: Log wood cultivated Shiitake

^① Cultivated acreage: the area of arable land that agriculture and forestry management bodies operate (rice fields, vegetable plots, orchards)

^② Dried log wood cultivated Shiitake: log wood cultivated Shiitake that is dried and preserved to be stored for long periods of time

local specialty, has more than 40% of the national share. The Sawtooth Oak forests spreading throughout this region produce 302.6 ton of the dried log wood cultivated Shiitake (Fig. 7). As far as quality is concerned, Oita Prefecture's dried log wood cultivated Shiitake have won the title of best in Japan at the National Dried Shiitake Competition^① for 14 consecutive years, thus playing an important role in dried log wood cultivated Shiitake production.

II. 2 Biodiversity and Ecosystem Functions

The Kunisaki Peninsula Usa area spreads radially from the peak of Mt. Futago (height of 721 m) at its center, to the coastal areas rich in variation. In each environment there exists a variety of plants and animals adapted to that environment. Through the adequate management of Sawtooth Oak forests and multiple irrigation ponds by the region's residents' unified efforts, characteristic agricultural, forestry and fishery industries such as log wood cultivated Shiitake and Shichitoui etc. are continually run. NPOs are at the center of the efforts to revive the Hotaru firefly (*Luciola cruciata*) and to plant broadleaf trees (Satoyama^② conservation activities) in order to conserve the affluent ecosystem.

a. Agrobiodiversity of the Region

i. Log Wood Cultivated Shiitake (*Lentinus edodes*)

Shiitake are edible mushrooms of the Kishimeji group and in this region which has a large cumulative amount of Sawtooth Oak forests, Shiitake cultivation using Sawtooth Oak as log wood is popular.

As the rainfall is low in winter, an ingenious plan of using Sawtooth Oak to produce log wood cultivated Shiitake in this region was devised and the region's unique cultivation techniques also evolved over time. In the occurrence of Shiitake, temperature and water control is important, but the production of log wood cultivated Shiitake is easily influenced by climate conditions and the shipping amount has a flaw of being unstable. Because of this, as mentioned later on, irrigation water is secured from irrigation ponds and is used to promote the sprouting of log wood cultivated Shiitake periods of water shortage. This is a technique to control the amount of Shiitake which emerge and is unique to the region. Combined with such favorable conditions, the stable production of high quality log wood cultivated Shiitake is made possible. Furthermore, as they are cultivated in a "bright Hoda-ba", the



Fig8: Dried log wood cultivated Shiitake

^① National Dried Shiitake Competition: Competition sponsored by the Japan Shiitake Agricultural Cooperative Association that judges the quality of domestic dried Shiitake

^② Satoyama: Forests or mountains adjacent to hamlets and houses, which are conserved and managed by people.

surface (‘Kinsan’^①) of the log wood cultivated Shiitake is dry and cracked. High quality dried log wood cultivated Shiitake, called “Chabana-Donko” and “Koko” with a good external appearance (Fig. 9) are produced in such bright “Hoda-ba”.

ii. Shichitoui (*Cyperus monophyllus* VAHL.)

Shichitoui is a type of grass belonging to the Kayatsuri-gusa family and is used for weaving tatami sheets, or ‘Tatamiomote’. Shichitoui was introduced to this area in the early Edo period and was exported to Kansai as “Bungoomote”, a monopoly product of the Kitsuki domain, through a sea lane. At present, the Kunisaki City is the only remaining production area of Shichitoui in Japan. The grass is known for its durability, more so than the Igusa (soft rush) which is also used for making tatami mats. Tatami mats made of Shichitoui are also used in traditional cultural assets such as temples (Fig.9).



Fig9: Shichitoui from Kunisaki

iii. Mitori Beans (*Vigna sinensis* L.)

The Mitori bean is a variety of the Sasage, or ‘cow pea’ (*Vigna unguiculata* (L.) Walp.) that has been passed down since the 19th century in the Nagasu district of Usa City. The husk of this bean is not eaten, only the bean (‘mi’) is eaten after separation (‘tori’), thus giving it the name ‘mi-tori bean’. Although the Akamitori bean, Kuromitori bean and Shiromitori bean are only grown in the limited part of Japan, the Kuromitori bean is cultivated as a native species in the Nagasu district of Usa City. Because the bean does not fall apart when boiled, and gives off a beautiful violet color, ‘Mitori-Okowa’ (glutinous rice steamed with Mitori beans) is cooked for ‘Obon’ and distributed throughout the neighborhood. The custom of offering Manju dumplings filled with bean paste made from Mitori beans at Buddhist altars still remains today. In 2004 the Mitori beans were selected by the Rural Culture Association Japan (Tokyo) as a ‘hometown’ ingredient to be retained (Fig. 10).



Fig10: Mitori Beans

iv. Oben kaki Persimmon (*Diospyros kaki* sp.)

This is a variety of persimmon (kaki) widely grown in this area. This variety has a deep relation to the Rokugomanzan culture, as it is said that the seed was cultivated by the legendary monk, Ninmonbosatsu. There is an old tree in Bungotakada City that is around 230 years old, which is designated by the prefecture as a specially protected tree (Fig. 11).

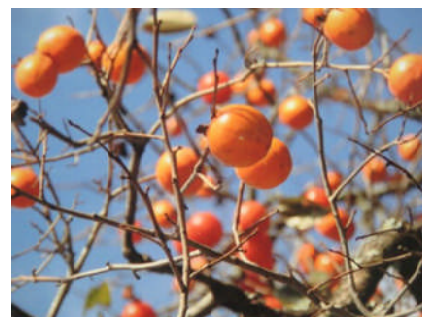


Fig11: Oben kaki persimmon

^① Kinsan: the top part of a Shiitake spread out like an umbrella

b. Conserving Biodiversity of Wildlife and Threatened Species

i. Plants

Among plants, 145 genus and 975 species of vascular plants have been registered. Among the 57 species that are considered to be important vegetation species of this region, 27 are listed in the MoE Red Data List (See Appendix c-i), including the Iwagirisou (*Opithandra primuloides*) (Fig. 12).



Fig12: Iwagirisou (*Opithandra primuloides*)

ii. Fish, Crustaceans

An extremely wide variety of creatures exist in this region and among the 51 species that are recognized as representative species of the area, as many as 48 of these are listed in the MoE Red Data List (See Appendix c-iv).

In the rivers; the Japanese Bitterling (*Tanakia lanceolata* (Temminck and Schlegel)), the Japanese endemic species Akaza (Fig. 13), in the mudflats; the Japanese endemic species Kubohaze, and the Kabutogani, known as a ‘living fossil’, are particularly notable.



Fig13: Akaza (*Liobagrus reinii* Hilgendorf)

The Kabutogani inhabits the waters of the Morie Bay in Kitsuki City and is one of the species that characterizes the Kunisaki Peninsula. The Kabutogani requires different environments depending on its stages of development, such as sandy beaches, tidal flats and seaweed beds^①. This demonstrates that the Kitsuki Bay area retains a good natural and diverse environment that helps this species to breed and grow well. The Aogisu, or ‘Small-scale Whiting’ (*Sillago parvisquamis* Gill) is another species of fish that is seen as endemic to Oita. Sporadic sightings are reported from the coastal areas.

iii. Reptiles, Amphibians

There are 32 species of reptiles and amphibians registered in this area including 12 species which are on the Environment Ministry’s Red List. The Ooitasanshouuo or ‘Japanese Giant Salamander’ (*Hynobius dunni* Tago) (Fig. 14) is a species of salamander discovered and recorded in Oita as its name suggests. It is also designated as a threatened species by the International Union for Conservation of Nature and Natural Resources.



Fig14: Ooitasanshouuo (*Hynobius dunni* Tago)

The Japanese Giant Salamander is designated as a Special Natural Monument of Japan. Among species of salamander, Usa City, which is the only natural breeding ground in Kyushu, is the southernmost limit of inhabitation in Japan.

^① Seaweed beds: plant clusters of sunken, aqueous marine plants, i.e. seaweed, spread on the coastline.

iv. Birds

259 bird species have been confirmed. Among these, 67 are important species to the region and 53 of these are featured in the MoE Red List (See Appendix c-ii). The main specific species is the Koshakushigi (*Numenius minutus*) (Fig. 19) among the 53 species.

Overall this region possesses terrain rich in variation, from mountainous areas to coastal areas. Each and every terrain provides an indispensable environment as suitable breeding grounds for bird species.



Fig15: Koshakushigi (*Numenius minutus*)

c. Ecosystem Functions

The Sawtooth Oak forests of this region support a landscape that sustains multifaceted functions. They sustain the cultivation of log wood cultivated Shiitake as a mainstay of farming livelihood in the local community. They serve to replenish the forest's metabolism through cycles of logging, recharging ground water and the prevention of flooding. The fallen leaves and decomposed logs form layers in Sawtooth Oak forests and Hoda-ba to absorb carbon and conserve soil from erosion, resulting in mitigation of climate change. Irrigation ponds accommodate rapid climate change by their water storage function which alleviates risks of drought as well as flood in rainy seasons and typhoon seasons. Irrigation ponds play an important role in the conservation of paddy agriculture and ecosystems of the region with limited precipitation.

II. 3. Knowledge Systems and Adapted Techniques

In the Kunisaki Peninsula Usa area exists excellent techniques suited to the agriculture and forestry industries such as the circulation of Sawtooth Oak cutting and re-growth, the production of log wood cultivated Shiitake in broadleaf forests, the water supply system of multiple interlinked small scale irrigation pond in each valley, and paddy agriculture, which are listed below.

Sawtooth Oak Forest Management and Log Wood Cultivated Shiitake Techniques

The Sawtooth Oak forests of this region have sustained log wood cultivated Shiitake farming which is a mainstay of farming livelihood in the local community (Fig. 16). Moreover, as the Sawtooth Oak forests exist in the gentle mountain sides, they are relatively homogenous and have good growth. They have the characteristic capability of easily operating a series of Sawtooth Oak forest management and Shiitake cultivation.

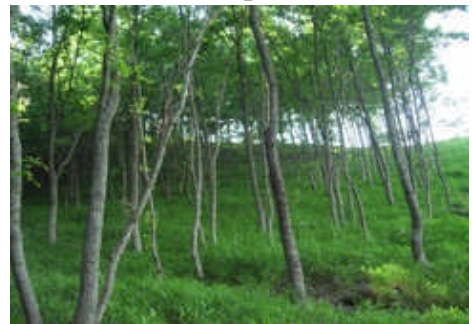


Fig16: Adequately cared-for Sawtooth Oak forests

Compared to the Konara plant (*Quercus serrata* Murray), that is also commonly used in Shiitake

production in other prefectures, the Sawtooth Oak plant yields bigger, heavier (thicker) and larger volumes of Shiitake mushrooms. For this reason the Sawtooth Oak plant has a history of cultivation in the Satoyama regions from around 1880. The Sawtooth Oak forest is maintained around 15 years, which includes weeding and string cutting etc. After 15 years the trees reach a size that is suitable for logwood cultivated Shiitake production, for effective occurrence amount and operations. The logging usually takes place in autumn and the logged wood is pieced into 1-1.2 m fragments. Holes are then drilled into these pieces and they are inoculated with the ‘Tanegoma^①’, a practice called ‘Komauchi^②’. After this process, the Shiitake mycelium spreads its roots inside the log, during a process known as ‘Fusekomi’. The logs are kept in this condition till the following autumn when the Hoda-gi^③ are transported into appropriate bright Hoda-ba areas. The Shiitake mushrooms can be harvested twice a year: in spring and in autumn (Image 3).

The cut off Sawtooth Oak trees grow new sprouts the following spring. At this point the undergrowth in the forest is cleared out to guarantee their growth and ensure the availability of nutrition. The cut off grass creates a barrier for the new grass to grow, and by slowly decomposing on the forest floor, creates a nutrition source for the growing Sawtooth Oak. Two to three years after sprouting, organizational work is carried out in order to retain 2 or 3 of the shoots. The Sawtooth Oak plant re-grows in 15 years and becomes suitable for using as the base for the Shiitake mushroom crop once again.

