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THE JAPANESE AND RICE

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HIGHLIGHTING
Japan

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THEME FOR **NOVEMBER:**

THE JAPANESE AND RICE

In Japan, rice is more than just a food. As the main staple of the national diet since antiquity, rice not only provides nourishment, it also defines landscapes, provides employment, and informs cultural practices and values ranging from festivals and rituals to the *mottainai* spirit of wasting nothing and the very notion of *wa* (harmony). In this month's Feature, we take a look at a few examples of Japanese interactions with rice.

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ON THE COVER
The Japanese and Rice: Photo shows rice paddy art in Inakadate Village, Aomori Prefecture, 2020
Photo: Courtesy of Inakadate Village

EDITORS' NOTE
Japanese names in this publication are written in Japanese order: family name first, personal name last.

JAPAN–INDONESIA SUMMIT MEETING

Japan-Indonesia Summit Meeting

On October 20, 2020, Suga Yoshihide, Prime Minister of Japan, who was visiting Indonesia, held a Japan-Indonesia Summit Meeting with H.E. Mr. Joko Widodo, President of the Republic of Indonesia, at the presidential palace. The overview of the talk is as follows.

At the outset, President Joko welcomed Prime Minister Suga's visit and expressed his intention to further develop the relationship between the two countries as strategic partners. In response, Prime Minister Suga extended his congratulations on the first anniversary of the inauguration of the second Joko administration and stated he hoped to work together to further strengthen the traditional cordial relations between the two maritime nations in the Indo-Pacific region, including in the areas of infrastructure and human resource development.

With regard to bilateral relations and the regional situation specifically, the two leaders exchanged the following views.

With the novel coronavirus disease (COVID-19) exerting a significant impact on the Indonesian economy, Prime Minister Suga announced his intention to provide Indonesia with a new 50 billion yen financial support loan with a view to enhancing the country's disaster response capacity. He also announced the Japanese government had provided medical supplies and equipment worth more than 4.4 billion yen to medical research institutions in Indonesia and intended to continue cooperating in this area, to which President Joko also expressed his earnest gratitude. Furthermore, the two leaders welcomed the signing of a Memorandum of Cooperation on healthcare, promoting cooperation between the two countries in the fields of pharmaceuticals and medical devices, human resource development, and medical services.

With regard to the resumption of cross-border travel between the two countries, the two leaders affirmed that travel was resumed for business personnel, including candidates for nurses and care workers under the Japan-Indonesia Economic Partnership Agreement. They agreed to closely coordinate to reopen cross-border travel for short-term business purposes as soon as possible, easing the 14-day stay period after entry.

In terms of President Joko's domestic priorities, Prime Minister Suga stated that he would promote infrastructure cooperation in such areas as the development of the Jakarta MRT network, the upgrading of the Java North Line railway, the construction and operation of Patimban Port, the development of the Masela Block, and the development of outer islands. The two leaders agreed to steadily advance their ongoing tangible cooperation.

In response to the issues that have emerged as a result of the pandemic, Prime Minister Suga announced his intention to work with Indonesia to reinforce the supply chain, including the development of investment environment in the country. President Joko responded by giving thanks for Japan's investment to date and expressed his hopes for further Japanese investment in the future as Indonesia proceeds with the development of its business environment.

Regarding cooperation in security and other fields, the two leaders agreed, in light of changes in the regional situation, to hold the Japan-Indonesia Foreign and Defense Ministerial Meeting (2+2), Japan's only 2+2 meeting in Southeast Asia, as soon as possible. They also affirmed that they would advance discussions on the transfer of defense equipment and promote human resource development in the field of maritime law enforcement.

The two leaders agreed to cooperate toward resuming the project for collecting the remains of Japanese soldiers who died in Indonesia. Prime Minister Suga also called on President Joko to ease the remaining restrictions on Japanese food imports introduced following the Great East Japan Earthquake.

Prime Minister Suga stated that the ASEAN Outlook on the Indo-Pacific (AOIP) drawn up by ASEAN last year shares many fundamental commonalities with the "Free and Open Indo-Pacific" (FOIP), and that Japan fully supports the Outlook. He expressed his intent to advance cooperation for the ASEAN-related Summit Meetings to be held next month. In response, President Joko made reference to the synergy between AOIP and FOIP in the Indo-Pacific region and hoped that ASEAN and Japan would work together. In light of this, the two leaders agreed to continue their cooperation in the run-up to the ASEAN-related Summit Meetings.

Both leaders agreed to continue to work closely together on regional affairs including the South China Sea issue and North Korea. Prime Minister Suga also asked for Indonesia's cooperation for the early resolution of the abduction issue.

Photographs and text courtesy of the Ministry of Foreign Affairs of Japan and the Cabinet Public Relations Office of the Government of Japan

THE JAPANESE AND RICE

In Japan, rice is more than just a food. As the main staple of the national diet since antiquity, rice not only provides nourishment, it also defines landscapes, provides employment, and informs cultural practices and values ranging from festivals and rituals to the *mottainai* spirit of wasting nothing and the very notion of *wa* (harmony). In this month's Feature, we take a look at a few examples of Japanese interactions with rice.

Photo: Courtesy of The Japan Electrical Manufacturers' Association

Sato Yo-ichiro, Professor at the Faculty of Letters,
Kyoto Prefectural University

History and Culture Fostered by Rice

RICE has played a variety of roles over the course of Japanese history. We spoke to Sato Yo-ichiro, a professor in the Faculty of Letters at Kyoto Prefectural University and President of the Society of Japanese Food Studies, about Japan's history and culture of rice.

When did rice cultivation begin in Japan?

Rice cultivation is thought to have started in the Yangtze River Delta in China about 10,000 years ago and then spread to Japan through mainland China or the Korean peninsula, although the timing for this remains quite uncertain. Rice cultivation can broadly be divided into dry field and paddy cultivation, and the paddy cultivation that is most common in Japan today is thought to have started in northern Kyushu about 3,000 years ago (10th century BCE). Paddy cultivation then spread to the Kinki region about 300 years later (7th century BCE) and then to the far north of the Tohoku region about 600 years after it began (4th century BCE). Grains like millet and buckwheat were also grown on a limited scale in fields at the time, but paddy rice cultivation had a higher yield, which is thought to have been the reason for the spread of rice. Thus, Japan gradually changed from being a hunter society where people caught animals like wild boar, deer, fish, and shellfish and collected fruits and nuts, to an agricultural society where people settled permanently and grew rice communally.

How did rice cultivation continue to spread after that?

From the 4th through the 6th centuries CE, as Japan was taking form as a country, enormous burial mounds were constructed in great numbers in the Kinki region. You could say that burial mound construction was a large-scale national project. It required colossal labor and food. This is why the leaders of that time gathered a labor force, cultivated new land and then expanded the paddy fields. Rice was an energy source for the many workers.

Starting in the early 8th century, the state began distributing land to people and collected rice grown on that land as tax. When land eventually started becoming scarce, the state recognized private ownership of land that a person had cultivated themselves in an effort to motivate farmers. This "privatization" of land development allowed powerful aristocratic families and local ruling families to expand the paddy fields. In the Sengoku (Warring States) period (late 15th century-early 17th century), rice was a military supply supporting wars. In this way, the possession of highly productive land came to equate to having economic, military, and political power. This didn't fundamentally change after that, but in fact persisted until the Edo period (1603-1867).

What role did rice play in the Edo period?

In the Edo period, the Tokugawa shogunate created a system where rice was at the center of the economy. The shogunate ranked the domains governing different parts of the country by rice harvesting capacity. The largest domain was Kaga Domain, which is plainly expressed in the fact that it was referred to as the "Kaga million *koku*" (*koku*

Photo: Sawaji Osamu

was a unit of volume to measure rice and other dry goods). Rice harvesting capacity was directly translated into a domain lord's rank. The domains consolidated the rice collected as tax in Edo (present-day Tokyo) and Osaka, encashed it, and purchased necessary goods. Rice really was the foundation of the economy. Meanwhile, as large quantities of rice started circulating among the urban residents of Edo, Osaka, and other cities, rice did become a staple food, but it also appears that only those with economic strength were able to eat enough rice in the farm villages, since most farmers had to render their rice as annual tax. The desire to eat one's fill of milled rice was something that remained up until Japan's economic growth that followed the Second World War. Perhaps it is rare nowadays, but parents used to scold their children for being "*mottainai*" (wasteful) if they left even a few grains of rice in their bowls.

What examples of Japanese culture are there that have to do with rice?

