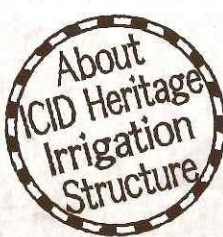


Registered in October 2015

ICID Heritage Irrigation Structure Uwae Irrigation Canal

Selected as one of the Top 100 Irrigation Facilities in Niigata



To make clear the history and development of irrigation and promote understanding and appropriate conservation of the irrigation facilities, the ICID established the World Irrigation and Drainage Prize policy in 2014. Under this, the ICID takes charge of registration and gives the award to irrigation facilities which are regarded as historically, technically, and socially valuable; for instance, those which were built over 100 years ago, contributed to the development of irrigation agriculture, or were built with outstanding techniques.

※Irrigation means...
To manually supply water from outside sources to agricultural land.



Outline of Uwae Irrigational Canal ~The realization of one of the largest high-quality rice-producing regions, thanks to 130 years of effort from farmers~

The Uwae Canal (Myoko Kawakami to Joetsu Nagaokashinden) is located in Myoko City and Joetsu City, in the southwest of Niigata Prefecture. The canal is 26 meters long and irrigates approximately 2,646 hectares of rice field. The region has two large canals, the Uwae Canal and the Nakae Canal, both of which serve the Takada plain. As opposed to the Nakae Canal, which was completed in a short amount of time with financial assistance from the Takada daimyo (feudal lord), the Uwae Canal was built over a period of 130 years starting 400 years ago and was made through the efforts of the local villagers and their hard-earned money.

The construction of the Uwae Canal is said to have begun in 1573. The construction of the canal never brought in any profits. The path winds through many mountainous areas, so they had to dig through mountains and under rivers, making construction very difficult. Thanks to the efforts of great men, the canal was finally finished in 1781. To honor the foremen who had led the construction, farmers erected memorial stones almost immediately after one of them died. They also enshrined them as Shinto and Buddhist gods and continue to honor their contributions today.

After entering into the Showa period, the canal was repaired as a



prefectural project and as a national project. Today the canal supports the area around it, which is a base of rice production and home to many of Niigata's granaries, and the area supplies delicious, high-quality Joetsu rice all over Japan.

