I. SUMMARY INFORMATION

Name of the proposed GIAHS site

Safflower System in the Mogami River Basin

Submission date :5/13/2025

Requesting Agency/Organization andcontact information

Yamagata Safflower Promotion Organization (Tel +81-23-630-2458)

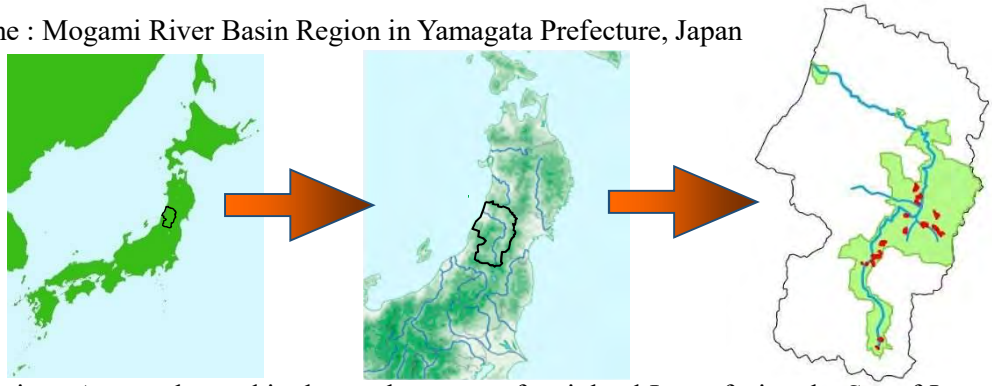
Members : Tourism-related organizations, Textile companies, Cooking schools, Government agencies and Safflower producers

Responsible Ministry and contact information

Ministry of Agriculture, Forestry and Fishers of Japan (Tel +81-3-6744-0250)

Location and geographical coordinates

・Name : Mogami River Basin Region in Yamagata Prefecture, Japan



・Location : An area located in the northern part of mainland Japan facing the Sea of Japan

・Geographic coordinates : Latitude:37°50'－ 38°27'N , Longitude:140°02'－140°26'E

Transport links between the site and the capital city or major cities

・Tokyo Station⇒ 150 minutes (Rail)⇒ Yamagata Station

・Tokyo International Airport⇒ 60 minutes(Air)⇒ Yamagata Airport

Area of coverage of the proposed GIAHS

Total area of managed arable land in Mogami River Basin Region 1,375ha

Buffer zone : Areas with records of safflower cultivation in the 17th and 18th centuries

(The soil and climatic conditions are similar to the site, so the system is expected to expand.)

Agro-ecological zones for agriculture, forestry, fisheries and aquaculture

Steep terrain、Humid, moderate soils、Humid, poor soils

Topographic features

Fertile fields in the Mogami River basin and mountains on both sides of the Mogami River

Climate type

Koppen climate classification : Dfa

Annual average temperature 12.7℃ Annual precipitation 1,243.5 mm

The area has four distinct seasons, with heavy snow during winter.

Approximate population : Beneficiaries 617 farmers (166 farmers cultivate safflower)

Traditional communities and/or Indigenous Peoples : N/A

Main source of livelihoods : Agriculture, Food Manufacturing, Tourism,

II. EXECUTIVE SUMMARY

The Mogami River basin is a unique region in the world where farmers takes advantage of its climatic and topographical conditions to produce safflower, a traditional red dye crop, as a raw material for dyeing, through delicate and complex land use.

The Mogami River and its tributaries are surrounded by mountains, giving the river basin fertile soil alongside the rivers and an abundant supply of water from snowmelt. Agricultural land use is determined by the scarcity of flat farmland in the basin. Well-irrigated flat land is given over to the cultivation of paddy rice, the staple crop, while sloping mountainside land is used to cultivate fruit trees, safflower, vegetables, and other crops that can be grown by snowmelt and natural rainfall.

Since long ago, farmers have cultivated different crops in rotation on small plots to maintain soil health and help prevent disease, reducing the risk to farming income. This sort of delicate land use has enabled farmers to pass down plots of a size suitable for small-scale family farms, retaining the site's distinctive landscapes. It is a unique landscape of this site the scene where small yellow flowers waving in the wind amid a patchwork of different shades of green made by small plots, where various crops and safflowers for dyeing are grown with forests as background.

Today, farming households generally maximize labor resource efficiency by having men focus mostly on the cultivation of the core staple, rice, which requires the use of machinery, while women tend to focus on safflower and vegetable cultivation, which require close manual work on small plots. This arrangement means that women play a significant role in producing the cash crops that generate income.