Rice is an ingredient in foods such as *mochi* rice cakes, confectionery, and seasonings such as miso and vinegar. Festivals celebrating the rice harvest are held across the country every fall. Likewise, during the rice planting in spring, there are songs and dances praying for a bountiful harvest. Rice from the year's first harvest as well as mochi and sake made from rice are offered to the gods at Shinto shrines. Annual events also always include offerings of food and drink with rice connections. For example, families eat *zoni* soup containing mochi rice cakes at New Year and sake is drunk together with *osechi*, the traditional New Year's food. "Washoku, traditional dietary cultures of the Japanese" was inscribed in UNESCO's Representative List of the Intangible Cultural Heritage and Humanity in 2013, and this intimate connection between annual events for celebration and Japanese food was one of the motivations for this decision.

Moreover, the basic style of Japanese food is rice and *ichi-ju san-sai*, which means a combination of soup with three kinds of small dishes. Western food has become common in Japan since the Meiji period (1868-1912) and meat has been added as an ingredient, but the style of eating "rice, small dishes, and a soup like miso soup" hasn't changed much. Many dishes that Japanese people enjoy, like sushi, curry, and *gyudon* beef bowl, are eaten together with rice.

What meaning do you think the rice culture fostered in Japan until now will have for the future?

I think there are few countries in the world where rice has influenced such a broad range of aspects, including the economy, society, and culture as much as it has in Japan. Rice is and will remain a valuable food for the Japanese, so I believe the rice-related cultural tradition should continue to be handed down through the generations. We're also seeing increasingly labor-saving developments through the introduction of agricultural machines, but rice cultivation used to be done by many people working together in the farm villages. That fostered a communal sense of mutual assistance. Some say Japan is a suitable place to cultivate rice, but I doubt it. Whether you have a poor or good crop, it highly depends on the natural environment. So people had a sense of awe and reverence, and tried to live together with nature, which I think is the basis of the Japanese lifestyle. I believe what we today call the sustainable society was already present in Japan a long time ago when everybody worked together, ate what grew in that area, and lived lives that valued their surrounding environment. As the world is aiming to achieve the Sustainable Development Goals (SDGs), I think that kind of lifestyle can be a helpful reference for Japan and the world in the future.

Interview by SAWAJI OSAMU

Working Together to Protect the Terraced Rice Fields

Oyama Senmaida in Kamogawa City, Chiba Prefecture

Rice cultivation in terraced rice fields created on the hillsides of mountainous regions has flourished in Japan since ancient times, although in recent years the area cultivated has been decreasing. In the terraced rice fields of Kamogawa City in Chiba Prefecture, local residents and urban dwellers work together to protect the scenic landscape and continue the practice of rice-growing.

KATO KYOKO

Rice cultivation in Japan originally flourished mostly in terraced rice fields on slopes that offered a secure water supply, until advancements in irrigation technology in the seventeenth century enabled the development of new rice fields on plains. People cultivated mountain slopes and drew water from upstream mountain rivers into the rice fields, created reservoirs and dug wells to store water, and drew water from springs to secure and maintain the water supply needed for the rice terraces. In the Oyama Senmaida[i] Terraced Rice Fields in Kamogawa City, Chiba Prefecture, however, rice has been cultivated without river water using rainwater alone, a rarity in Japan, owing to the presence of clay soil with very high water-holding capacity. Rice produced in clay soil is sweet and sticky with excellent flavor, and is said to have been one of the highest quality rice grains available in the suburbs of Edo (present-day Tokyo) during the Edo period (1603-1867).

Terraced rice fields have a multitude of functions, such as preserving tradition and culture, offering scenic beauty, providing education, and ensuring national land conservation. This has led them to be likened to pyramids. The Oyama Senmaida are the closest terraced rice fields to Tokyo and comprise 375 rice paddies of various shapes and sizes spread across the steep, mortar-shaped terrain at an elevation of 90 to 150 meters. Less than two hours' drive from the center of Tokyo, these scenic terraced rice fields evoking old Japan have recently become a popular tourist destination.

The mechanization of farming and the shift to large-scale agriculture has led to an increase in the number of abandoned terraced rice fields owing to

All photos: Courtesy of Oyama Senmaida Preservation Society

Rice terrace owners and local farmers work together

their relatively low productivity. In response to this situation, the Oyama Senmaida Preservation Society, which was established in 1997 by landowners, Kamogawa residents, and people from out of town, has taken the lead in preserving the terraced rice fields and growing rice.

"Because the terraced rice fields are built on steep slopes, large machinery can't access them so they rely on manual labor, and work efficiency is very low. So it was virtually impossible to make a living from rice farming alone. That's why we decided to introduce the terraced rice field "owner system," to maintain and manage the farmland through interaction between the local community and city residents," says Ishida Mitsuji, Chairman of the board of directors of the Preservation Society.

Under the terraced rice field "owner system," people who rent a terraced rice field (100 square meters) for an annual fee of 30,000 yen become "owners," which allows them to perform farming tasks such as planting and weeding around seven times a year and harvest their own rice. In addition to farming tasks, the Preservation Society offers a variety of hands-on activities such as viewing nature and making rice cakes, which are popular with urban dweller owners as it enables them to learn about the traditional culture of a rural area.

Oyama Senmaida illuminated at night

In 2016, the Gonbei restaurant opened in a renovated 100-year-old farmhouse near the terraced rice fields, serving *onigiri* rice balls, rice noodles, and other local dishes using rice harvested from the terraced rice fields, conveying the appeal of the region's rice food culture.

"When the Oyama Senmaida Preservation Society was first formed, most locals thought that city people would never pay to do farm tasks. However, when we started accepting applications for terraced rice field owners, it was more popular than we had anticipated and it filled up quickly. I think what we need to do now is engage in a variety of community revitalization activities with urban dwellers in addition to the preservation of the terraced rice fields."

The terraced rice field "owner system" originating in the Oyama Senmaida has now spread to five areas in Kamogawa City. The efforts of the Preservation Society offer a hint for the future of rice farming in Japan: diversify the guardians of agriculture while passing on the beautiful rural landscape to the next generation.

i Literally translated, "*Senmaida*" means 1,000 rice paddy fields. "*Sen*" means 1,000, but it can also mean "many." There are a lot of paddy fields called "Senmaida" in Japan, but they do not necessarily have 1,000 rice paddy fields.

Rice Breeding Past and Present

The varieties bred and rice produced by NARO: left: Eminokizuna; center, Koshihikari; right, Itadaki

All photos: Courtesy of NARO

The objectives of rice breeding in Japan have changed over time, reflecting the social conditions that prevail. An initial focus on yield gave way to a focus on eating quality, shifting in more recent times to high-yield and good eating quality rice produced at low cost for home markets as well as for export. Today, the accomplishments of technology over more than a century are expected to help improve the world's food situation.

KATO KYOKO

THE cultivation of rice in paddies in Japan is said to have started about 3,000 years ago. Until the Meiji period (1868-1912), people bred rice varieties by selecting those that were best suited to their region from among the mutants that had arisen by a rare natural mutation. Since this was not based on genetics, rice breeding progressed slowly, and farmers often had to deal with poor harvests when crops were damaged by cold weather or pests, often resulting in deaths due to famine. All people could do was pray for a successful rice harvest.

At the end of the nineteenth century, the Japanese government established agricultural experiment stations and the full-scale breeding of rice began with the aim of improving its yield, disease resistance, cold resistance, and so on. The first superior variety produced by artificial crossing in Japan, Rikuu 132, was developed in 1921. Rikuu 132 is a hybrid that is resistant to cold-weather damage and has good eating quality. Koshihikari, Japan's top-ranking rice bred in 1956, is the descendant of Rikuu 132.

Ishii Takuro, Director of the Division of Rice Research, Institute of Crop Science, at the National Agriculture and Food Research Organization

(NARO), says, "Currently, there are more than 300 varieties of rice grown in Japan. Koshihikari accounts for the largest percentage (33.9%) of the area planted in 2019. The most widely grown cultivars after Koshihikari are Hitomebore followed by Hinohikari, then Akita Komachi and Nanatsuboshi. These are all descendants of Koshihikari and are the most popular rice varieties with consumers."

Until the period of high economic growth, the purpose of breeding was yield to achieve self-sufficiency of rice. However, the emergence of rice overproduction in around 1970 brought a shift toward prioritizing eating quality. Despite the drawbacks of Koshihikari, namely lodging[i] during cultivation and susceptibility to disease, it has become popular for its plump cooked rice, sticky texture, and its rich umami taste that suits the Japanese palate. Ishii says it has become important to breed varieties that have good eating quality while also being high-yield and disease resistant, reducing production costs.

"Restaurants and take-out food establishments demand rice that is reasonably priced and tastes good. One technique that has been introduced to lower production costs is direct seeding, which means sowing seeds directly into the rice paddies rather than using the conventional method of growing seedlings first and then planting them in the fields. Chihominori, developed by NARO, is a high-yield and tasty variety with short plant height and resistance to lodging, making it suitable for direct seeding. More and more growers in Japan are now introducing the direct seeding technique, especially those with large-scale operations.