While most of the maintenance of the Sawtooth Oak forests is carried out by individuals, the Sawtooth Oak forest adjacent to the Matsugasako irrigation pond is jointly managed by the forest management association made up of 28 farm households. The re-grown Sawtooth Oak trees are used by individual log wood cultivated Shiitake producers. Such a “common land” management system and utilization systems are carried out as a whole in this area.

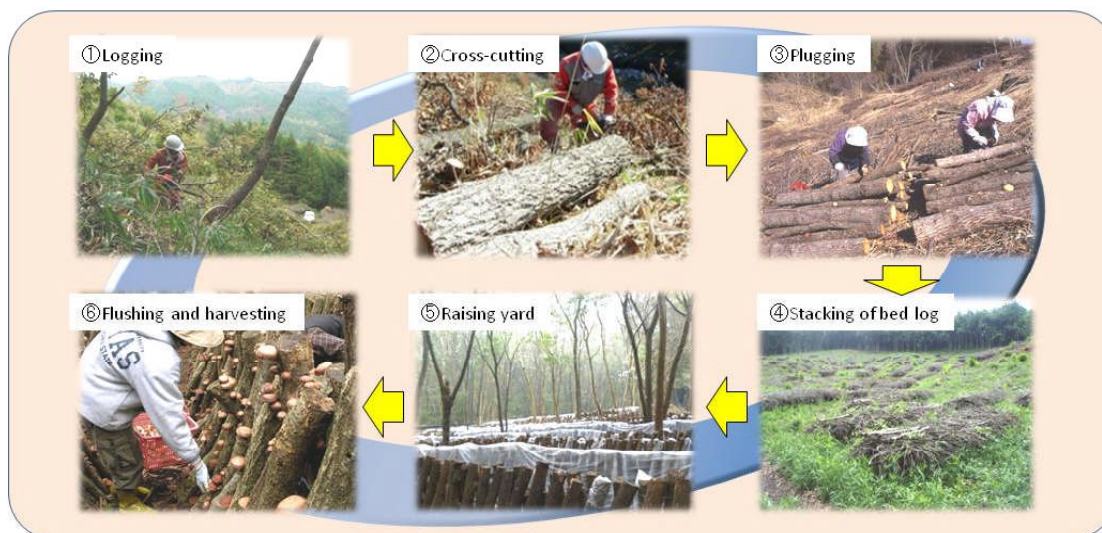


Image3: Process of log wood cultivated Shiitake

① Tanegoma: chips of wood that have been cultivated with fungal filaments, used in the production of Shiitake and other mushrooms.

② Komauchi: the inoculation of Tanegoma into the log wood.

③ Hoda-gi: log wood that has been inoculated with Shiitake Tanegoma

b. Managing the Multiple Interlinked Irrigation Pond System

The water usage system of multiple interlinked small scale irrigation ponds plays an important role in the conservation of paddy agriculture and the ecosystem. The passing down of knowledge and experience in the Kunisaki Peninsula Usa area for the purpose of continuous management of the water usage system is a matter worthy of special attention.

At the meetings held once a year to regulate the irrigation water of the district, “Ikemori” selected from amongst all of the farm households is entrusted with all of the operations and management regarding the irrigation ponds, such as the opening and closing of the pond water drawing points. This Ikemori levels the supply and demand of the wetland rice water and manages the water drawing in order to use the small amount of water more effectively and fairly. If this water management did not function, it would be a difficult situation for the continuation of paddy agriculture. As such, the local farm households which possess these facilities cooperate with one another whilst carrying out the continued management of water supply system, beginning with the irrigation ponds.

With each of the rivers that spread out radially from the Futago mountain system, the management of the multiple interlinked irrigation ponds is in the hands of the local people, which is a characteristic of this region’s paddy agriculture.

c. Traditional Agriculture and Forestry Production

i. Dried Log Wood Cultivated Shiitake

Dried log wood cultivated Shiitake are processed from log wood cultivated Shiitake which have been dried out in the sun or by a drying machine. Based on the condition and color they are divided into “Tenpaku Donko”, “Chabana Donko”, “Donko”, “Koko”, and “Koshin”. In this region, bright Hoda-ba are used for growing the Shiitake, using the broadleaf Sawtooth Oak forest, and when water is needed for the sprouting of the Shiitake, the irrigation ponds are utilized. These practices have contributed in the cultivation of highly prized products such as the Chabana-Donko and Koko which have won numerous accolades including 11 MAFF Ministers Awards and 39 Forestry Agency Awards at the National Dried Shiitake Competition.

ii. Shichitoui

As the Shichitoui plant is weak to low temperature, the crop’s seed bed^① is covered to protect from cold weather in winter. Shichitoui is planted in the beginning of May in rice paddies and thereafter, pruning known as ‘Uragiri^②’ takes place to ensure that the plants are uniform in size and color.

The crop is steadied by nets and protected from rain and wind. After a passage of 90 days from the planting,



Fig17: Manufacturing process of Shichitoui
tatami-omote(surface of tatami)

^① Seed bed: the place where young plants are planted to develop, such as in a field or in woods

^② Uragiri: the work involving cutting the tips to exactly the same length of 1.3 m using a pruning machine

the Shichitoui crop is cut in early August. The cutting must take place in the morning or evening dew and sickles are used to cut the crop. Once cut, the crop is then sliced vertically into two equal halves and the bundles are laid out to dry for 10 hours. Finally, the Shichitoui weaving^① is done. The Shichitoui cutting and processing is a very time-consuming and labor intensive practice (Fig 17), however the cutting and processing period does not overlap with the busy period of the rice paddies. This characteristic of the plant has made it a widely cultivated supplementary crop.

II. 4 Culture, Values and Social Structures

a. Religion, Value System (Water) and Faith

i. Water Resource Management of Tashibunosho Osaki area

In the Tashibunosho Osaki area, rice cultivation using natural spring water began in the narrow flat plains adjacent to steep mountain ravines in the 11th Century. Historical paddy names such as “Amabiki” (which means “inviting rain” in Japanese): are testament to the deep relationship the spring waters had with the local temple and shrines. The Amabiki Shrine was also located in this area (Fig 18). The Tougeike irrigation pond was constructed in recent times in the upstream part of the Osaki valley, which allowed rice agriculture to spread all over the flat plains in the valley with the help of steady water supply.



Fig18: The Amabiki Shrine

The Tashibunosho Osaki region not only retains the rural landscape with terraced paddy fields as it was during the 11th Century in adjacent areas of the Usa Hachiman shrine, it is also a great example of how local cultures evolved through a harmonious relationship between nature and farming societies, involving traditional tilling methods, in the mountainous areas of the Kunisaki region.

ii. The Water philosophy as depicted in the religious practices involving water

The Kunisaki Peninsula Usa area is known for devising many techniques indispensable in water procurement, including the plantation of the broadleaf Sawtooth Oak forests that strengthen the water retention capacity of the groundwater, in addition to the construction of irrigation ponds. Works requiring knowledge, effort and time have been continued fervently.

These ponds were also used for praying to the water gods. Practices such as grass pruning near the ponds, the mud dredging and the practice of “surveying” the environment and potential of water yield with monks all continue to this day. In some ponds, the practice of worshipping the “Pond kannon” (Buddhist deity) in the pool areas (deep water) can also be seen.

① Weaving: making ‘Tatamiomote’ sheets by weaving Shichitoui

b. Shinto-Buddhist Syncretic Practices

In the Kunisaki Peninsula Usa area there exists the Tendai Temple area which has a deep connection with the Usa Hachiman shrine and is also related to agriculture. Characteristic religious festivals still remain today.

i. Shujo-onie (Important Folk Culture Asset- nationally designated)

The Shujo-onie festival is still observed at the Tennenji (Bungotakada City) and Iwatoji and Joubutsu-ji temples (Kunisaki City) today (Fig. 19). The festival offers gratitude for the harvest of the previous year and prays for prosperity in the year ahead. Apart from the lighting of giant torches and memorial services by Buddhist monks, one prominent attraction is the performance of ‘oni’ or ‘demon’ dances by the monks. Ordinary people also participate in the preparation of the lightings and supporting roles beside the ‘demons’ and uphold the close relationship the temples and shrines enjoy with the local community.



Fig19: Shujo-onie festival

ii. Otaue festival

The Otaue festival is one of the occasions commemorating the rice planting and praying for a bumper crop. Ladies arriving with bentou boxes (lunch boxes containing premade food) symbolize the rice crop. Aside from the Usa Hachiman shrine, the festival is also held at Morotayama Shrine (Kunisaki City), Nata and Wakamiya Hachiman Shrines (Kitsuki City) among others.

iii. Doburoku Festival

This festival is held at the Shirahige Shrine in Kitsuki City. It is a festival that celebrates good harvest and pays respect to the guardian deity of this shrine (Fig 20). The parishioner of the shrine belongs to a group of festival organizers called the Jikangumi who select a location to make rice wine for the occasion. It is said that the festival commemorates a tradition that began with the parishioner of this shrine in the year 710.



Fig20: Doburoku festival

c. Unique Food Culture

In this region there is a rich tradition of preparing local cuisine with local farm products or the local fish catch. Aside from individual families, groups of farming women take a prominent part in the management of local food restaurants. These groups are not only engaged in sustaining the traditional food culture of the region, but they are also active in devising new menus with traditional farming items and creating new bridges with customers from urban areas in the process. Some notable items are described below:

i . Dango-jiru (available throughout the entire area)

This is a food item cherished by farming households from during the times when rice was expensive. The ‘dango’ is made of wheat, and it is broiled with seasonal vegetables and laced with Miso, the integral ingredient of Japanese cuisine. It is a food that warms the body and along with supplying carbohydrates and vegetables (vitamins) (Fig. 21).



Fig21: Dango-jiru

ii . Kenchin-jiru (available throughout the entire area)

This dish uses root vegetables broiled in sea kelp or dried Shiitake extract and is then laced with Soy sauce or Miso paste. It was consumed by pilgrims in olden days, and is devoid of meat items for this reason (Fig. 22).



Fig22: Kenchin-jiru

iii . Imokiri (available in Himeshima Village)

This is a local daily food popular among common people living in the community near the coastal area which has small paddy fields. Noodle made of taro powder and wheat powder is served with soup using dried Shiitake and fresh fish as broth (Fig. 23).



Fig23: Imokiri

iv . Mitori-okowa (available throughout the entire area)

The Mitori beans are a common local type of ‘sasage’ beans, they are widely cultivated because they are easier to produce than the azuki variety and they have a greater output (in volume). This type of bean is a famous local product of the Usa area. Its color is darker in comparison to the azuki bean (Fig. 24).



Fig24: Mitori-okowa

v . Ureshino (available in the Kunisaki Peninsula)

The Sea Bream (Tai) variety of fish was widely available in the Kitsuki area. This was a favorite food of the feudal lord of the Kitsuki fief (han) and became known as ‘ureshino’ (originating from his word ‘very happy’). This is considered to be a delicacy today. The fish is seasoned with soy sauce and sesame and laid on top of rice and served with tea poured over it(Fig. 25).



Fig25:Ureshino

d. Social Organizations of Irrigation Pond Management

In order to prevent water backing up that has flown down from upstream, there is a need to build “embankments” for the irrigation ponds. The construction of these embankments took place up until the 19th century, a period without large machinery, and was carried out by hand by the farmers.

The completed irrigation ponds made it possible to store water in the future, and the region had to manage these appropriately.

As referred to earlier, the “Ikemori” tradition of managing water usage is practiced in the Tsunai area of the Kunisaki City by communal leaders chosen by the region. The water for agricultural use

is supplied and distributed according to the area of the paddies.

In addition to their primary functions of “water supply for agricultural use” and “water control”, irrigation ponds also serve many other functions such as “cultivation and purification of underground water”, “emergency livelihood water supply”, “water-front scenery formation” and “biodiversity conservation”. Thus it is necessary for local farmers to continue this irrigation pond management.

II. 5 Remarkable Landscape and Water Resource Management Features

a. Landscape

Due to the volcanic activities of the Futago volcanic zone about 1.5 million years ago, the Kunisaki Peninsula was created in a near-circular shape around Mt. Futago. Parts of the Kunisaki Peninsula are recognized for their excellent visual and natural capital value. Furthermore, parts of the area are registered under the ongoing Seto Inland Sea National Park scheme and Prefectural Nature Reserve of Kunisaki Peninsula (See Appendix e).