Safflower has been cultivated here as the raw material for a traditional red dye since the second half of the sixteenth century. The ‘Mogami Benibana’ variety grown in the Mogami River Basin for dyeing purposes is a unique variety that farmers have selected seeds to produce a safflower cultivar with characteristics suited to the production of benimochi in a moist climate, over the years, resulting in a genetic resource that is rare worldwide.

After picking only the petals one by one, safflower farmers wash, ferment, and dry them, then process the dried petals into benimochi (flat disks of safflower containing concentrated red dye) for sale, adding value to the crop. In other parts of the world where safflower is used as a dye, the process typically involves only drying after harvesting. In contrast, the processing method of benimochi that includes fermentation represents a traditional and unique technique that remains in this region. The Mogami River Basin is now the only location worldwide that retains such a technique.

The red dye has long been a vital part of Japan's cultural heritage, used in the creation of traditional costumes and ritual objects, and providing the red color for the flag of Japan. Farmers and other local people talk about, learn about, and take pride in safflower's cultural connections, which seem even more valuable than its monetary value. So farmers have continued to cultivate safflowers over the years with sense of mission and pride. For this reason, there is still a stable demand within Japan. Additionally, there are actual users in the region who

utilize this value, contributing to the development of the local economy through experiential travel products centered around safflower cultivation, such as harvesting and dyeing, as well as the sale of safflower-dyed products.

With growing awareness of SDGs and education aimed at highlighting local assets, farmers are collaborating with elementary and middle schools so that students can learn about the history and culture of local agriculture and experience safflower and benimochi production, while high school and university students work with local residents to communicate the attraction of the area and create new value through initiatives such as developing new products.

Over the past hundred years, production of natural dyestuffs declined worldwide as chemical dyes took over the market. Recently, however, a global trend toward greater use of natural sources of colors has emerged as part of the fashion industry's environmental efforts, and the value of safflower is growing as a natural dye with a low environmental impact.

The Yamagata Prefecture Safflower Promotion Organization supports these activities as part of its efforts to perpetuate the safflower system and nurture future producers. GIAHS designation would make the system a useful model for community development based on sustainable land use by small farmers, and based on the production of crops that can be used for dyeing.

Terminology

Benibana Safflower	The safflower is an annual plant of the Asteraceae family. Its petals are orange and contain the red pigment carthamin and the yellow pigment safflower yellow. The petals are used as a raw material for dye, food, and medicine. The leaves and stems are edible, and the seeds are used for oil. They are also used as cut flowers for ornamental purposes. The safflower is a long-day plant, with flower buds differentiating in spring and summer, followed by flowering. (The flowering season in this region is from early to mid-July). The bracts that encircle the flower buds have the role of protecting the buds during growth and produce sharp thorns as they grow. Fine thorns are also seen on leaf margins. The safflower was established as the flower of Yamagata Prefecture in 1982. 
Benimochi Safflower disk for dyeing	Benimochi safflower disk for dyeing is a raw material for red dye produced from orange petals. It is used as a raw material for safflower dyeing and cosmetic rouge among other purposes. The Benimochi is flat and dark red in color. Each Benimochi disk weighs about four grams, and it takes about 300 safflower flowers to make one Benimochi safflower disk. One of the characteristics of the agricultural system in this region is that farmers are involved in the entire process of harvesting safflower petals and subsequent processing of Benimochi safflower disk making. The specific process is to add water to the safflower petals to make a paste and oxidize the yellow pigment to make red pigment. The red pigment content increases through the oxidation process, making it a unique processing method in the world that enhances the quality of the raw material for red dye. 
Mogami Benibana	‘Mogami Benibana’ is a dye-oriented variety that is planted for the production of Benimochi safflower disk. It was selected from among the native species at the Yamagata Integrated Agricultural Research Center from 1965 to 1968.
Mogami Benibana Mogami-safflower	“Mogami Benibana” is also the name (brand name) of Benimochi safflower disk produced in this region, which has been used since the 17th century. It was considered the best quality among Benimochi safflower disk from all over Japan.

Benibana Polyculture System of the Mogami River Basin

In the Mogami River basin, small-scale farmers use the land in a delicate and complex manner, taking advantage of the topography and weather conditions, and cultivate 'Mogami benibana,' a local variety of safflower, to produce "benimochi," a raw material for dyeing.

In this site, there are local economic activities using traditional benimochi, and local community has made effort to pass down the Benibana Polyculture System.

Water Cycle in the Mogami River Basin

Winter
Snow

Spring
Snow melt

Various crops grow with rainwater

Resilient Land Use

Crop rotation avoids crop failure and cultivates a variety of crops

Summer

Autumn

Crop rotation

Summer
River mist

Safflower spines softened by the river mist

'Mogami Benibana', a local variety

"Benimochi" for red dye

Mogami River

Rice fields

Traditional Techniques for Producing Dyestuffs

Dyeing

Kimono

Contributing to local industry