With Japanese food such as sushi spreading around the world, rice breeding is also being carried out with an eye to export. Eminokizuna, one of the varieties bred by NARO, is suitable for sushi rice because when cooked it is less sticky so sushi vinegar can penetrate the cooked rice well and the grains separate easily, imparting a light texture. Eminokizuna is now being exported, mainly to Singapore and other Asian countries.

There is a demand too for varieties that cope with global warming. If the temperature is too high in the summer when the grains are developing and growing, the grains become chalky and the quality drops significantly. At the same time, there is still a risk of cold damage, so NARO is researching varieties that can cope with both high and low temperatures.

Rice immediately before and after harvesting

"From 1998 to 2004, the rice genome[ii] was sequenced by an international consortium led by Japan. Based on this information, it is now possible to determine characteristics such as the disease resistance of a rice plant simply by extracting DNA from its leaves. Selection techniques that use rice genome information could make a significant contribution to the world's food situation, by enabling efficient breeding of varieties with the purpose of improving disease resistance and yield," says Ishii.

The rice breeding techniques developed in Japan over many years are expected to offer major benefits for the world at large.

i The weakening of plant stems under the weight of grain.
ii Sequence of the four types of bases inside a nucleic acid molecule: adenine (A), thymine (T), guanine (G), and cytosine (C).

Showing Hospitality *to the* Rice-Field Deities

A demonstration of Aenokoto at Gorokuan. Here, the head of the house, wearing formal attire, speaks to the deities

In the Oku Noto region of Ishikawa Prefecture, an agricultural ritual in which farming families show hospitality to the deities of the rice fields has been passed down for over 200 years.

YANAGISAWA MIHO

An Aenokoto meal

In Oku Noto, a rice-producing region, an agricultural ritual known as Oku-noto no Aenokoto has been handed down by farming families for many years and has been inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity. The "*Ae*" of Aenokoto means "hospitality through food" and "*koto*" means "ritual."

Aenokoto is a rite in which farming families show hospitality to the deities of the rice fields, and it is performed every year on December 5 and February 9. In December, farmers give thanks for the year's harvest by inviting the deities of the rice fields into their homes, and in February, before planting, they pray to the deities for an abundant harvest and show them back out to the rice fields.

What makes this custom unique is that the head of the house, wearing formal robes, performs the ritual while speaking politely as if the deities were actually present.

The ritual in December begins with the head of the house going into the rice fields carrying in one hand a sacred sprig of a young evergreen tree and, in the other, a hoe. The farmer ceremonially tills the soil with the hoe three times then leads the deities back to his house. The deities are considered to be a married couple, and as both are said to have poor

All photos: Courtesy of Noto town

The deities of the rice fields are invited to bathe in a barrel

eyesight, the head of the house deferentially guides them and talks to them politely. For example, if there are steps in their path, he says, "There are some steps. Please step carefully."

When they reach the house, the farmer invites the deities to rest by the hearth. While they are resting, he checks the temperature of the bath, and when the water is deemed hot enough, he invites the deities to bathe. After that, he guides them to the sitting room and describes the feast of rice, black rockfish, vegetables and other produce laid out before them. The head of the house expresses gratitude to the deities for the harvest of the ingredients. After the meal, the deities retire to a space where stacked rice bales have been ceremonially placed, and they stay there until February. In February, a similar ritual is performed, in which the deities are shown back out to the fields.

It is not clear when these rituals were established, but we know that they have continued for at least 200 years, as tableware for Aenokoto has been found inscribed with a date from the second half of the eighteenth century. During the Edo period (1603-1867), when there were no modern agricultural technologies, farmers faced many difficulties in producing rice, including weather disasters and pests. As Oku Noto is located between the mountains and the sea and has few open plains, rice is cultivated in small terraced fields carved out of the mountains, requiring a great deal of effort. It is thought that the ritual of paying respects to the deities of the rice fields, symbolic of nature itself, began as a means of overcoming these challenges.

Takeuchi Tsuyoshi, a representative of the Noto Mirai Sozo Network (Network in Noto for Future Design), says of Aenokoto, "It is fundamentally a conveyance of gratitude for the deities of the fields for the harvest of this year and a prayer for the next good harvest."

The Noto Mirai Sozo Network was established with the goal of promoting the revitalization of the Noto region, and it manages Gorokuan, a thatched-roof house in the Yanagida Botanical Park where visitors can watch Aenokoto at any time of year.

Takeuchi says, "All of the dishes presented in the ritual are offered in generous portions. On top of that, two servings are prepared as the deities are a couple. After the ritual, the food is eaten by the family members."

However, there are fewer and fewer farmers each year left to pass on the custom of Aenokoto. Tashiro Nobuo, from the Local Promotion Division at Noto Town Hall, says, "Currently, there are about eighty farmers who perform Aenokoto. Simplification of the ritual slowly continues and there may only be ten farmers remaining who perform the ritual in the formal attire. I hope visitors learn how local people relate to nature by watching the ritual at Gorokuan."

This rare ritual of showing hospitality to the deities of the rice fields is a part of Japanese farming culture. Local people continue to work together to preserve and pass on this unique folk tradition.

Visitors can experience Aenokoto year-round at Gorokuan in Yanagida Botanical Park, Noto

Rice Paddy Art

The thriving agricultural village of Inakadate in Aomori Prefecture is the location of an unusual event in which rice paddies serve as canvases for enormous works of nature-made art.

YANAGISAWA MIHO

In spring, the mirror-like paddies filled with water reflect the blue of the sky. In early summer, there is the radiant green of the rice plants, already growing vigorously since planting in spring. The paddies in autumn have a golden sparkle as the tops of the plants droop under the weight of the rice grains before harvesting. The appearance of rice paddies changes over the year, conveying the arrival of the seasons and delighting the eyes.

Recently, rice paddy art events, in which pictures are drawn using the different and changing colors of rice plants as "paints" and rice paddies as "canvases," have spread across Japan, attracting many visitors.

The birthplace of rice paddy art is Inakadate Village in Aomori Prefecture. In 1981, evidence of rice production roughly 2,100 years ago was found in Inakadate Village, which is located in the middle of the Tsugaru plains. The area is covered with snow throughout the winter, and the village attracted attention at the time as the northernmost place for rice production in Japan. Blessed with productive land, the village has managed to harvest the largest amount of rice per area in Japan time after time.

Drawing on its rice-growing history, Inakadate Village offered a rice-producing experience as part of classes at the elementary school, using the same rice plant that was cultivated in ancient times. This ancient rice is different from the rice plant cultivated across Japan today, with some of its leaves being purple or yellow. From this color difference, the village office had an idea to draw Japanese characters and pictures in the paddies using the plants' different colors, and held the first "exhibition" in 1993.

For the first few years they created simple artworks such as messages and a depiction of Mount Iwaki, a symbol of Aomori Prefecture. Gradually they started to take on the challenge of creating more complex patterns, and for the 11th event in 2003 created the *Mona Lisa*. However, when viewed from above, their Mona Lisa looked a little chubby. To fix this, a draft was created that corrected the perspective, and using computer modeling, a method was established to drive piles into the rice paddy according to the plan, planting rice plants in the appropriate sections. Using this method, it became possible to create increasingly elaborate pictures and realistic rice paddy art was born.

All photos: Courtesy of Inakadate Village

Momo Taro (2017)

Early rice paddy art in Inakadate Village, 1994

"ONE FOR ALL, ALL FOR ONE" (2020)

The high level of reproduction can be proved by the request for the creation of rice paddy art for movie advertising by Disney in 2015, and in the same year stunning rice paddy art was also created for *Star Wars: The Force Awakens*. News agencies picked up the story, and the following year the village appeared in several Japanese movies and TV shows. About 350,000 people came to visit the village, which has a population of just 8,000, to view the art.

However, as this is art made from natural processes, there are elements that cannot be controlled. According to Suzuki Toru, a member of staff in the Inakadate Village Tourism Planning Section, "In recent years, the color of the rice plant leaves has changed as the temperatures in summer have increased, and this had led to cases where parts of characters or pictures couldn't be drawn and are missing."

The best time to see the rice paddy art of Inakadate Village is from the middle of July until the middle of August when the rice plants grow tightly together. Some of the art is set up so that visitors can see changes in the picture from the emergence of ears of rice grains and changes in leaf colors later on.

Suzuki says, "Thanks to the rice paddy art, the name of this small village has come to be known even overseas. Using rice paddy art as an opportunity, I hope we can come up with ways in the future for visitors to enjoy the village's specialties: our nature, rice, apples and strawberries."