Fig26: Landscape of Tashibunoshō: Sawtooth Oak

In the valleys of the mountains that extend to the coast, there are multiple irrigation ponds and in the lower reaches of these valleys, rice paddies were developed using irrigation ponds water.

forests, connected by irrigation ponds, channels and paddy fields

In addition there are stretches of Sawtooth Oak forests that sustain Shiitake farming, which is practiced in combination with rice cultivation.

Finally, the ‘Agricultural landscape of Tashibunoshō Osaki Area’ (Fig.26 and 27) is regarded as a living museum where the early 14th to 15th century agricultural practices and landscapes are retained. This area was registered as a Nationally Important Cultural Landscape in 2010.

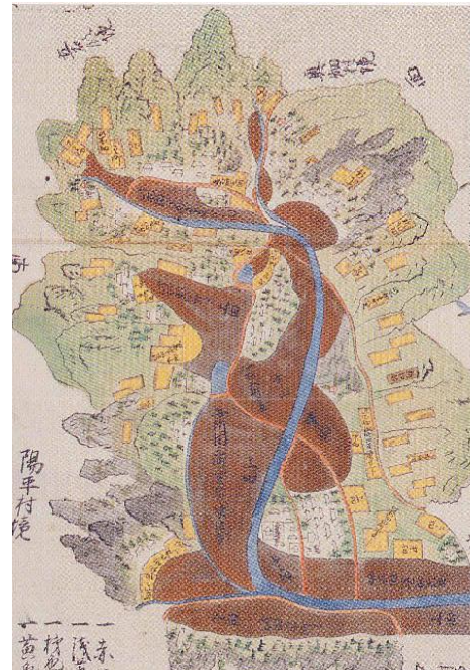


Fig27: Ancient Map

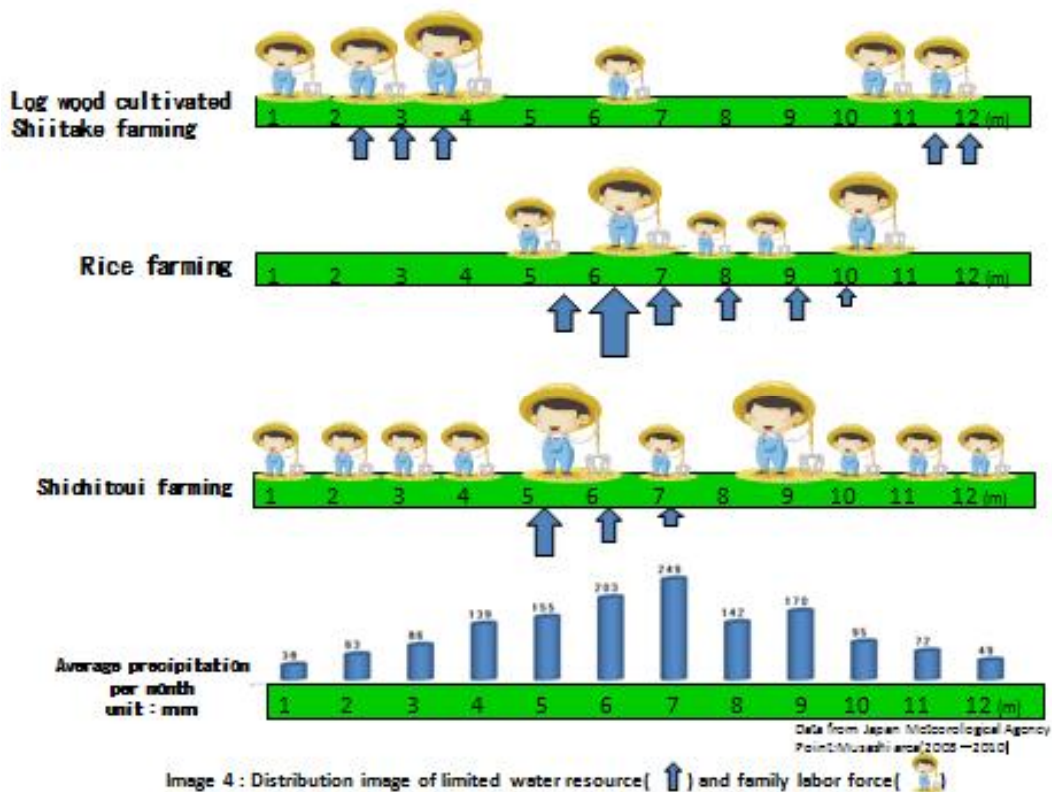
b. Land and Water Management

Interlinked Irrigation Pond System

It is thought that the history of the irrigation ponds in this region goes back to the 11th century when rice cultivation was developed. The irrigation ponds of this region have the unique

characteristic of being “interlinked”, where small canals join these water bodies and distribute water from these ponds on an equitable basis throughout the region, thereby alleviating water shortages. In addition, the canals also bring water (precipitation) from other catchment areas into the reservoirs, and maintain a steady water supply.

For effective usage, the limited water resources are distributed systematically to the log wood cultivated Shiitake farmers (for the sprouting of Shiitake from February to April and November to December), to the rice farmers (for the rice planting in June), and to the Shichitoui farmers (for the Shichitoui planting in the beginning of May). (Refer to Image 4 below for water and labor distribution)



III. Other Social and Cultural Characteristics Pertinent to the Management of the Agricultural System (Optional)

The Usa Hachiman shrine is one of the most famous shrines in Japan. The main pavilion (Fig.28) is registered as a National Treasure, and the origin of this shrine is dated back to 571 AD.

The patron Deity, Hachiman, is said to have appeared near a pond shaped like a diamond (rhombus) and from this it can be said that Hachiman has the characteristics of a water Deity.

We have observed in the proposal that the Kunisaki



Fig28: The main pavilion of the Usa Hachiman shrine

Peninsula Usa area is known for its irrigation pond culture, and as the Hachiman Shrine and its affiliated temple, the Mirokuji have had a profound effect in shaping the culture of this region, it can be claimed that the influence of the Hachiman Deity was a motivating factor behind the creation of the water management culture. The resting place of Hachiman is said to have been constructed in a shape of Misumiike by a craftsman who came to Japan in the Asuka Period.

The oldest and most traditional part of the culture associated with the history of the peninsula is the Rokugomanzan, and the mountains where Hachiman trained were the mountains of the Kunisaki Rokugo. After this, from the 11th to the 12th century a new village control system called the manorial system was put in place, and subsequently in Kunisaki's Rokugo many manors were established that were possessed by the Usa Hachiman shrine. After this, clear evidence of agricultural practices associated with the Rokugomanzan in this region emerged.

In the 17th century the Rokugomanzan temple which had temporarily fallen into decline began to be revitalized and the Futagoji Temple played an important role in revitalizing the religious landscape of the area. The Mineiri ritual (Fig.29) provided an important bridge to connect priests and ordinary people. It is also thought that the stone carvings of Buddha on the mountainsides of the land exemplify local animistic beliefs associated with the mountains. Mountain worship is a practice that involves worshipping the mountains as gods, but whereas the mountains are tough and unforgiving, they are actually providers of water and other vitally important resources for life in the flat plains. The Magaibutsu which is sculpted on the hillside is said to represent the mountain deity in the form of Buddha. The Magaibutsu has close ties with local shrines and symbolizes the blessing of the mountain deity which takes the form of water. From the stage of the establishment of Rokugomanzan in this region, a deep understanding and gratitude toward the cycle of resources has taken root in this region.



Fig29: The Mineiri ritual

IV. Historical Significance

a. History of Paddy Agriculture

It is clear that paddy agriculture has been carried out in the Kunisaki Peninsula Usa area from ancient times. The historical ruins of the Ankokuji hamlet (Fig.30) were found on the right bank of the Tabuka River, a region that is now covered in rice paddies. In 1992 it was designated as a Historic Site.

In an investigation carried out in the period between 1949 and 1952, a large amount of pottery and wooden tools such



Fig30: Historical remains of the Ankokuji Hamlet

as plows and hoes were dug up, which were clearly remnants of a village from the Yayoi Era (400BC-400AD). The establishment of wetland rice crops in the Yayoi period brought about the permanent settlement of residents and the formation of the communities.

Water is a primary requirement for wetland rice cultivation. Due to the patronage of the Usa Hachiman shrine established in 571 and its affiliated temple, rice agriculture spread through the manor system in the area. This manor system is a living example of the farming landscape during the early 14th-15 centuries.

b. History of Sawtooth Oak Forests

Seeds of Sawtooth Oak were found along with pottery and wooden tools from previously mentioned Ankokuji hamlet historical ruins. It comes to the presumption that Sawtooth Oak forests extended and nuts of Sawtooth Oak were gathered for human consumption around the ruins in Yayoi Era (400BC-400AD).

With the establishment of wetland rice agriculture, Sawtooth Oak was used for charcoal and firewood making. Later Sawtooth Oak was recognized as useful log wood for Shiitake cultivation and was planted from the end of 19th century. Especially in Oita prefecture, Japan's largest Sawtooth Oak forests was formulated because of the support by Oita Prefectural Government, such as subsidies for Sawtooth Oak planting aimed at promoting log wood cultivated Shiitake as a cash crop.

c. History of Multiple Irrigation Ponds

Securing water has been a challenge in this region since ancient times. Irrigation ponds are constructed to address this challenge, and many are seen in the Kunisaki Peninsula today. Irrigation ponds were small in size and built in plain field near hamlet before 17th century. Some irrigation ponds were built in valley like present-day dam and on mountain ridges with gradual slope after 17th century. As new paddy fields were developed around existing paddy fields in 19th century, a more complex system of multiple interlinked irrigation ponds system was devised and built in a full-fledged manner.

d. History of Log Wood Cultivated Shiitake Production

Shiitake cultivation in Japan started in the Saiki City area of Oita during the early 17th century when Natameshiki cultivation method^① using Nara (*Quercus* L.) or Sawtooth Oak was established. This technique was brought to the Kunisaki area in 1885 when a farmer from Tsukumi specializing in Shiitake cultivation settled in Mt. Futago. Shiitake cultivation entered a phase of rapid growth with the discovery of 'plug spawn' made by Kisaku Mori in 1942. As Kunisaki offered a particularly good environment for cultivation due to the presence of Sawtooth Oak forests, the region eventually became the main production area for log wood cultivated Shiitake production in

^① Natameshiki: Cultivation method: Shiitake cultivation method that spore of Shiitake naturally attaches to log wood nicked by suing sickle.

the country.

People in the area still observe the custom to eat Botamochi^① praying for good harvest when they drill plug spawn into log wood. Since Botamochi means “good luck” and “many fruits (mycelia)”, this practice to wish for mycelia attachment to log wood is the traditional custom originated in the period when Shiitake cultivation was not stable unlike today.

e. History of Shichitoui Cultivation

Shichitoui cultivation in Oita began about 350 years ago, when, it is said, Goroemon Hashimoto took seedlings back home with him to the Kunisaki area where it spread. Records show that 3 million bundles were exported to Kansai area in the 1700s, under a protection and promotion policy of the local ruler. This export was known as ‘Bungoomote’.

Shichitoui became an important indigenous farming practice in Kunisaki where the total area of farmland was small, and brought large profits to the region.

Nagatsune Okura, who is known as one of the three great experts of agriculture during the Edo Period, is known to have raised Shichitoui as an example of community profit making, and argued for reform of agricultural management practices to cope with advances made in trade and industry led economy. Thus, we know that the Shichitoui had a significant influence on the traditional agriculture of Japan (Fig. 31 and 32).

Strong and high quality Shichitoui is selected as parental strain and inherited to next generation because it is propagated by division of underground stem. It is interesting and charming fact that even currently cultivated Shichitoui is an inheritance from the parental strain selected in Edo period.



Fig31: Shichitoui cultivation



Fig32: Judo hall equipped with tatami mat covered with Shichitoui sheet

V. Contemporary Significance

In the modern world, more urbanized and increased populations are contributing to increased carbon dioxide in the air and loss of forest resources, manifesting global warming. On the other hand, an improper use of pesticides and agricultural chemicals and mislabeling food are growing unrest on food safety.