In 2020, all planting experience tours and viewings were canceled due to COVID-19, but the message "ONE FOR ALL, ALL FOR ONE" was etched into the rice paddies. Without a doubt, the rice paddy art of Inakadate Village, with its long history of rice production, will also continue long into the future.

Changes in patterns associated with the changing of the seasons

Growing Rice, Growing Recovery

Kato Emi and her husband, Koji

Kato Emi, a resident of Fukushima Prefecture, works in agriculture with her husband. They continue their activities towards recovery from the Great East Japan Earthquake, protecting local agriculture and employment while representing the farmer lifestyle and the foods of Fukushima.

KATO KYOKO

Kato Farm Co., Ltd is an agricultural production company which, with 53 hectares, holds one of the largest collections of rice paddies in Fukushima City. The company's managing director, Kato Emi, began her career in agriculture in 2009 together with her husband, Koji, by following in the footsteps of Koji's grandfather, a farmer who specialized in rice production.

However, they experienced the Great East Japan Earthquake in March 2011 in their second year in farming, and the Fukushima Daiichi Nuclear Power Station Accident also occurred. Kato, who was pregnant with their third child at the time, looks back.

"At the time, we were confused about what to do next, lacking a sense of reality in words we weren't familiar with, such as nuclear accident, radiation, sievert and becquerel. We took shelter outside the prefecture temporarily, but we returned to our home a month after the earthquake, wanting to know the state of the rice paddies, our home and Fukushima itself. We considered moving to other land and continuing farming, but in the end, we wanted to farm and live together with our family in Fukushima. Sharing this strong feeling, my husband and I decided to continue rice production here."

They began cultivation of Ten no Tsubu rice, a variety of rice developed over fifteen years in Fukushima Prefecture. This rice has been praised for its uniform excellence, its luster, and its slightly sweet flavor and firm texture. Betting on Ten no Tsubu, which is only cultivated in Fukushima Prefecture, the Katos continued producing rice, focusing on this variety.

In December 2017, Kato Farm received certification from GLOBALG.A.P., a farm assurance program translating consumer requirements into Good Agricultural Practice, including initiatives to ensure the sustainability of agriculture from the perspectives of ensuring food safety, protecting the environment, and labor safety.

The Katos want others to know about the farmer

All photos: Courtesy of Kato Emi

1 Kato planting rice seedlings
2 Harvesting work in autumn
3, 4 An event held in France by B-eat JAPAN introducing Fukushima products

lifestyle and Fukushima as it is, rather than just hear about the safety of Fukushima from farmers, and they have continued to steadily show daily farm work and the farmer lifestyle on social media. For this reason, they began to receive words of encouragement and gradually more and more people bought their rice.

At Kato Farm, they strive to produce safe, secure, and even better tasting rice, working to keep the soil in good condition using fewer pesticides and more organic fertilizer. In 2015, Kato Farm entered their Koshihikari rice into the Fifth KOME-1 Grand Prix, a contest to decide the rice with the most delicious flavor in Japan, and by finishing with a high ranking, the delicious flavor of their rice was proven.

Kato took a leading role in 2018 by launching B-eat JAPAN, an organization with the goal of showcasing the charm of the food of Fukushima both in Japan and abroad. Four farmers within the prefecture became members, and the organization has so far sold *onigiri* rice balls and rice in Vietnam, France and Thailand, hosting events to convey the charm of Fukushima. All of these events were successful, creating connections with local people and industries connected with the food industry.

In September 2020, the Katos also opened the Yellow Beer Works craft beer brewery (Ozaso, Fukushima City) using barley and hops cultivated at home as ingredients to create jobs for the off-season in farming and to stabilize farm management.

Kato says, “We have steadily worked to appeal directly to visitors through lectures, events, and so on in addition to beginning to release information online about our activities. This comes from a desire to help not just ourselves but also to protect agriculture for all of Fukushima. The possibilities for agriculture in Fukushima are limitless. We hope to carry out activities in the future that will set all of Fukushima in the best possible direction by putting effort into training young farmers.”

Freshly cooked rice in a rice cooker
Photo: Courtesy of The Japan Electrical Manufacturers' Association

The Evolution of the Rice Cooker

From the traditional *kamado* stove to the induction heating "jar," the rice cooker continues to evolve.

UNO MASAKI

UNTIL the mid-1960s, most Japanese households cooked rice using a *kamado*, a type of firewood fueled oven. The polished rice is washed in water, left to stand for a while, then heated in an iron pot (*hagama*) with a wooden lid and is ready within the hour. There is a saying that goes something like, "The heat is low at first, then it gets hotter. When steam blows out, turn down the heat. Don't remove the lid, even if the baby cries." That is, you should let the rice absorb the water at low heat in the first step and then cook it at high heat in the second step, followed by a gradual lowering of the temperature and finally a constant temperature for steaming. This is the Japanese way of cooking delicious rice. The part saying "Don't remove the lid, even if the baby cries" reflects the wisdom that you won't get lustrous rice unless the steaming is done properly.

An iron pot (*hagama*) of the type once used to cook rice on a *kamado*

Rice cooking is important work for any household, but it used to be laborious and put a heavy burden on housewives in the past. As TVs, fridges, washing machines, and other home electronics became more prevalent in the 1950s, the "automatic electric rice cooker" made its appearance in 1955. Initially, there were those who doubted it, asking, "Can you cook rice with an electric device?" Yet the convenience of automatically cooking rice without hassle at the flip of a switch became popular and spread to households across the country. According to a survey by Central Research Services, Inc., the household ownership rate of rice cookers was 19.6% in 1959, 55.2% in 1969, over 90% in 1971, and more than 95% after 1980, thus becoming a common sight nationwide.

Since the Japanese are quite particular about how they want their rice to taste, it is not enough for the rice cooker to just be able to cook rice, automatically. Overseas, rice usually means long and narrow indica rice; in Japan, despite a circulation of more than 820 types (brands) of domestic rice (2019 production), the vast majority is a type of japonica that is short and nearly round. Japonica rice is characterized by its stickiness and sweetness, qualities which are brought out through proper cooking. Rice cooker makers took on this challenge and won the support of households.

The makers then incorporated more electronic

1 Japan's first automatic electronic rice cooker (1955)
2 Jar rice cooker that can keep the rice warm (1972)
3 A pressure IH rice cooker (1992)
4 IH jar rice cooker for high heating with charcoal in the inner pot (2006)
Photos: Courtesy of The Japan Electrical Manufacturers' Association

technology to make continuous improvements. For example, the "jar rice cooker" that can keep the rice warm after cooking was released on the market in 1972, and the "micro-controller jar rice cooker" that can adjust heating according to rice volume became available in 1979, with both products boosting popularization. What was truly ground-breaking for the rice cooker was the IH (induction heating) rice cooker, which made its debut in 1988. Earlier electric micro-controller rice cookers were warmed from a heater at the bottom of the inner pot, but IH allowed for the entire pot to be kept on high heat by controlling the strength of the current flowing through an IH coil. This evolved further so that rice can be cooked "hard," "normal," and "soft," according to preference. The pressure IH rice cooker appeared in 1992, making it possible to cook delicious brown rice and millet rice, responding to prevailing health trends. This broadened the range of cooking techniques, and cookers now come with more than 100 cooking settings.

The eating habits of the Japanese are becoming more diverse—for example, bread consumption is increasing—but the desire for "delicious rice" has not changed. The makers continue to work hard on developing their products in pursuit of that deliciousness, adjusting how the rice is cooked by changing the material of the inner pot, the heating method, and so forth.

Yasuko, a Tokyo resident who remembers cooking rice with a kamado as a child, laughs that it's possible to cook delicious rice with a kamado, but adds, "I grew up in a rice-growing district in the northeast, so I care about how the rice should taste. I do get a real feeling of how the rice cooker has developed when I prepare rice. Now we can enjoy not just white rice but also brown rice and rice cooked with other ingredients. The main thing is, eating delicious rice together is a family's greatest pleasure."

Japanese rice cooker makers are active not only in Japan but also in other countries, mainly in Asia. They are developing rice cookers suitable for rice produced in each country, and are currently engaged in local production and export. The accumulation of techniques for Japanese rice cooker development over sixty-five years is now helping people to cook delicious rice in many other countries.

The latest models from Japan's seven rice cooker manufacturers
Photos: Courtesy of The Japan Electrical Manufacturers' Association

Bread Made from Brown Rice

A selection of brown rice breads sold at GENKI-DO

Bread made in the foothills of Mt. Aso in Kumamoto Prefecture using locally harvested brown rice as the main ingredient is growing in popularity across Japan thanks to the new technology used in the bread-making process.

SATO KUMIKO

The brown rice bakery GENKI-DO is located on the side of a road that extends straight towards Mt. Aso. Inside, a unique sweet and fragrant aroma—one that is slightly different from that of wheat bread—fills the air. The bread sold here is made from at least 80% brown rice among its ingredients.

The seed of the rice plant that has just been harvested is typically made into white rice for consumption by removing the hull, or chaff, on its surface, along with the bran and germ below. The milling of brown rice, by contrast, leaves the bran and germ intact and only removes the chaff, thereby retaining abundant nutrients when compared to white rice, including vitamins, minerals, and soluble fiber. Brown rice also contains functional components that offer an antioxidant effect and regulate cholesterol.

GENKI-DO's brown rice bread retains most of the nutrients and functional components of the brown rice when baked and is delicious, gaining popularity since the bakery's opening in 2014, especially among those with an interest in health.

GENKI-DO is operated by Kumamoto Brown Rice Laboratory Co., Ltd. The Laboratory was established by Kumamoto-based Nakakyushu Kubota Co., Ltd., which sells agricultural machines and implements, and operates in the maintenance industry. The Laboratory was established to help counter a reduction in the production volume of rice. Since the 1970s, the consumption of rice has continued to decrease in Japan, and the production volume continues to decrease even in Kumamoto Prefecture, the representative rice-producing region of the island of Kyushu.

President of Nakakyushu Kubota and CEO of the Laboratory Nishiyama Tadahiko says, "Rice terraces have been made along hills since ancient times in Japan, with 75% of its land covered in mountains. The

All photos: Courtesy of GENKI-DO

fact that abandoned farmland on these rice terraces continues to increase is a major issue today." Protecting these rice terraces is significant in many ways, including in flood control and the protection of ecosystems. Kumamoto Brown Rice Laboratory decided to take on the challenge of creating bread using nutrient-rich brown rice from President Nishiyama's desire to increase rice production and to somehow protect the beautiful scenery of rice terraces.

Creating bread using rice flour has been done before all over Japan, but brown rice was deemed to not be suitable for bread making as in addition to the difficulties in making brown rice into a powder given the oil content of rice bran and germ, the oil also easily oxidizes. To increase its processability, Kumamoto Brown Rice Laboratory developed a technology to mix and pulverize brown rice and water in a mixer and turn it into a paste without destroying the starchiness that can alter nutrients and flavor. The brown rice is produced in Kumamoto, and the mixer used is also a specialty product developed in Kumamoto. And so it became possible to produce a rare bread in Japan through the completed brown rice paste, making full use of the nutrients and flavors of brown rice.

In 2016, a factory to produce gluten-free bread and paste with 100% brown rice paste was established in response to strong demand from customers, and these products began to be sold online.

President Nishiyama says, "The gluten found in wheat can cause gluten-related disorders, such as wheat allergies and gluten hypersensitivity, depending on the person. Gluten-free brown rice bread and pasta can be eaten by people with these conditions without worry. We really hope to sell our products overseas in the future for these kinds of customers."

In addition to their own farm, they currently have contracts with several dozen farmers within Kumamoto Prefecture to produce the brown rice paste, using 100 tons of rice annually. These farmers have told the Kumamoto Brown Rice Laboratory that creating rice to be eaten by many people is the greatest joy for a farmer. The challenge of creating bread from brown rice has created new potential for rice.


1


2


3


4

1 Brown rice bakery GENKI-DO in Kumamoto
2 Brown rice paste made from brown rice and water
3 Three varieties of brown rice bread that are completely gluten-free and also free of twenty-seven common food allergens (from left, matcha adzuki bean, sunflower and plain)
4 A meal made from brown rice paste gluten-free pasta

Japanese rice is of the japonica variety, featuring short, round grains

The Growing Popularity of Japanese Rice Abroad

"Washoku, traditional dietary cultures of the Japanese," was inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity in 2013, attracting a lot of attention at home and abroad. There has since been consistent growth in Japanese rice exports, helped by the rising demand for good quality rice that pairs well with Japanese food, in synch with the growing popularity of Japanese food overseas.

SAWAJI OSAMU

Japanese food such as sushi and *onigiri* (rice balls) has recently become popular around the world, and Japanese restaurants can now be found in many large cities. According to the Ministry of Agriculture, Forestry and Fisheries (MAFF) of the Japanese government, in 2019 there were approximately 156,000 Japanese restaurants overseas, compared to around 24,000 in 2006.

As Japanese food becomes more popular, the export of rice, one of the essential elements of Japanese food, has been on the rise. Some 7,640 tons of Japanese rice were exported in 2015, and that number has grown to 17,381 tons in 2019. More recently, Japan's rice exports have grown further, reaching 13,556 tons for the period from January to September in 2020, a 15% increase over the same period the previous year, according to MAFF.

The rice distributed around the world falls into two major varieties: japonica and indica. Rice cultivated in Japan is of the japonica variety, which typically features short and round grains in contrast to the long-grain indica variety. White Japanese rice, milled and cooked, has a soft texture with a slightly sweet aroma. Japanese rice tastes great and has a fluffy texture when it is freshly cooked and served hot as *gohan*. At the same time, Japanese rice is suitable for sushi, onigiri and other dishes served cold, as it continues to taste good even when it gets cold.

Japanese rice is highly appreciated by consumers even outside

A food tasting event in Russia serving *inarizushi* made with Japanese rice, 2019

A retail store in Finland selling sushi made with Japanese rice

Japan for its excellent taste and quality. This is the result of continuous efforts to improve breeding, cultivation and milling technologies. Strict quality control after harvest also plays a significant role in ensuring quality. For example, at rice milling plants in Japan, harvested rice goes through a process of slow-drying, husking and sorting by size using a sifter. Optical technology is then used to find and remove impurities such as stones and any rice that is defective in terms of shape and color or that may have been damaged by insects. Even after completing the milling process, the quality of rice is checked against a number of criteria, including grain shape, water content and taste. In this way, safe, high-quality rice that has been carefully chosen through various processes in Japan is traded on the market today.

INITIATIVES FOR POPULARIZING JAPANESE RICE AROUND THE WORLD

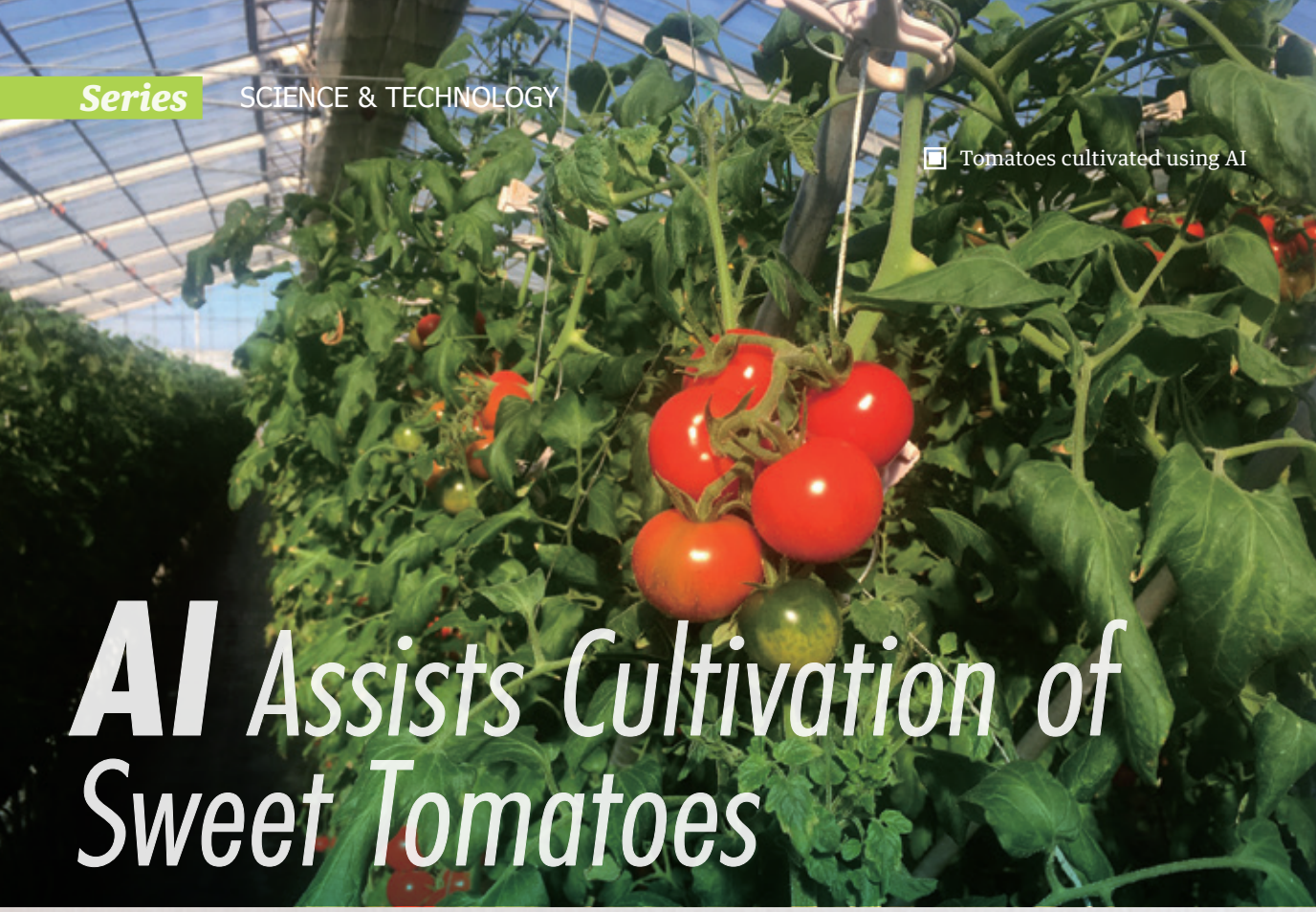
A number of initiatives are underway to popularize and share Japanese rice with many more consumers around the world, including promotional activities in collaboration with the government, exporters and rice producers. For example, tasting events have been held in many countries, seeking to create opportunities for local consumers and people in the restaurant business to taste high-quality Japanese rice. In Russia, a food tasting event promoting *inarizushi* (vinegared rice tucked inside sweet, deep-fried tofu pockets) and trade meeting were held at a retail store. At the food tasting event, participants learned how to cook delicious rice and make inarizushi. Rice producers from Japan joined the event in person to vouch for the taste of their rice. In China, trade shows and fairs for buyers have been held to promote the idea of giving Japanese rice as a gift, since China has a tradition of giving gifts to family and friends during the Spring and Mid-Autumn Festivals.