^① Botamochi: Rice dumpling covered with bean paste.

a. Climate Change

In Kunisaki Peninsula Usa area, fallen leaves and discarded logs form layers in Sawtooth Oak forests and Hoda-ba to absorb carbon and conserve soil, resulting in mitigation of climate change. Irrigation pond accommodate rapid climate change by its water storage function which alleviate risks of drought as well as flood in rainy and typhoon seasons.

b. Biodiversity Conservation

The Oita Japanese Giant Salamander and the Horseshoe crab are found in this area. These are both rare species and they cannot survive without clean water. Due to the Sawtooth Oak forests and Irrigation Ponds in the Kunisaki Peninsula Usa area, a stable waterfront environment has been created, preserving the abundant nature which retains many biodiversity hotspots providing habitats for a range of species. A part of these hotspots are maintained by conserved areas such as national parks, but a large number of these zones are also managed directly by local communities through initiatives such as the Aigamo Agricultural Practice^①, farming by sex pheromones (instead of pesticides) in pest control measures for Shironegi cultivation, and Sawtooth Oak forest and Irrigation Pond management across generations.

c. Multi-stakeholder Process for Conservation of Traditional Agriculture

In recent years, children are encouraged to experience these environments, giving them more knowledge about primary industries and food production in addition to helping them develop their interpersonal skills, independence, self-sufficiency, manners and moral and mental fortitude. Efforts to popularize rural experiences with children are being implemented widely. Green tourism initiative in the region increases city dwellers' interest in agriculture, forestry and fisheries, and plays a large role in the revitalization of the region.

d. Food security and safety

Shiitake cultivation is expanding worldwide and is providing an alternative source of nutritional food and livelihoods in many areas where arable land is constrained. The 'Oita Dried Shiitake Traceability System' is a pioneering concept that has used in Oita from 2006. This system allows complete tracking of the package from the production location, to selling and shipment points. This is deemed useful for maintaining the production quality and volume of the largest dried Shiitake in Japan (Fig. 33).

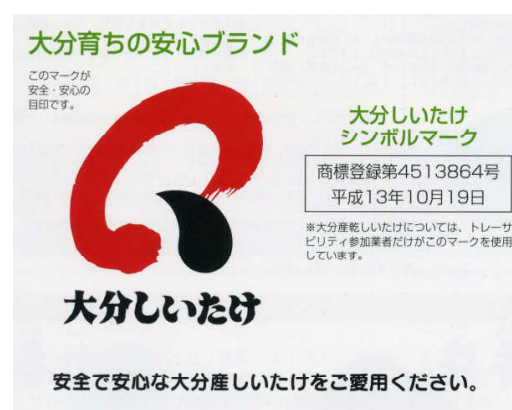


Fig33: Oita Shiitake Logo

^①Aigamo Agricultural Practice: Practice that Aigamo duck is released to eat weed and pests in rice paddies after harvesting. The duck supply oxidant into paddies by stirring water and mud too.

VI. Threats and Challenges

a. Threats

Depopulation and aging are two major threats for the sustainable development of the agricultural community of the Kunisaki Peninsula Usa area. The total population of this area fell from 186,246 in 2000 to 177,433 in 2010, and the number of farming households fell from 18,009 in 2000 to 13,691 in 2010. In addition, about 70% of the people who engage in farming as their main source of livelihood are over 65 years of age. If these trends persist, abandonment of farmlands will increase, the management of the satoyama including Sawtooth Oak forests will collapse, biodiversity will decrease and invasive species will disturb the ecosystem due to reduced biodiversity.

Until the early 20th century, the Shichitoui was a major side-profession for farmers. However, mechanical cutting could not be developed due to the toughness of the plant, and due to the fact that it requires intense manual labor, coupled with the scenario that young people migrated to urban areas during the high economic growth, and the number of houses with Japanese style rooms declined, the production took a severe hit. The scenario is no difference in Kunisaki City which is the only remaining production area. The total area of plantations at the peak was 1,711 ha in 1,925, but it dwindled to a mere 1ha in 2011. The farmers engaged in this practice are steadily growing older, making the continuation of this profession a grave challenge.

b. Challenges

Countermeasures connecting national and regional organizations conformed to ‘The Basic Plan for Food, Agriculture and Rural Areas(2010)’ drawn up by the Ministry of Agriculture, Forestry and Fisheries are being carried out. Measures such as establishing farming schools to recruit people into farming, reforming empty houses to take in people from cities, environmental policies of those mountain villages and measures of combining software and hardware to keep out deer and wild boar are being actively pursued. Efforts such as conservation measures for Satoyama (rural landscape), protection and management of wildlife, infrastructure building to sustain biodiversity are being made based on ‘Oita Prefecture Strategy for Biodiversity (Mar. 2011)’.

VII. Practical Considerations

a. Sustained Efforts for GIAHS Promotion

i. Log Wood Cultivated Shiitake

For maintaining the agri-heritage of the Kunisaki Usa it is imperative to maintain the Sawtooth Oak forests of this area in an optimum condition. There are numerous grant schemes for upgrading Shiitake production efficacy and the Oita Shiitake Genbei School for young farmers, providing them with incentives and leadership training.

ii. Shichitoui cultivation

The Shichitoui production area was nominated as a ‘Furusato Cultural Asset Forest’ by the Agency for Cultural Affairs in 2010, and became a sustainable source for use in repairing cultural artifacts.

In the same year the ‘Kunisaki Shichitoui Promotion Association’ was established by farmers, sellers, and government organizations. This association is creating ways for preserving and revitalizing this practice as a traditional industry. Furthermore, the Kunisaki city and Oita National College of Technology signed a joint agreement for labor saving on the fiber weaving looms, and Oita Prefecture is attempting to support production growth by improving the weaving looms and drawing up circulation and sales strategies in the year 2013.

iii. Makomo Wild Rice Cultivation

There are efforts to popularize the Makomo production in the Osaki Region of Tashibunosho, which is deeply related to Usa Hachiman shrine, and the provision of Makomotake wild rice cooking during stays in local farming households, model harvesting sessions and workshops, to deepen interaction with visitors from inside and outside the prefecture.

iv. Organic Farming, Pesticide Reduction

In the area, there are active efforts to ensure environmentally friendly agriculture. Rice and vegetable products conform to the JAS standard, and 46 farming households, comprising around two thirds of the JAS accredited farming households of Oita, are from this region. There are also efforts to minimize pesticide use and chemical fertilizer use and the region is steadily becoming one of the popular area of organic, pesticide reduction farming.

v. Farmland/Water Environment Conservation

Volunteer groups and others are tackling the maintenance/management activity of water supply system such as multiple irrigation ponds and seaweed bed/tidal flats environment conservation project by utilizing schemes such as Farmland/Water Environment Conservation and Improvement Project of The Ministry of Agriculture, Forestry and Fisheries and Environment/Eco System Conservation Project of Fisheries Agency.

b. Interaction between cities, mountain villages and fishing hamlets

A pioneering effort to popularize green tourism is found in the Ajimu Town of Usa City, where guests are allowed to stay in farming households to experience the farmers’ lives as if they were family or relatives of the farmers. This area is known in Japan as the leader of Green Tourism and the origin of private residence farm stay. Oita Prefecture relaxed rules to allow tourists to stay in local households. Bungotakada and Kunisaki City areas are also witnessing similar types of activities. A total of 12,889 people were allowed to stay in farming houses between April 2011 to March 2012, and this initiative has a big influence on facilitating interaction between urban and rural units (Fig.34).

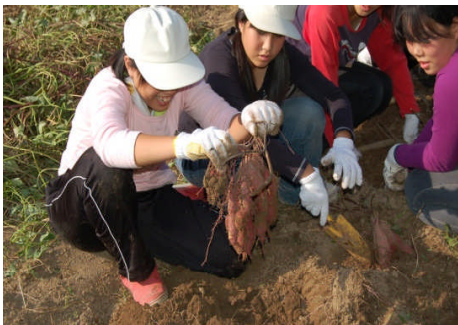


Fig34: Agricultural experience

c. Prospect of managing the GIAHS in a sustainable manner

The number of new entrants in the log wood cultivated Shiitake industry rose by 44 people, 5

companies during 2008-2011. Furthermore, the voluntary research groups and production units in the Kunisaki Usa area are working actively.

In recent years there is a trend for appreciation of rustic and natural products and the need for Shichitoui mats in Kyoto's temples and prefectural Japanese style inns, for example, is definitely increasing. Two new trainees have been incorporated into the profession and numerous other initiatives to strengthen the profession are ongoing.

GIAHS accreditation to this site will not only increase the motivation for the agriculture, forestry and fishery industries of the region, but will also increase tourist people and add value to local products through tourism, and will contribute to both the revitalization of the primary industry's local livelihoods and the increase of the people's involvement in these professions.

Traffic access is a vital point for sustaining this type of good stimulus for the local society. Fortunately the region has an airport, 1 hour 35 minutes flight from Tokyo's Haneda airport and about a 2 hour flight from Narita airport.

d. Expected Social and Ecological Benefits of the GIAHS

There are three main influences that can be expected from the site becoming registered as a GIAHS.

The first influence is the feasibility of managing traditional cultural capital in the region. It is expected that with the efforts to manage the Sawtooth Oak forests and Irrigation Pond sustainably, there will be a continuous system of managing associated agricultural systems into the future, resulting in the revitalization of agricultural practices and ecosystem maintenance. And repeating the Sawtooth Oak cutting and regeneration facilitates the metabolism of the Sawtooth Oak forests and fulfill the multifunctional role of the forests. It is also expected to contribute to the world's food security that log wood cultivated Shiitake produces food from forest resources.

The second expectation is that more interaction between urban and rural units will be made possible. An increase of tourists will increase the potential of green tourism. With increased interaction between urban and rural areas, understanding about agriculture, forestry and fisheries will increase. It is also expected that with the progress of keeping the successors to respond to the increase of farmers' houses' staying and exploiting I/J/U turn^① returnee's knowledge, agriculture, forestry and fisheries will activate.

The third expected result is the strengthening of local branding. The GIAHS accreditation gives a global identity to a region and in this case it will help the region make its presence be felt in an increased manner, with the dried log wood cultivated Shiitake and Shichitoui that is only produced in Kunisaki City. It is expected that the more local farmers, foresters and fishermen will be a part of

① I turn: to get a job at or migrate to a place that is not his or her hometown

J turn: people from rural area work at urban area one time and then migrate to other rural area (not his or her hometown) and work there

U turn: people from rural area work at urban area one time and then return to his or her hometown and work there

a sixth industrialization^① and positive stimulus will be available for not only local agricultural production, but also for regional revitalization in general.

e. Motivation for Stakeholders in the National and Local Organs and Other Units

i. Local Society

The GIAHS Promotion Association comprising 4 cities, 1 town and 1 village in the Kunisaki-Usa area is the mother organization for efforts to get GIAHS status to this region and also for managing this region as a GIAHS.

These efforts will help conserve the traditional agriculture, culture and landscapes of the area as well as revitalize primary industries and local lifestyle. Residents of the region will also be involved in surveys and kick-off meetings for GIAHS as well as numerous other follow-up measures.

In addition to the Tashibunoshō Osaki area already being registered as an Important Cultural Property, there are committees such as the Manor Promotion Committee which is working towards revitalizing the region through the utilization of this landscape and the committee striving to have Usa Hachiman shrine and Kunisaki Peninsula designated as World Heritage Sites.

ii. Regional Stakeholders

Oita Prefecture is managing the concept of ‘The Oita’ brand with dried log wood cultivated Shiitake and kabosu limes at its center. At present the initiative is being strengthened with Shiroshidakarei (flatfish), Shironegi and House mikan.

In order to manage the good quality of the Shiitake, the Traceability System is used to track customer satisfaction. Shichitoui is also promoted as a traditional product of Oita and with the support for activities of and market openings for the “Kunisaki Shichitoui Promotion Association”, a new branding initiative has been taken to promote it as a regional product. Other products will also be brought in under the 6th industrialization scheme and be strengthened as brands.

The region is also pushing for more tourists with the slogan “Oita: Japan’s best hot spring hot spot. Full of flavors”. Numerous efforts such as making tourist products based on culture, utilizing the historic nostalgia associated with the Himeshima village and the 1000 year old syncretic tradition of the Usa Hachiman shrine are trying to bring these elements together to make a ‘1000 year old historical zone’ with this region at the center.

iii. National Level

The national government is participating in efforts to create more agricultural production based industries through its ‘Basic Plan for Food, Agriculture and Rural Areas (2010)’.