More and more retailers and restaurants in Japan are working to provide Japanese rice and rice-related products abroad. Iwai Corporation, one of the strategic exporters designated by MAFF for the promotion of Japanese rice exports, operates rice ball shops in New York and New Jersey in the United States and Paris in France. To keep the rice quality high, the company purchases brown rice directly from contracted farmers across Japan, and then mills and cooks the rice on-site in the stores.

Another strategic exporter designated by MAFF, Wakka Japan, was awarded the Minister's Prize in 2017 for its successful initiatives promoting Japanese agricultural exports. The company operates shops specializing in Japanese rice in a number of places overseas including Singapore, Ho Chi Minh in Vietnam, and Hawaii and New York in the United States. The company provides fresh white rice by exporting brown rice and milling it at the shops overseas in response to local customers' requests. They also produce organic rice at their rice fields in Nagano Prefecture for environmentally conscious consumers and export it overseas.

For details about events and recipes using Japanese rice, please visit the following website, which is available in nine languages, including Japanese, English, Chinese and French: https://zenbeiyu.com/en/, the Japan Rice and Rice Industry Export Promotion Association Home Page.

A retail store in France selling *onigiri* rice balls made with Japanese rice



Tomatoes cultivated using AI

AI Assists Cultivation of Sweet Tomatoes

A research group led by Shizuoka University Professor Mineno Hiroshi has developed a system that applies artificial intelligence to provide stable yields of high-quality sweet tomatoes.

UMEZAWA AKIRA

In recent years, IoT (Internet of things), robots and AI (artificial intelligence) are increasingly being applied in the field of agriculture. Shizuoka University Professor Mineno Hiroshi, who specializes in research on communication systems and sensor networks, has developed a system that uses AI to determine the best time to water plants to support their growth and productivity.

Development of the system was inspired by a project conducted with Shizuoka Prefectural Research Institute of Agriculture and Forestry beginning in 2013.

"Our goal was to increase the harvest volume of tomatoes by 30% by administering the appropriate amount of a nutrient solution needed for growth through the use of sensor network technology," Professor Mineno explains. "We were not able to increase the harvest volume; however, we were able to produce high-quality tomatoes with a high sugar content."

Tomatoes do not grow to their full size potential when the plants are underwatered, but their components become more concentrated, sugar content rises and the fruit becomes sweeter. This method of cultivating tomatoes with a high sugar content was well known among experts. However, the method is hard on the tomato plants, and if the amount of water supplied is too low, the plant may grow slowly or wither. It is said to take ten years to master the watering of plants, because it requires skill to determine a plant's precise state of growth and the best time and amount of water to give it to keep the plant from withering.

"Skilled farmers carefully check the color and tension of the tomato plant's leaves to determine the right amount of water to give it. I thought that if we applied their experience and intuition to

A sensor used to measure the conditions within the greenhouse

A camera used to record the movement of the plants' leaves

Professor Mineno Hiroshi (left) and tomato farmer Tamai Daigo (right)

numbers and were able to have a computer learn this data, then it would be possible not only to pass on high-quality know-how of cultivation that isn't being passed on due to a shortage of workers, but also improve this knowledge."

Plants absorb water through their roots and evaporate the majority of it through pores in their leaves. If the amount of water absorbed sufficiently covers the amount lost through this process of transpiration, then the leaves will be healthy, but if there is not enough, the leaves will wilt. Professor Mineno theorized that "we could determine the appropriate timing for watering if we could quantify the wilting state of the leaves."

He placed a camera in the greenhouse and programmed it to take photographs every minute. In this way, he was able to record the subtle movements of the leaves when wilting. By having AI learn this data in addition to data on temperature, humidity, brightness and other environmental factors, Professor Mineno developed a system that could automatically adjust the timing of watering by detecting the state of wilting in the tomato plants. Gaining the support of vegetable wholesaler Happy Quality and other companies in Fukuroi City, Shizuoka Prefecture, they were able to achieve the stable harvesting of high sugar content tomatoes as well as prevent splitting in the fruit.

"In addition to monitoring lighting and other indirect factors, the key feature of our system is that it can determine the timing of watering by observing the plant itself," says Professor Mineno. "Using this system, tomato growers whatever their experience can administer watering at the best time for the plants, regardless of the differences in the growing medium or cultivation environment. We are currently conducting repeat experiments in different regions and environments to test this prior to commercializing the system."

A number of companies are said to be interested in providing the system as a package that includes sensors, cameras and the equipment needed to control the best time for watering. Professor Mineno, who hopes to release the system some time in 2021, says that we can expect similar developments for cantaloupes, strawberries, leafy vegetables and more in the future.

"Given the shortage of workers and the aging of society, agriculture can become a stable and sustainable industry if value-added produce can be easily produced by anyone through the use of AI. We hope to support agriculture with the concept of conversing with plants using AI technology."

All photos: Courtesy of Mineno Hiroshi

The Sake Evangelist


John Gauntner

US-born former-engineer John Gauntner was captivated by Japanese sake and became a sake journalist. Since then he has communicated the delights of sake to people all over the world through a range of activities, including writing, lectures and running sake courses.

SAWAJI OSAMU

According to figures announced in February 2020 by the Japan Sake and Shochu Makers Association, which represents around 1,730 breweries and distilleries across Japan, exports of sake in 2019 had gone up for the tenth year in a row and were worth a record high 23.4 billion yen, more than three times the figure in 2009. The top market for exports was the United States and the second, China.

"These last ten years, there's been a huge increase in the number of Americans who drink sake," says John Gauntner. "I think this is not only because Japanese food has become more popular, but also because wine sommeliers are getting interested in sake and starting to recommend it to diners at their restaurants."

Ohio-born Gauntner's work includes writing articles on sake, giving presentations and exporting sake. He is known as a "sake evangelist."

Although he worked as an engineer at an electrical manufacturer after graduating from a local university, he decided that he "wanted to have an adventure before getting old." He successfully applied for the JET Programme, which invites young people to Japan from overseas to engage in international exchange and foreign language teaching, and came to Japan in 1988 as an "assistant language teacher" of English.

It was New Year 1989 when he discovered sake's fascinations, a few months after he'd started teaching at some high schools in Kanagawa Prefecture. A sake-aficionado coworker invited Gauntner to his home to taste and compare sake from breweries in Tohoku, Shikoku, Kyushu and elsewhere.

"Although I'd had sake before, I thought they all tasted the same," he remembers. "But the sakes I drank that day each tasted totally different. What's more, the flavors were extremely rich and complex. From then on my life changed."

Gauntner stayed on in Japan after finishing the JET Programme and, while working as an engineer in Tokyo, deepened his knowledge of sake by drinking sake at *izakaya*, visiting breweries and reading books on the drink. Meanwhile, by chance he met a journalist at the *Japan Times* who suggested he write a column on sake for the newspaper. That led to a variety of sake-related work arriving, including giving lectures and writing for publications on sake.

In 1998, he quit his job as an engineer and decided to focus squarely on his sake work. That's how broad and deep the fascination of sake was for Gauntner.

Varying elements can produce a truly diverse range of flavors in

All photos: Courtesy of John Gauntner



1 Gauntner gives a lecture
2 Sake Professional Course students visit a Chiba Prefecture sake brewery, 2017
3 Participants on a Sake Professional Course held in Toronto, Canada, 2016

sake, including the base ingredients of rice and water, how the sake is made, and the climate and cuisines of the producing area. Even the same sake will taste differently depending on whether it is drunk at room temperature or chilled. Gauntner was also astonished by the tremendous skill of the brewmasters who make sake. For example, in sake production there is a process prior to steaming the rice where it is soaked in water. The brewmasters make an extremely precise judgment—without any measuring equipment—as to how long to soak the rice and how much water the rice will absorb.

"All the processes of sake production rely on highly-experienced brewmasters. Of course, they also use modern science and technology, but at the end of the day it is their experience and intuition that is most important," explains Gauntner.

Having amassed sake knowledge and experience, in 2010 Gauntner became the first non-Japanese person to be certified as a Master of Sake Tasting. In 2015, he became the first non-Japanese person to serve as a judge in the finals of the Annual Japan Sake Awards. Through these and other activities, Gauntner has established his position as a sake specialist.

One particular activity that Gauntner has put much effort into is his Sake Professional Course, launched in 2003. Gauntner teaches this intensive 3-5 day course himself, covering the history and culture of sake, different kinds of sake, the brewing process, and other topics. The course is held not just in Japan, but also the United States, Canada, China and Singapore. To date, more than 2,000 people have taken part. In principle, classes are conducted in English, so many participants are non-Japanese, including on the courses held in Japan. During the course, students not only taste a range of sakes but, in Japan, also visit breweries and study the sake production process. Due to COVID-19, at present Gauntner is running the Sake Professional Course online. But he says that since students can participate from anywhere in the world, the range of nationalities has become more diverse.

"Once COVID-19 is over, I'd like to quickly restart our brewery visits. I just love talking with people of the breweries," says Gauntner. "Sake breweries are the equivalent to chateaux in the wine world, but people outside Japan still don't get much information about those sake breweries. To make sake more popular overseas, we need to communicate even more information about the people who make sake."

Gauntner on a sake-tasting visit to Nagano Prefecture

Sake produced using the rice and water of Akita Prefecture

Sake Cultivated by the Nature of Akita

Sake production has prospered since ancient times in Akita Prefecture, using high-quality rice and water. Sake made from locally-produced rice and groundwater using the latest technology is also very well-suited to the local cuisine.

KATO KYOKO

Sake production has long flourished in Akita Prefecture, a rice-producing region, and the prefecture is 6th in the country for volume of sake shipped. Sake with a well-rounded aroma and elegant flavor is brewed in Akita's cold climate using the abundant subsoil water produced by the mountainous terrain, including the Ou Mountains with their many 1,000- and 2,000-meter-high peaks.

A representative of the Sales Planning Department at Akita Shurui Seizoh Co., Ltd., a local sake brewery, says, "In the seventeenth century, there were various mines in the Satake domain [modern-day Akita Prefecture], including the Innai-Ginzan Silver Mine, said to be one of the three great silver mines of Japan. Workers, engineers, and merchants from all over Japan gathered here. Sake was in demand as a form of entertainment for these people, and the Satake clan actively worked to protect the sake production industry. It seems there were over 700 sake shops within the domain at the time."

Akita Shurui Seizoh, known for the Takashimizu brand, was born out of the merger of twelve sake breweries in 1944 and is one of the many representative Akita breweries, currently producing about 2.68 million liters of sake annually.

Some 97% of the rice for the sake made by this company is produced in Akita Prefecture, Akita Sake Komachi and Miyama-Nishiki being two varieties popular with brewers.

The representative explains, "Akita Sake Komachi offers the gentle sweetness of rice and creates sake with a light flavor. Miyama-Nishiki rice, by contrast, has body and creates a crisp sake."

Highly-refined white rice can be produced from large-grain Akita Sake Komachi, with the steamed rice being elastic. A major feature of this rice is that *koji* (malted rice)

All photos: Courtesy of Akita Shurui Seizoh Co., Ltd.

1 Akita Sake Komachi brown rice
2 State-of-the-art rice polishing machines
3 *Koji* production
4 Creating a starter culture by mixing steamed rice, water, and *koji* in a tank

can be easily produced due to the fact that the surface of the steamed rice doesn't dry out easily.

Akita Shurui Seizoh produces many varieties of sake, including *ginjo-shu* (sake made from highly polished rice) and *daiginjo-shu* (super premium *ginjo-shu*, made from even more highly-polished rice). Sake uses white rice as an ingredient after polishing away the outer layers of brown rice, and the amount of rice that is removed is one of the main elements affecting the aroma and flavor of sake.

To improve the level of polishing, Akita Shurui Seizoh introduced fourteen automatic rice polishing machines that utilize diamond grinding stones in August 2019 as they updated their aging machines, and they polish all of their rice in-house. By introducing these updated machines, low-energy rice polishing has become possible and the company is able to control degradation in rice quality due to frictional heat when scraping the rice.

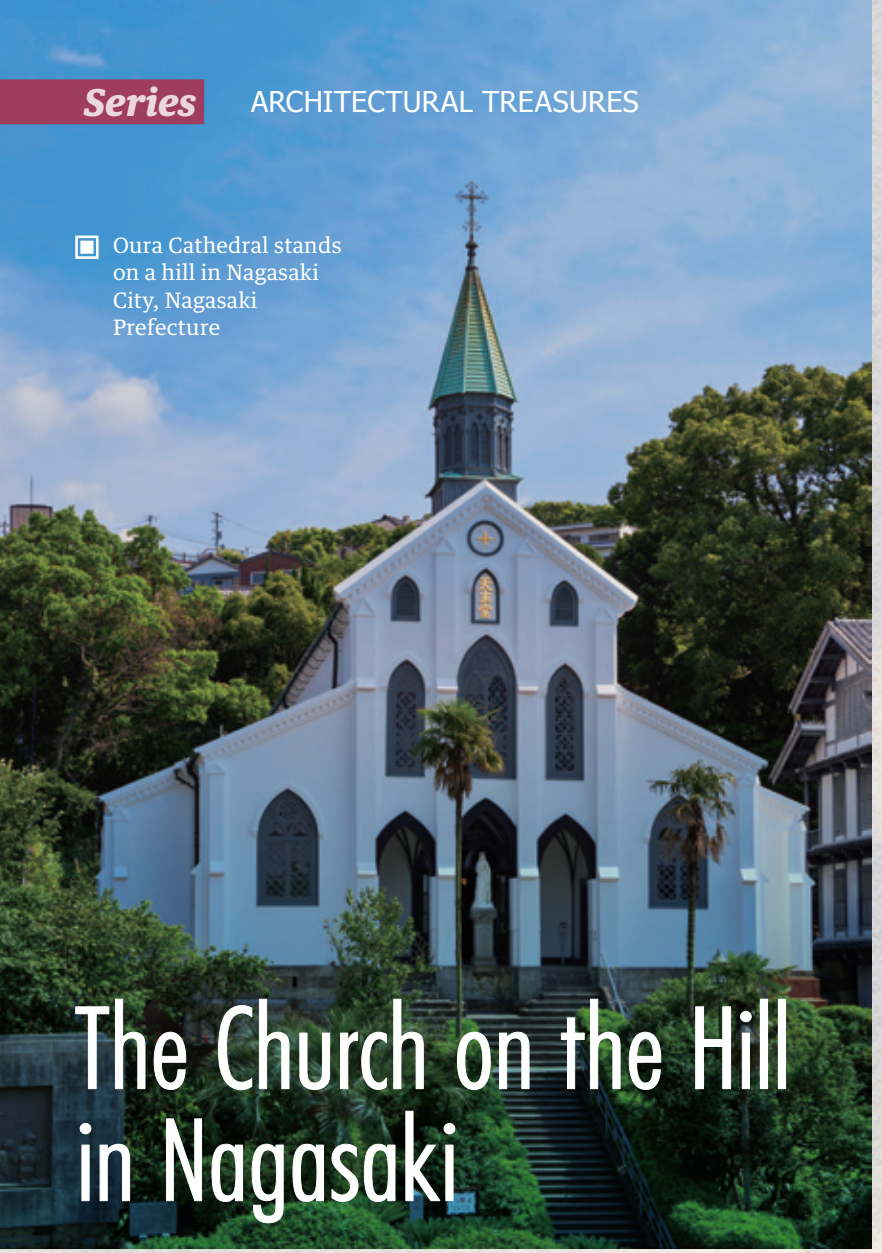
Water quality is also extremely important in the production of sake. Akita Shurui Seizoh is located in a place where the Omono River, Asahi River and Taihei River meet, with their waters flowing from the Ou Mountains to the Sea of Japan. The groundwater used as an ingredient in sake is said to be of the same vein as the wells used for the lord of the Satake domain. This water is soft, with a hardness of 49.7 mg/l, and has a smooth mouthfeel.