The national government is also committed to maintaining the production platform for agricultural products and environmental conservation in rice paddies and Satoyama (rural landscape) regions in accordance with local land management systems.

^① Sixth industry: the term is derived by multiplying the industrial sectors as follows. First (primary) × second (secondary) × third (tertiary) to come up with the “sixth industry.” The sixth industry is expected to synergistically create a new added value through effective use of agricultural, forestry and fishery products, as well as land, water and other resources in farming, mountains and fishing villages, by integrating production, processing and distribution activities.

The 'Basic Tourism Promotion Plan (2012)' is a step towards strengthening local brands associated with culture and agricultural lifestyles—which are seen as important tourism capitals, especially for the promotion of green tourism.

f. Historical and Archeological Explanation

The Kunisaki Peninsula is characterized by steep and dissected mountains, with deep ravines radiating outwards. The dissected, steep mountains were beyond the grasp of human thinking for the ancient societies and thus formed places of worship. The priests of Mirokuji Temple of the Usa Hachiman shrine pursued the Kunisaki Peninsula as a training center.

Kunisaki Peninsula is an area of mountain worship and based on the fact that it was a place of discipline for the monks of the Mirokuji Temple the Rokugomanzan were created during the 12th Century.

From before the establishment of the hamlets, the downstream areas of the rivers and the basin areas that make up the base points of these hamlets, forestry and agricultural works were carried out, and the Ankokuji village remains which are remnants from the Yayoi Period (300BC-400AD) tell of such an agricultural state in the river's downstream areas.

The place of discipline and the temple in the river's middle- and upper stream areas brought about the development of farming in the valleys between the mountains and a bird's eye view of the peninsula would show that the middle- and upper stream areas were Rokugomanzan and the downstream areas and coastal areas formed the manors and associated lands of Usa Hachiman shrine and Mirokuji.

Under these historical backgrounds, this area nurtures agriculture, forestry, fisheries diversity.

Outline of the Dynamic Conservation Plan

The GIAHS Promotion Association, comprised by cities and others, will actively tackle the conservation and succession of the system, ecosystem and culture of the site accredited by GIAHS and expect good results by developing the following activities.

And the association will monitor and evaluate these activities along with managing the progress.

a. Promotion of Agricultural Production and Biodiversity Conservation

i. Log Wood Cultivated Shiitake

As the log wood cultivated Shiitake production mostly involves small scale farmers, steps to stabilize their business, strengthen production bases, improve quality, cut costs, divide labor and improve circulation will be taken.

Efforts will be made to maintain the traditional Shiitake cultivation techniques, through small group of Shiitake growers and research groups on forestry practices formed in the villages and towns.

The Efforts to gain the JAS accreditation will also be made.

ii. Shichitoui

In the year 2010, the Shichitoui production landscape of the Kunisaki area was recognized as a ‘Furusato Cultural Asset Forest’ for its stable supply of materials for cultural artifacts conservation. In 2012 the Kunisaki City and Oita National College of Technology signed a joint agreement for labor saving on the fiber weaving looms.

From 2013, the Shichitoui Production Promotion Platform will be managed as a regional task, involving improvement of the weaving looms (machines) in addition to improvement of production, quality, circulation and sales strategies.

iii. Conservation and Rehabilitation of Sustainable Biodiversity

As this region’s marine products are nurtured by the characteristic geographical conditions of the water and coastal areas brought about by the forests, research institutions are advancing research regarding the relationship between the organic matter and nutrient salt originating from the forests, and the ecology of the oceans.

Furthermore, research by the various main constituents such as NPOs, research institutions and local governments regarding the inhabitation and growth environment of will continue to be put into execution. Based on this research, public awareness activities and environmental conservation and revitalization activities such as irrigation pond and paddy field creature observation will be carried out.

b. Traditional Land Use and Cultural Continuity

i. Dried Log Wood Cultivated Shiitake

Numerous initiatives are being taken to improve production and employment in log wood cultivated Shiitake farming such as: the Oita Shiitake Genbei School, Shiitake Production Research Units aiming to attract new farmers.

ii. Shichitoui

In the year 2010, the Kunisaki Shichitoui Promotion Association was set up by farmers, sellers, and government organizations to maintain this cultural tradition of Oita and also to revitalize the regional industry. The effort brings these stakeholders together for reviving Shichitoui.

In 2012 the Kunisaki City signed a joint agreement with Oita National College of Technology for labor saving on the fiber weaving looms.

iii. Irrigation Ponds

It is planned so that the main managing bodies of these reservoirs, the land reform commissions and the management groups will involve non-farming local residents to create an extensive platform of irrigation ponds management across the whole region.

iv. Sawtooth Oak Forest

Oita Prefectural Government’s Forest Improvement Project contains a Preservation Plan for the Sawtooth Oak forests aimed at circulatory usage of Sawtooth Oaks as log wood for Shiitake cultivation. Appropriate maintenance and conservation will be conducted based on this plan.

c. Complementary Initiatives at National and International Levels

i. Interaction between Urban and Rural Areas

Various schemes centering on tourism are being planned including the strategic utilization of local tourist attractions, such as nature, hot springs, culture, local produce, and food. Need based tourism product development, volunteer guide development and regional tourist routes using the Kyushu Bullet Trains are some other notable examples.

ii. Interaction with other GIAHS sites

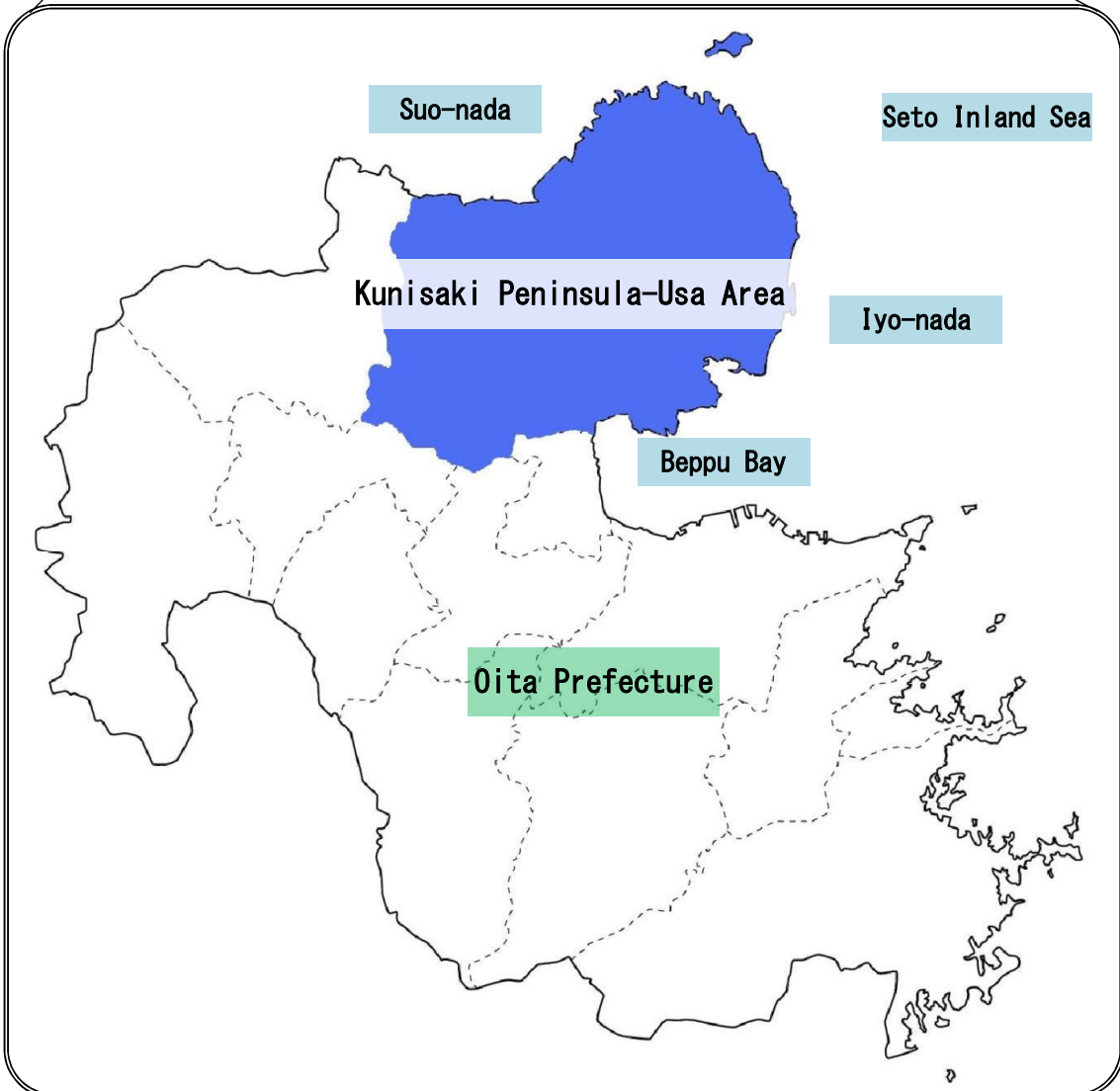
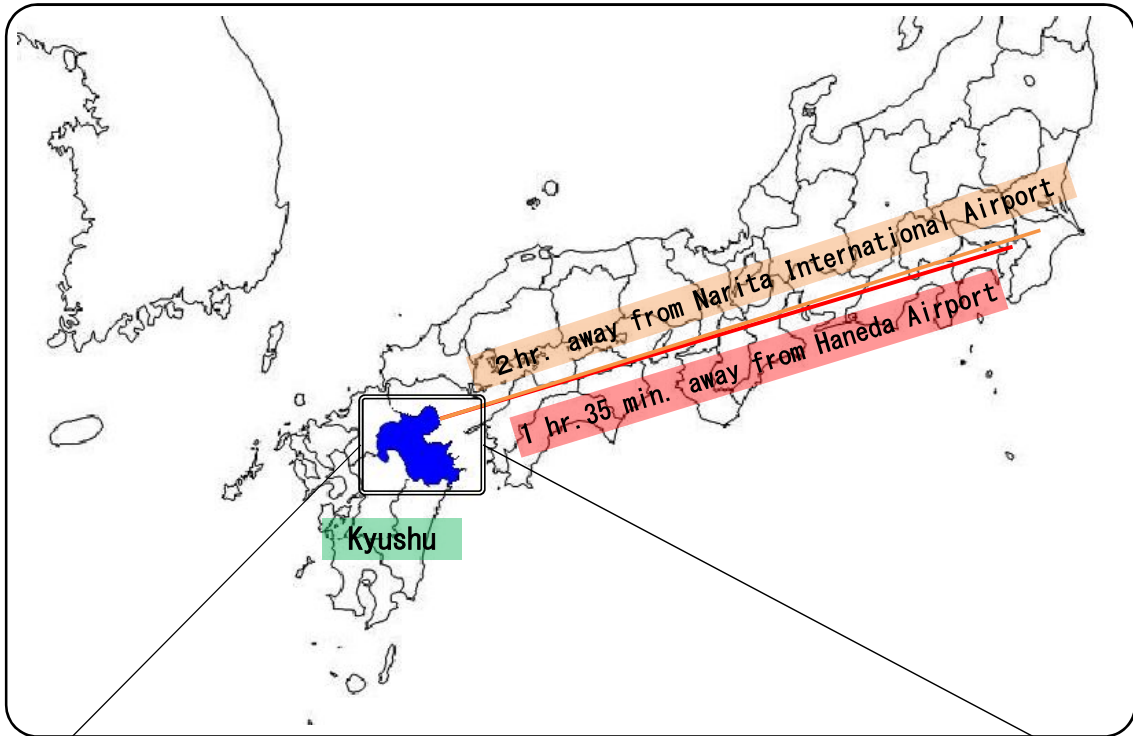
Attractive programs will be formulated by promoting interaction with other GIAHS sites.