Takashimizu sake, made with this local rice and natural soft water, has been highly praised for its mild umami and aroma and its crisp, clear flavor. According to the brewery representative, the company aims for a sake you won't tire of and that brings out the flavors in food.

"There are many kinds of local cuisine in Akita Prefecture, an area that is blessed with produce from the sea and the mountains and where agriculture has prospered. Takashimizu is well suited to characteristic Akita foods, such as *kiritampo-nabe*, which uses local chicken and *kiritampo* [steamed rice that has been smeared onto a wooden stick and grilled], *hatahata sushi*, where sailfin sandfish caught in the Sea of Japan in winter are pickled and fermented with koji and rice, and more. I hope you will taste some of these foods in Akita. Their compatibility with our sake is outstanding."

Kiritampo-nabe

Hatahata sushi



Oura Cathedral stands on a hill in Nagasaki City, Nagasaki Prefecture

The Church on the Hill in Nagasaki

Standing on a hill overlooking Nagasaki Bay is Oura Cathedral, one of the most important examples of Christian church architecture in Japan.

SATO KUMIKO

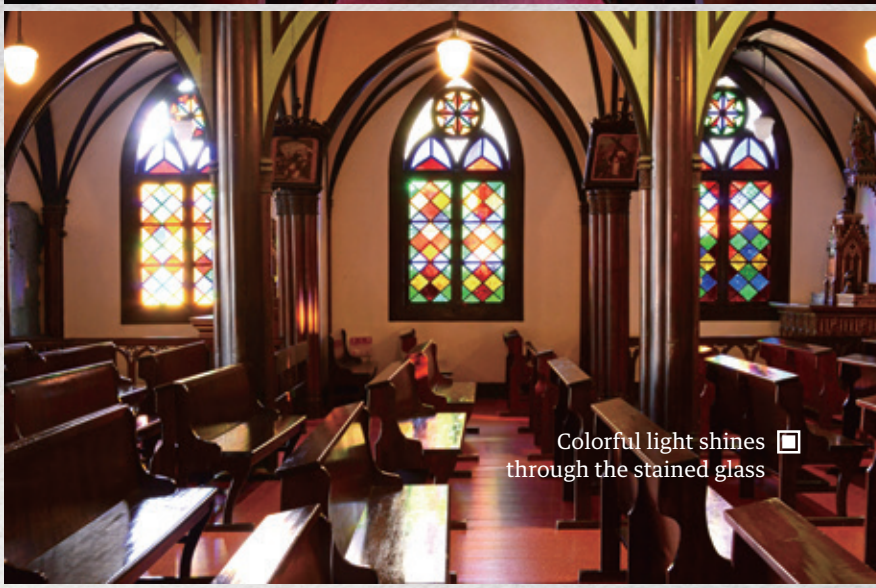
In the Edo period (1603-1867), exchange and trade with foreign countries was highly restricted by the Tokugawa shogunate. However, in 1858, the shogunate signed treaties of amity and commerce with the United States, the Netherlands, Russia, Great Britain and France, and the following year, Hakodate, Yokohama and Nagasaki were designated as trade ports. In each of these ports, foreign settlements were established, where foreigners were allowed to build their own trading houses and residences.

The Oura district in Nagasaki City, Nagasaki Prefecture, was one such foreign settlement. At the time, many Western-style consulates and houses stood on the hillside with stunning views across Nagasaki Bay. Oura Cathedral, built in 1864 for the benefit of the foreigners living in the settlement, still stands there today. It is the oldest surviving Catholic church in Japan and the only church building to be designated a National Treasure.

The strikingly beautiful exterior of white stucco brick encasing the original wooden structure owes to extension work completed in 1879, but the interior of the building has remained largely unchanged since it was first constructed. The church was designed by the French Roman Catholic priests Louis-Theodore Furet and Father Bernard Thaddée Petitjean, who were posted to Nagasaki at the time. It was built by Koyama Hidenoshin, a master carpenter from Amakusa. Designed in the Gothic style[1], Oura Cathedral has a tall octagonal spire with stained glass

Oura Cathedral altar

The interior of Oura Cathedral with its distinctive rib-vaulted ceiling



Colorful light shines through the stained glass

lancet arched windows to let light into the interior. The high vaulted ceilings typical of Gothic places of worship were constructed using wooden reinforcements known as "rib vaults," commonly known as "bat-shaped ceilings," rather than stone as is common in Europe and the United States, testifying to the skill and ingenuity of Japanese carpenters of the time.

Taguchi Koji, facility manager of the Oura Cathedral Preservation Committee, says, "The ceiling is made of bamboo, woven in a distinctive way, and clay. It's difficult to recreate work such as this with today's technology." The roof of Oura Cathedral is made of *sangawara*[2] pantiles, which were invented and widely used in the early Edo period.

Christianity was introduced into Japan in 1549 and briefly spread throughout the country until it was banned during the Edo period. Although Oura Cathedral was built as a church for foreigners, a plaque bearing the name of the cathedral in Japanese (Tenshudo) was displayed high on the facade of the building to signal its presence to Japanese people. This was said to be in part due to the priest's belief that some Japanese people may have been keeping their Christian faith in secret for over 250 years. Sure enough, in 1865, a dozen or so Japanese visited Oura Cathedral and confessed to their faith to Father Petitjean, saying, "We are of one heart with you." This event was reported to the Vatican and came to be known throughout the world as the "Discovery of the Christians." After the ban on Christianity was lifted in 1873, believers who had gone into hiding across Nagasaki began to emerge one after another. This historical background contributed to the registration of Oura Cathedral as a UNESCO World Heritage Site in 2018. The church is a core site of the "Hidden Christian Sites in the Nagasaki Region[3]."

In World War II, an atomic bomb was dropped on Nagasaki. Oura Cathedral, located a short distance from the epicenter, sustained extensive damage to its main gate, roof, ceiling and stained glass windows. The restoration took five years and was completed in 1952. The cathedral's original bell survived the War and was housed in a newly built bell tower. This bell still rings twice a day, at noon and in the evening, accompanied by a prayer for peace.

1 A style of architecture and art that began in France in the first half of the twelfth century, and was widely influential across the whole of Europe until the sixteenth century. The lancet arches and stained glass of the cathedral are characteristic of this architecture.
2 Square tiles with an undulating cross-section
3 The cathedral was designated a UNESCO World Heritage Site in 2018 for its role in the survival of a community of believers who, for 250 years of severe oppression under the Ban on Christianity during the Edo period, preserved their faith without the presence of missionaries, while remaining connected to mainstream society.

Sazaedo Temple

A Buddhist Pilgrimage Off the Beaten Track

JAPAN HERITAGE

The Aizu 33 Kannon Pilgrimage linking 33 statues of the Kannon goddess of mercy offers a fascinating way to explore the Aizu area off the beaten track.

The sites of this pilgrimage were established in the mid-17th century and are historically and spiritually significant, but these days the journey has a more relaxed feel–almost casual–compared with other pilgrimages. Worship is not the only reason people visit these sites. The pilgrimage remains popular with locals and visitors as a leisurely hike that takes in some impressive yet relatively low-profile temples and lots of beautiful scenery along the way. There is still a sense of being away from an established tourism area, and the temple buildings are very different from those in areas such as Kyoto. Some of these sites are slightly challenging to access due to their location, so there is little need to worry about being swamped by crowds, and this adds to the experience.

The Aizu 33 Kannon Pilgrimage inspired the establishment of several more pilgrimages in the area, which was called "Buddhist Capital Aizu" because Buddhist culture flourished there. Visitors who are short of time but want to complete a pilgrimage in spirit might consider heading to the pagoda-shaped Sazaedo(*) Temple near Aizu-Wakamatsu City. This unique building, which contains a double-spiral ramp leading to the top and back down again, enshrines 33 Kannon that were said to provide anybody who passed them with the same spiritual benefit as walking an entire pilgrimage route in the Tokai and Kansai regions.

Surrounding all this is Aizu's stunning scenery. Aizu has plenty of hiking trails, and visitors can access picturesque lakes, the Oze National Park, and a wild beech forest. Some of the pilgrimage sites are in or near *onsen* hot spring towns–the perfect place to relax after exploring Aizu and its heritage.

*The *sazae* is a kind of shellfish, known as the turban shell in English.

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