○ Appendices

- a) Map
- b) Diverse list of agricultural products
- c) List displaying biodiversity
- d) Interlinked multiple irrigation ponds
- e) Designation status of nature parks

○ Appendicies

a) Map



b) Diverse list of agricultural products

Category	Article	Scientific name	Notes
Rice	Rice	<i>Oryza sativa</i>	
	Rice for brew	<i>Oryza sativa</i>	
	Ancient rice	<i>Oryza sativa</i>	
Wheat varieties	Barley	<i>Hordeum vulgare</i>	
	Wheat	<i>Triticum aestivum</i>	
	Naked barley	<i>Hordeum vulgare var.nudum</i>	
Millet	Buckwheat	<i>Fagopyrum esculentum</i> sp.	
Pulses	Soybean	<i>Glycine max</i>	
	Peanut	<i>Arachis hypogaea</i> sp.	
	Cow pea	<i>Vigna sinensis</i> L.	
Vegetables	Tomato	<i>Lycopersicon esculentum</i> Mill.	
	Welsh onion	<i>Allium fistulosum</i>	
	Welsh onion	<i>Allium fistulosum</i>	
	Strawberry	<i>Fragaria × ananassa</i>	
	Cucumber	<i>Cucumis sativus</i> L.	
	Egg plant	<i>Solanum melongena</i> L.	
	Cabbage	<i>Brassica oleracea</i> L. var.capitata sp.	
	Chinese cabbage	<i>Brassica rapa</i> var.nipposinica sp.	
	Japanese radish	<i>Raphanus sativus</i> L.	
	Onion	<i>Allium cepa</i> L.	
	Taro	<i>Colocasia esculenta</i> Schott	
	Pea	<i>Pisum sativum</i> L. sp.	
	Rope	<i>Brassica campestris</i> ver.campestris	
	Garlic	<i>Allium sativum</i> L.	
	Rape blossom		
	Water dropwort	<i>Oenanthe javanica</i>	
	Shepherd's Purse	<i>Capsella bursa-pastoris</i> (L.) Medik.	
	Cudweed	<i>Gnaphalium affine</i>	
	Chickweed	<i>Stellaria neglecta</i>	
	Nipplewort	<i>Lapsana apogonoides</i>	
Turnip	<i>Brassica rapa</i> L.		
Radish	<i>Raphanus sativus</i> L.		
Bamboo shoot	<i>Phyllostachys pubescens</i>		
Manchurian wild rice	<i>Zizania latifolia</i>		
Fruit	Satsuma mandarin	<i>Citrus unshiu</i> Marc.	
	Kiwifruit	<i>Actinidia chinensis</i> Planch.var.deliciosa	
	Yuzu	<i>Citrus junos</i>	
	Kabosu	<i>Citrus sphaerocarpa</i>	
	Grape	<i>Vitis</i> spp	
	Japanese pear	<i>Pyrus pyrifolia</i> ver.culta	
	Japanese persimmon	<i>Diospyros kaki</i> Thund	
	Ginkgo	<i>Ginkgo biloba</i>	
	Olive	<i>Olea europaea</i>	
Flowers	Florist's chrysanthemum	<i>Chrysanthemum</i> L. sensu ampl.	
	Prairie gentian	<i>Eustoma grandiflorum</i> (Raf.) Shinnery	
	Sweet pea	<i>Lathyrus odoratus</i> L.	
	Aster	<i>Aster hispidus</i> Thunb. var. hispidus	
	Sunflower	<i>Helianthus annuus</i> L.	

	Stock	<i>Matthiola incana</i> (L.) R.Br.	
	Chinese lantern plant	<i>Physalis alkekengi</i> var. <i>franchetii</i>	
	Rose	<i>Rosa</i> .L	
Livestock	Japanese Black	<i>Bos taurus</i>	
	Holstein	<i>Bos taurus</i>	
	Pig	<i>Sus scrofa domesuticus</i>	
	Broiler	<i>Gallus gallus domesuticus</i>	
	Layers	<i>Gallus gallus domesuticus</i>	
Forestry products	Ceder	<i>Cryptomeria japonica</i>	
	Japanese cypress	<i>Chamaecyparis obtusa</i>	
	Moso bamboo	<i>Phyllostachys edulis</i>	
		<i>Phyllostachys reticulata</i>	
Fungi	Shitake	<i>Lentinus edodes</i>	
Marine products	Red sea bream	<i>Pagrus major</i>	
	Hairtail	<i>Trichiurus japonicus</i>	
	Pike conger	<i>Muraenesox cinereus</i>	
	Marbled sole	<i>Pleuronectes yokohamae</i>	
	Japanese anchovy	<i>Engraulis japonica</i>	
	Common Octopus	<i>Octopus valguris</i>	
	Kuruma Prawn	<i>Marsupenaeus japonicus</i>	
	Whiskered Velvet Shrimp	<i>Metapenaeopsis barbata</i>	
	Swimming crab	<i>Portunus trituberculatus</i>	
	Pacific oyster	<i>Crassostrea gigas</i>	
	Japanese littleneck	<i>Ruditapes philippinarum</i>	
	Razor clam	<i>Solen strictus</i>	
	Nori	<i>Porphyra yezoensis</i>	
	Hiziki	<i>Hizikia fusiformis</i>	
Fresh water	Soft-shelled turtle	<i>Pelodiscus sinensis</i>	
	Oriental weather loach	<i>Misgurnus anguillicaudatus</i>	

c) List displaying biodiversity

(i) Kunisaki Peninsula Usa area's vascular plants

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
1	Whisk fern	<i>Psilotum nudum</i>	Near threatened	Near threatened
2	Wright's filmy fern	<i>Mecodium wrightii</i>		Near threatened
3	Asplenium oligophlebium Baker	<i>Asplenium oligophlebium</i>		Threatened species category IB
4	Arachniodes standishii	<i>Woodsia macrochlaena</i>		Threatened species category IB
5	—	<i>Woodsia polystichoides</i>		Near threatened
6	—	<i>Loxogramme salicifolia</i>		Near threatened
7	Juniper	<i>Juniperus rigida</i>		Near threatened
8	—	<i>Heterotropa asaroides</i>		Near threatened
9	Lizard's tail	<i>Saururus chinensis</i>		Threatened species category II
10	—	<i>Arisaema thunbergii</i>		Near threatened
11	Ottelia alismoides	<i>Ottelia japonica</i>	Threatened species category II	Threatened species category IB
12	—	<i>Potamogeton octandrus</i> var. <i>miduhikimo</i>		Threatened species category II
13	Horned pondweed	<i>Zannichellia palustris</i> var. <i>indica</i>	Threatened species category II	Threatened species category IB
14	—	<i>Bulbophyllum drymoglossum</i>	Near threatened	Threatened species category II
15	Briza maxima	<i>Bulbophyllum inconspicuum</i>	Near threatened	Threatened species category II
16	Calanthea	<i>Calanthe discolor</i>	Near threatened	Threatened species category IB
17	Gold brocade	<i>Cephalanthera falcata</i>	Threatened species category II	Threatened species category II
18	Dendrobium	<i>Dendrobium moniliforme</i>		Threatened species category II
19	Rattlesnake plantain	<i>Goodyera velutina</i>		Threatened species category II
20	Iris rossii Baker	<i>Iris rossii</i>	Threatened species category II	Threatened species category IB
21	—	<i>Sparganium stenophyllum</i>	Threatened species category II	Threatened species category II
22	Carex kobomugi Ohwi	<i>Carex kobomugi</i>		Near threatened
23	Kishunakiri Sedge	<i>Carex nachiana</i>	Threatened species category II	Threatened species category IB
24	—	<i>Fimbristylis sericea</i>		Near threatened

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
25	—	<i>Ischaemum antheboroides</i>		Threatened species category II
26	—	<i>Ischaemum aristatum</i> var. <i>glaucum</i>		Threatened species category II
27	—	<i>Clematis patens</i>	Near threatened	Threatened species category IB
28	—	<i>Meterostachys sikokianus</i>	Threatened species category II	Threatened species category IB
29	—	<i>Orostachys japonicus</i>	Near threatened	Near threatened
30	—	<i>Sedum polytrichoides</i>	Threatened species category II	Near threatened
31	—	<i>Sedum yabeianum</i>		Threatened species category II
32	—	<i>Ribes fasciculatum</i>		Threatened species category II
33	—	<i>Euphorbia jokinii</i>		Near threatened
34	—	<i>Paliurus ramosissimus</i>	Threatened species category II	Threatened Species Category IA
35	—	<i>Quercus variabilis</i>		Threatened species category II
36	Japanese alder	<i>Alnus japonica</i>		Threatened species category II
37	Korean hornbeam	<i>Carpinus turczaninovii</i>		Threatened species category II
38	—	<i>Daphne pseudo-mezereum</i>		Near threatened
39	—	<i>Hibiscus hamabo</i>		Threatened species category II
40	—	<i>Persicaria erecto-minor</i>		Threatened species category II
41	—	<i>Rumex dentatus</i> subsp. <i>nipponicus</i>	Threatened species category II	Threatened species category II
42	—	<i>Suaeda maritima</i>		Near threatened
43	—	<i>Lithospermum zollingeri</i>		Threatened species category IB
44	Japanese green gentian	<i>Swertia japonica</i>		Near threatened
45	—	<i>Stephanotis lutchuensis</i>		Near threatened
46	—	<i>Vincetoxicum pycnostelma</i>	Near threatened	Near threatened
47	—	<i>Ophithandra primuloides</i>	Threatened species category II	Threatened Species Category IA, *
48	—	<i>Veronica undulata</i>	Near threatened	Near threatened
49	Motherwort	<i>Leonurus macranthus</i>	Threatened species category II	Threatened species category IB
50	—	<i>Mosla japonica</i>	Near threatened	Threatened species category II
51	—	<i>Scutellaria guilielmii</i>	Threatened species category II	Threatened species category II

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
52	Russian wormwood	<i>Artemisia iwayomogi</i>	Threatened species category II	
53	—	<i>Dendranthema occidentali-japonense</i> var. <i>ashizuriense</i>		Near threatened
54	—	<i>Heteropappus hispidus</i> ssp. <i>arenairus</i>	Near threatened	Near threatened
55	—	<i>Ixeris chinensis</i> subsp. <i>strigosa</i>	Threatened species category II	Threatened species category IB
56	Cocklebur	<i>Xanthium strumarium</i>	Threatened species category II	
57	Marsh rosemary	<i>Limonium tetragonum</i>	Near threatened	Threatened species category II

* Regulations concerning the protection of Oita Prefecture's rare wild plants and animals-designated rare wild plants and animals

Reference: Setoya Koji, Shunro Akamine, Mikihiro Seguchi, Masanori Arakane. 2009. The Vascular Plants of Kunisaki Peninsula Prefectural Nature Parks. pp73-92.

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(ii) Kunisaki Peninsula Usa area's bird varieties

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
1	Copper Pheasant	<i>Syrnaticus soemmerringii</i> (Temminck, 1830)	Near threatened	Near threatened
2	Swan Goose	<i>Anser cygnoides</i> (Linnaeus, 1758)	Lack of information	
3	Taiga Bean Goose	<i>Anser fabalis</i> (Latham, 1787)	Threatened species category II	Lack of information
4	Greater White-fronted Goose	<i>Anser albifrons</i> (Scopoli, 1769)	Near threatened	Lack of information
5	Lesser White-fronted Goose	<i>Anser erythropus</i> (Linnaeus, 1758)	Threatened species category IB	
6	Brant Goose	<i>Branta bernicla</i> (Linnaeus, 1758)	Threatened species category II	Threatened species category II
7	Common Shelduck	<i>Tadorna tadorna</i> (Linnaeus, 1758)	Threatened species category II	Threatened species category IB
8	Ruddy Shelduck	<i>Tadorna ferruginea</i> (Pallas, 1764)	Lack of information	Lack of information
9	Mandarin Duck	<i>Aix galericulata</i> (Linnaeus, 1758)	Lack of information	Threatened species category II
10	Baikal Teal	<i>Anas formosa</i> Georgi, 1775	Threatened species category II	Threatened species category II
11	Oriental Stork	<i>Ciconia boyciana</i> Swinhoe, 1873	Threatened species category IA	Lack of information
12	Eurasian Spoonbill	<i>Platalea leucorodia</i> Linnaeus, 1758	Lack of information	Lack of information
13	Black-faced Spoonbill	<i>Platalea minor</i> Temminck & Schlegel, 1849	Threatened species category IB	Threatened species category IA
14	Eurasian Bittern	<i>Botaurus stellaris</i> (Linnaeus, 1758)	Threatened species category IB	Lack of information
15	Yellow Bittern	<i>Ixobrychus sinensis</i> (Gmelin, JF, 1789)	Near threatened	Threatened species category IB
16	Japanese Night Heron	<i>Gorsachius goisagi</i> (Temminck, 1836)	Threatened species category II	Threatened species category IB
17	Intermediate Egret	<i>Egretta intermedia</i> (Wagler, 1829)	Near threatened	Near threatened
18	Pacific Reef Heron	<i>Egretta sacra</i> (Gmelin, JF, 1789)		Near threatened
19	Chinese Egret	<i>Egretta eulophotes</i> (Swinhoe, 1860)	Near threatened	Lack of information
20	Pelagic Cormorant	<i>Phalacrocorax pelagicus</i> Pallas, 1811	Threatened species category IB	Threatened species category IB
21	Western Osprey	<i>Pandion haliaetus</i> (Linnaeus, 1758)	Near threatened	Near threatened
22	Crested Honey Buzzard	<i>Pernis ptilorhynchus</i> (Temminck, 1821)	Near threatened	Near threatened
23	Eastern Marsh Harrier	<i>Circus spilonotus</i> Kaup, 1847	Threatened species category IB	Threatened species category IB
24	Hen Harrier	<i>Circus cyaneus</i> (Linnaeus, 1766)		Near threatened
25	Eurasian Sparrowhawk	<i>Accipiter nisus</i> (Linnaeus, 1758)	Near threatened	Near threatened
26	Northern Goshawk	<i>Accipiter gentilis</i> (Linnaeus, 1758)	Near threatened	Threatened species category II
27	Grey-faced Buzzard	<i>Butastur indicus</i> (Gmelin, JF, 1788)	Threatened species category II	Threatened species category II
28	Mountain Hawk-Eagle	<i>Nisaetus nipalensis</i> Hodgson, 1836	Threatened species category IB	Threatened species category IB
29	Ruddy-breasted Crake	<i>Porzana fusca</i> (Linnaeus, 1766)	Near threatened	Threatened species category II
30	White-naped Crane	<i>Grus vipio</i> Pallas, 1811	Threatened species category II	Threatened species category II
31	Common Crane	<i>Grus grus</i> (Linnaeus, 1758)	Lack of information	
32	Hooded Crane	<i>Grus monacha</i> Temminck, 1835	Threatened species category II	Threatened species category II
33	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus, 1758)	Threatened species category II	Threatened species category IB
34	Grey-headed Lapwing	<i>Vanellus cinereus</i> (Blyth, 1842)	Lack of information	
35	Little Ringed Plover	<i>Charadrius dubius</i> Scopoli, 1786		Near threatened

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
36	Kentish Plover	<i>Charadrius alexandrinus</i> Linnaeus, 1758	Threatened species category II	Near threatened
37	Greater Painted-snipe	<i>Rostratula benghalensis</i> (Linnaeus, 1758)	Threatened species category II	Near threatened
38	Latham's Snipe	<i>Gallinago hardwickii</i> (Gray, JE, 1831)	Near threatened	Threatened species category II
39	Bar-tailed Godwit	<i>Limosa lapponica</i> (Linnaeus, 1758)	Threatened species category II	
40	Little Curlew	<i>Numenius minutus</i> Gould, 1841	Threatened species category IB	Lack of information
41	Eastern Curlew	<i>Numenius madagascariensis</i> (Linnaeus, 1766)	Threatened species category II	Threatened species category II
42	Spotted Redshank	<i>Tringa erythropus</i> (Pallas, 1764)	Threatened species category II	
43	Common Redshank	<i>Tringa totanus</i> (Linnaeus, 1758)	Threatened species category II	Threatened species category II
44	Nordmann's Greenshank	<i>Tringa guttifer</i> (Nordmann, 1835)	Threatened species category IA	Lack of information
45	Dunlin	<i>Calidris alpina</i> (Linnaeus, 1758)	Near threatened	
46	Spoon-billed Sandpiper	<i>Eurynorhynchus pygmeus</i> (Linnaeus, 1758)	Threatened species category IA	Lack of information
47	Oriental Pratincole	<i>Glareola maldivarum</i> Forster, JR, 1795	Threatened species category II	Threatened species category II
48	Saunders's Gull	<i>Chroicocephalus saundersi</i> Swinhoe, 1871	Threatened species category II	Threatened species category IB
49	Greater Crested Tern	<i>Thalasseus bergii</i> (Lichtenstein, 1823)	Threatened species category II	
50	Little Tern	<i>Sternula albifrons</i> (Pallas, 1764)	Threatened species category II	Threatened species category IA
51	Ancient Murrelet	<i>Synthliboramphus antiquus</i> (Gmelin, JF, 1789)	Threatened species category IA	Lack of information
52	Eurasian Scops Owl	<i>Otus scops</i> (Linnaeus, 1758)		Threatened species category II
53	Ural Owl	<i>Strix uralensis</i> Pallas, 1771		Threatened species category II
54	Short-eared Owl	<i>Asio flammeus</i> (Pontoppidan, 1763)		Threatened species category II
55	Grey Nightjar	<i>Caprimulgus jotaka</i> Temminck & Schlegel, 1845	Near threatened	Threatened species category IB
56	Pacific Swift	<i>Apus pacificus</i> (Latham, 1802)		Near threatened
57	Ruddy Kingfisher	<i>Halcyon coromanda</i> (Latham, 1790)		Threatened species category II
58	Peregrine Falcon	<i>Falco peregrinus</i> Tunstall, 1771	Threatened species category II	Threatened species category II
59	Fairy Pitta	<i>Pitta nympha</i> Temminck & Schlegel, 1850	Threatened species category IB	Threatened species category IB
60	Ashy Minivet	<i>Pericrocotus divaricatus</i> (Raffles, 1822)	Threatened species category II	Threatened species category II
61	Japanese Paradise Flycatcher	<i>Terpsiphone atrocaudata</i> (Eyton, 1839)		Near threatened
62	Japanese Leaf Warbler	<i>Phylloscopus xanthodryas</i> (Swinhoe, 1863)		Threatened species category II
63	Japanese Robin	<i>Erithacus akahige</i> (Temminck, 1835)		Threatened species category II
64	Siberian Blue Robin	<i>Luscinia cyane</i> (Pallas, 1776)		Threatened species category II
65	Narcissus Flycatcher	<i>Ficedula narcissina</i> (Temminck, 1836)		Near threatened
66	Chestnut-eared Bunting	<i>Emberiza fucata</i> Pallas, 1776		Near threatened
67	Yellow Bunting	<i>Emberiza sulphurata</i> Temminck & Schlegel, 1848	Near threatened	

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(iii) Kunisaki Peninsula Usa area's reptiles and amphibians

№	English name	Scientific name	Red list	
			Environment Ministry	Oita Prefecture
1	Japanese gecko	<i>Gekko japonicus</i> (Dume'ril et Bibron,1836)		
2	Tawa gecko	<i>Gekko tawaensis</i> Okada,1956	Near threatened	Threatened species category II
3	Japanese five-lined skink	<i>Plestiodon japonicus</i> (Peters,1864)		
4	Japanese grass lizard	<i>Takydromus tachydromoides</i> (Schlegel,1838)		
5	Oriental odd-tooth snake	<i>Dinodon orientale</i> (Hilgendorf,1880)		Threatened species category II
6	Japanese ratsnake	<i>Elaphe climacophora</i> (Boie,1826)		
7	Japanese four-lined snake	<i>Elaphe quadrivirgata</i> (Boie,1826)		
8	Burrowing ratsnake	<i>Elaphe conspicillata</i> (Boie,1826)		
9	Japanese keelback	<i>Amphiesma vibakari</i> (Boie,1826)		
10	Tiger keelback	<i>Rhabdophis tigrinus</i> (Boie,1826)		
11	Japanese mamushi	<i>Gloydius blomhoffii</i> (Boie,1826)		
12	Reeves' pond turtle	<i>Chinemys reevesii</i> (Glay,1831)		
13	Japanese pond turtle	<i>Mauremys japonica</i> (Temminck et Schlegel,1833)	Near threatened	Near threatened
14	Chinese softshell turtle	<i>Pelodiscus sinensis japonicus</i>	Lack of information	Lack of information
15	Green turtle	<i>Chelonia mydas</i> (Linnaeus,1758)	Threatened species category II	Threatened species category II
16	Hawksbill turtle	<i>Eretmochelys imbricata</i> (Linnaeus,1758)	Threatened species category IB	Threatened species category IB
17	Loggerhead turtle	<i>Caretta caretta</i> (Linnaeus,1758)	Threatened species category IB	Threatened species category IA
18	Clouded salamander	<i>Hynobius nebulosus</i> (Schlegel,1838)	Threatened species category II	Threatened species category II
19	Oita salamander	<i>Hynobius dunni</i> Tago,1931	Threatened species category II	Threatened species category II
20	Spotted salamander	<i>Hynobius naevius</i> Dunn,1923	Near threatened	Near threatened
21	Japanese giant salamander	<i>Megalobatrachus japonicus</i> (Temminck,1837)	Threatened species category II	Threatened species category IA
22	Japanese fire-bellied newt	<i>Cynops pyrrhogaster</i> (Boie,1826)	Near threatened	
23	Western-Japanese common toad	<i>Bufo japonicus</i> Schlegel,1838		Near threatened
24	Japanese tree frog	<i>Hyla japonica</i> Gunther,1858		
25	Tago's brown frog	<i>Rana tagoi</i> Okada,1928		
26	Japanese brown frog	<i>Rana japonica japonica</i> Gunther,1858		
27	Montane brown frog	<i>Rana ornativentris</i> Werner,1904		
28	Black-spotted pond frog	<i>Rana nigromaculata</i> Hallowell,1860	Near threatened	Threatened species category II
29	Indian rice frog	<i>Rana limnocharis</i> Wiegmann,1835		
30	Wrinkled frog	<i>Rana rugosa</i> Schlegel,1838		
31	Schlegel's green tree frog	<i>Rhacophorus schlegelii</i> (Gunther,1858)		
32	Kajika Frog	<i>Rhacophorus buergeri</i> (Schlegel,1838)		

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(iv) Kunisaki Peninsula Usa area's aquatic life

№	English name	Scientific name	Red list		
			Environment Ministry	Oita Prefecture	Association of Benthology
1	Japanese eel	<i>Anguilla japonica</i> Temminck and Schlegel,1846	Threatened species category IB		
2	—	<i>Tanakia lanceolata</i> (Temminck and Schlegel,1846)	Near threatened	Near threatened	
3	Japanese chub	<i>Zacco sieboldii</i> (Temminck and Schlegel,1846)		Near threatened	
4	Oriental weather loach	<i>Misgurnus anguillicaudatus</i> (Cantor,1842)	Lack of information		
5	Yamato spined loach	<i>Cobitis</i> sp. 'Yamato' species complex (type B)	Threatened species category II	Near threatened	
6	Goosefoot	<i>Liobagrus reini</i> Hilgendorf,1878	Threatened species category II	Threatened species category II	
7	South japanese rice fish	<i>Oryzias latipes</i> (Temminck and Schlegel,1846)	Threatened species category II		
8	Japanese fluvial sculpin	<i>Cottus reinii</i> Hilgendorf,1879	Threatened species category IB	Lack of information	
9	Aucha perch	<i>Coreoperca kawamebari</i> (Temminck and Schlegel,1843)	Threatened species category IB	Near threatened	
10	Small-scale whiting	<i>Sillago parvisquqm</i> s Gill	Threatened species category IA	Threatened species category IB	
11	—	<i>Apocryptodon punctatus</i> Tomiyama	Threatened species category II	Lack of information	
12	Mudskipper	<i>Peripthalmus modestus</i> Cantor	Near threatened	Near threatened	
13	—	<i>Taeniooides cirratus</i> (Blyth)	Threatened species category IB	Threatened species category II	
14	Ice goby	<i>Leucopsarion petersii</i> Hilgendorf,1880	Threatened species category II	Near threatened	
15	—	<i>Luciogobius pallidus</i> Regan,1940	Near threatened	Near threatened	
16	—	<i>Eutaeniichthys gilli</i> Jordan and Snyder	Near threatened		
17	—	<i>Gymnogobius cylindricus</i> (Tomiyama)	Threatened species category IB	Threatened species category IA	
18	—	<i>Gymnogobius scrobiculatus</i> (Takagi)	Threatened species category IB	Threatened species category IB	
19	—	<i>Gymnogobius macrogathos</i> Bleeker,1860	Threatened species category II	Threatened species category IA	
20	—	<i>Gymnogobius uchidai</i> (Takagi)	Threatened species category II	Threatened species category IB	
21	—	<i>Pseudogobius masago</i> (Tomiyama)	Threatened species category II		
22	—	<i>Silhouettea dotui</i> (Takagi)	Near threatened	Lack of information	
23	Far eastern brook lamprey	<i>Lethenteron</i> sp. 2	Threatened species category II	Threatened species category IB	
24	Benkeigani Crab	<i>Sesarmops intermedia</i> (de Haan, 1835)			Threatened species category II
25	—	<i>Macrophthalmus abbreviatus</i> Manning et Holthuis, 1981			Near threatened
26	horseshoe crab	<i>Tachypleus tridentatus</i> (Leach,1819)	Threatened species category I	Threatened species category IA, *	Threatened species category IA
27	Ivory Shell	<i>Tegillarca granosa</i> (Linnaeus,1758)	Threatened species category II		Threatened species category IB
28	densely lamellated oyster	<i>Ostrea denselamellosa</i> Lischke,1869	Threatened species category I		Threatened species category IB
29	—	<i>Inversiunio yanagawensis</i> (Kondo,1982)	Threatened species category II	Near threatened	
30	—	<i>Macoma (Macoma) contabulata</i> (Deshayes,1855)	Near threatened		Near threatened
31	Cherry Shell	<i>Nitidotellina hokkaidoensis</i> (Habe,1961)	Near threatened		Near threatened
32	Boeddinghaus Sanguin	<i>Soletellina boeddinghausi</i> Lischke,1870	Threatened species category I		Threatened species category IB
33	—	<i>Soletellina petalina</i> (Deshayes)	Lack of information		Lack of information
34	—	<i>Semele cordiformis</i> (Holten,1802)	Threatened species category I		Threatened species category IB

№	English name	Scientific name	Red list		
			Environment Ministry	Oita Prefecture	Association of Benthology
35	—	<i>Trapezium liratum</i> (Reeve,1843)	Near threatened		
36	—	<i>Corbicula leana</i> Prime,1864	Threatened species category II		
37	Chinese Anapella Clam	<i>Coecella chinensis</i> Deshayes,1855	Near threatened		
38	Script Venus	<i>Circe (Circe) scripta</i> (Linnaeus,1758)	Near threatened		Near threatened
39	—	<i>Dosinia (Asa) biscocta</i> (Reeve,1850)	Threatened species category I		Threatened species category IA
40	rattle	<i>Arthritica reikoe</i> (Suzuki & Kosuge,2010)	Lack of information		Lack of information
41	—	<i>Umbonium moniliferum</i> (Lamarck,1822)	Near threatened		Near threatened
42	Glosbe	<i>Batillaria multiformis</i> (Lischke,1869)	Near threatened		Near threatened
43	—	<i>Cerithidea (Cerithidea) rhizophorarum</i> A. Adams,1855	Near threatened		Near threatened
44	—	<i>Angustassiminea castanea</i> (Westerlund,1883)	Near threatened		Near threatened
45	—	<i>Assiminea</i> sp. E	Threatened species category II		Threatened species category II
46	—	<i>Cryptonatica adamsiana</i> (Dunker,1860)	Near threatened		Near threatened
47	—	<i>Niotha livescens</i> (Philippi,1849)	Near threatened		Near threatened
48	—	<i>Tomura himeshima</i> Fukuda & Yamashita,1997	Threatened species category I		Threatened species category IB
49	—	<i>Leucotina diana</i> (A. Adams in H. Adams,1854)	Threatened species category I		Threatened species category IB
50	—	<i>Turbonilla kuraenohamana</i> Hori et H.Fukuda,1999	Near threatened		Near threatened
51	Uzumushi horeseshoe crab	<i>Ectoplana limuli</i> (Ijima et Kaburaki,1916)	Threatened species category I		Threatened species category IA

* Regulations concerning the protection of Oita Prefecture's rare wild plants and animals-designated rare wild plants and animals

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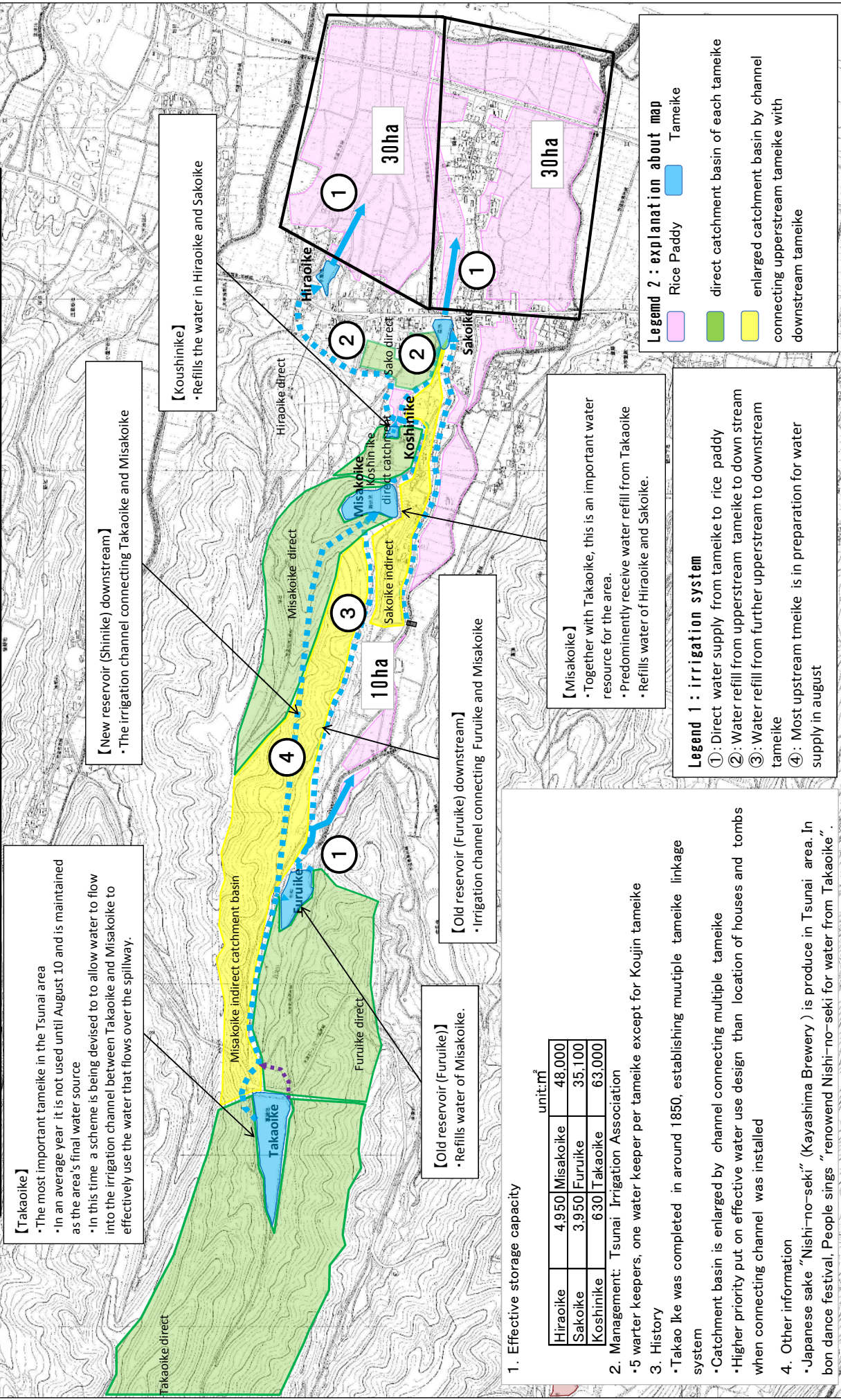
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Water Supply System Linking Multiple Irrigation Ponds Reservoir (Tsunai Area, Kunisaki -machi Kunisaki City)



【Takaoike】
 •The most important tmeike in the Tsunai area
 •In an average year it is not used until August 10 and is maintained as the area's final water source
 •In this time a scheme is being devised to allow water to flow into the irrigation channel between Takaoike and Misakoike to effectively use the water that flows over the spillway.

【New reservoir (Shinike) downstream】
 •The irrigation channel connecting Takaoike and Misakoike

【Koushinike】
 •Refills the water in Hiraoike and Sakoike

【Old reservoir (Furuike)】
 •Refills water of Misakoike.

【Old reservoir (Furuike) downstream】
 •Irrigation channel connecting Furuike and Misakoike

【Misakoike】
 •Together with Takaoike, this is an important water resource for the area.
 •Predominantly receive water refill from Takaoike
 •Refills water of Hiraoike and Sakoike.

Legend 1 : irrigation system
 ①: Direct water supply from tmeike to rice paddy
 ②: Water refill from upperstream tmeike to down stream
 ③: Water refill from further upperstream to downstream tmeike
 ④: Most upstream tmeike is in preparation for water supply in august

Legend 2 : explanation about map
 Rice Paddy Tmeike
 direct catchment basin of each tmeike
 enlarged catchment basin by channel connecting upperstream tmeike with downstream tmeike

1. Effective storage capacity
- | | unit:㎡ |
|-----------|--------|
| Hiraoike | 4,950 |
| Misakoike | 48,000 |
| Sakoike | 3,950 |
| Furuike | 35,100 |
| Koshinike | 630 |
| Takaoike | 63,000 |
2. Management: Tsunai Irrigation Association
 •5 water keepers, one water keeper per tmeike except for Koujin tmeike
3. History
 •Takao ike was completed in around 1850, establishing multiple tmeike linkage system
 •Catchment basin is enlarged by channel connecting multiple tmeike
 •Higher priority put on effective water use design than location of houses and tombs when connecting channel was installed
4. Other information
 •Japanese sake "Nishi-no-seki" (Kavashima Brewery) is produced in Tsunai area. In bon dance festival, people sing "Nishi-no-seki for water from Takaoike".

e) Designation status of nature parks

(i) Nature parks designation territory (territories relating to the proposed site)

Name	Location	Area (ha)	Park characteristics
Seto Inland Sea National Park	Bungo Takada City Kunisaki City Himeshima Village	2,496	All sorts of geographical and geological features including obsidian cliffs, folds, faults etc. can be seen in Himeshima Village, the Futago/Monju region as a spot for appreciating Buddhist cultural heritage, and a good lookout spot to the Seto Inland Sea.
Kunisaki Peninsula Prefectural Natural Park	Bungo Takada City Kitsuki City Usa City Kunisaki City	19,691	Including a large amount of cultural assets which are connected to the Rokugoumanzansuch as the national treasure Fukiji, Makioudou, the Kumano magaibutsu and Kunisaki-tou, the beautiful southern coast of Kunisaki Peninsula's inland areas and reefs and coastal beauty of the white sand and green pines forested with the Yabakei scenery. In this park, there are a variety of recreation facilities including an ancient culture park, and a place for people to relax. Swimming, camping and fishing can be enjoyed at every turn.

(ii) Nature park environment conservation region designation status

Name	Location	Area (ha)	Date of designation	Natural environment characteristics
Oita Prefecture Taketazu Nature Conservation Area	Kunisaki City	3.3	1976.12.7	In the Taketazusha grounds forests, the natural evergreen broad-leaf tree Sudaji koji make for a rare and wonderful forest.

(iii) Designation status of natural coastline preservation areas

Area name	Location	Coastline extension(m)	Designation date	Usage model
Tomikuura Nature Beachside Conservation Area	Kunisaki City	(approx.)1,000	1982.8.3	Shellfish Gathering