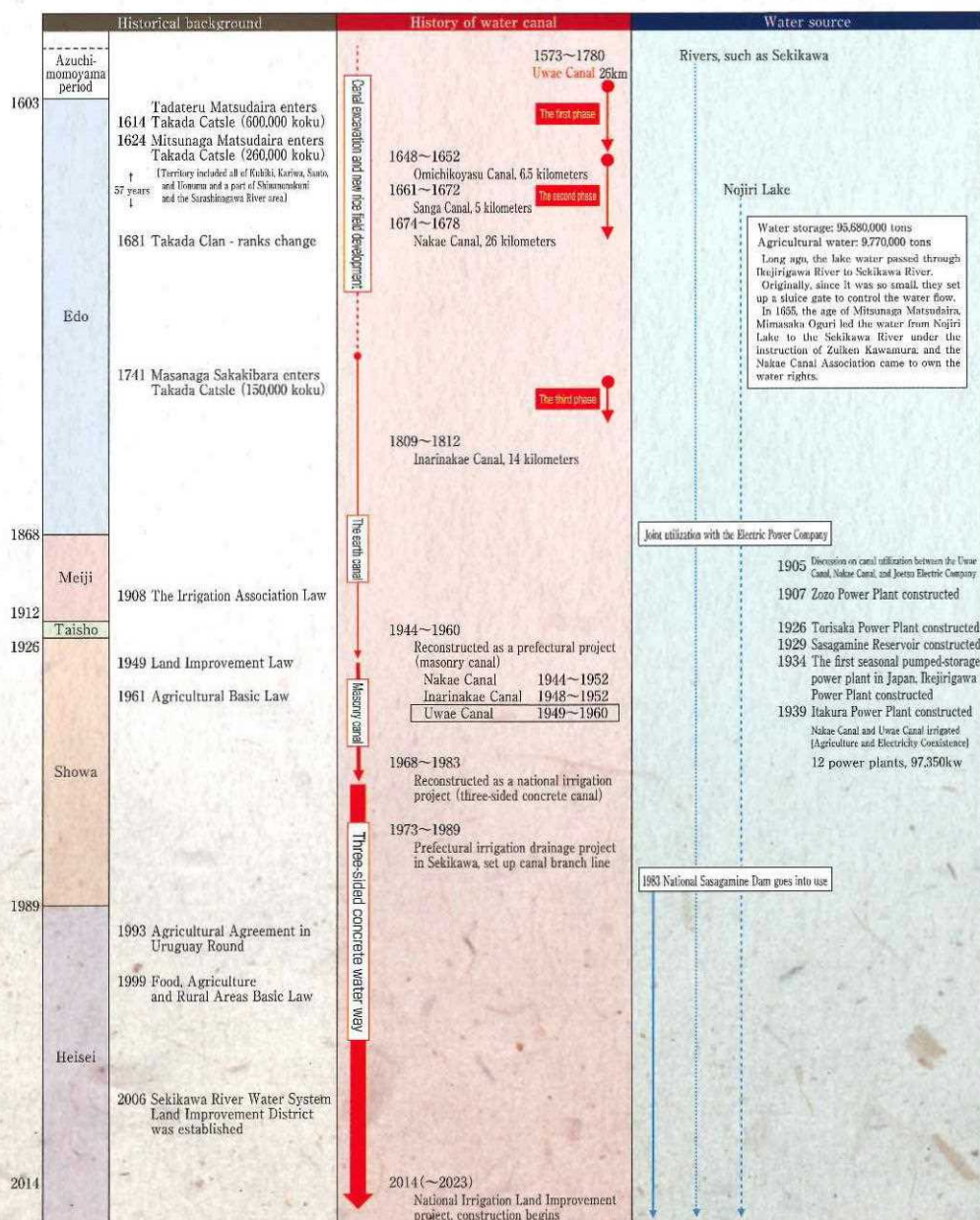
History of the Uwae Canal's Excavation

Development of agricultural water canal in Sekikawa region

Before the Uwae Canal was constructed, irrigation was done by damming up a number of small rivers and creating a reservoir of water. Even with the snowmelt in early spring, however, there was often not enough water, and with the sharp slope of the area, it was almost impossible to store water until September to ensure a good rice harvest. It is uncertain when exactly construction on the Uwae Canal began, but it is often said to have begun in 1573 during the Sengoku period.

Afterward, in the Edo Period, there was increased development of new rice fields, and the construction of the canal also continued. The first phase of construction (1573-1648) saw Kyuhachiro Tomisato, the head of the village of Yoshiki, at the center, and he oversaw excavation from Myoko's Kawakami area to the Yoshiki Shinden area. In the second phase (1650-1694), the one in charge was Matazaemon Shimizu, who was from a house of local officials and was quite influential in the area. He extended the canal from Joetsu Yonemasu to Kamifukasawa. Furthermore, after 1965, the villages downstream asked many times to extend the canal, but were opposed by upstream villages and so could not proceed. Finally, after 80 years, the third phase (1772-1781) began, and the influential landowner Tomijiro Shimotori extended the canal from Kamifukasawa to Okagi.

After the Uwae Canal was completed, over 60 villages gained a stable source of water as a result, allowing enough rice to be made for some 12,000 people. This accounted for 8% of the Takada domain and contributed to the stability of its operation. This production became a cornerstone of farming in the area, and the region today has become a base of rice production.



C haracteristics of The Uwae Canal (One of the most difficult constructions)

The Uwae Canal runs along the mountain bases in the Takada Plain and passes through a number of rivers. This canal, which runs 26km and cuts through some rough topography, required cutting through mountains and going under rivers. This large scale canal was particularly difficult to construct and is quite unique in Japan.

Kawakami Kuriana Tunnel

When the Uwae Canal was first excavated, it ran along the Sekikawa River while at the same time damming it. However every time there was heavy rainfall the Sekikawa River would flood, and the Uwae Canal would be washed away, ensuring not even a drop of water would get downstream and causing problems for the farmers there. So in 1810, a request was made to Iemon Matsuoka of the Kawakami village, and tunnels were dug under his house.

The idea to have a canal go below a person's house was innovative at the time and demonstrates the passion which people had for ensuring that the Uwae Canal worked. The tunnel was to be made in the shape of a horseshoe and would be 3.3 meters wide, 1.7 meters tall and 220 meters long. 4,280 people worked on the project, and it cost around 122 ryo (15,860,000 yen in present day).

The tunnel collapsed from torrential rainfall in 1931, and so reconstruction was carried out. As part of a national project in recent years, the tunnel was closely inspected. In testament to the engineering skills of the past, it was found to have no warping or distortion and was not in need of any further reinforcement.



Sanjobori

In 1775, during the largest construction effort in the Uwae Canal's history, which was overseen by Tomijiro Shimotori, the Sanjobori, a 9-meter tall tunnel coming down from the highest part of Okamine Hill, was built. There were many mudslides while excavating the area under the Kushiikegawa River, but owing to Shimotori's strong will and the passion of the farmers, the construction took 5 years, finishing in 1780.

To measure inside the tunnels, lanterns were hung to mark distance, pitch, and



direction. All the work was done with manpower, unlike today where we can use heavy machinery, and they excavated from downstream to upstream for drainage.

According to the history of the canal, over 1,700 farmers were involved in the construction of the Sanjobori, and the total cost was a massive 3,455 ryo (450,000,000 yen in modern terms). It's unknown how many workers lost their lives due to cave-ins, but it's said that owing to the danger of the work, a coin box was set up at the entrance of the tunnel, and workers were paid in cash for the day's work. This project shows that the farmers were willing to go to incredible lengths to ensure water flowed.

In the 1970s, as part of a national project, steel pipes were inserted into the stone work of the tunnels, and mortar was poured into the chinks in the stone, but no real mistakes were noticed, paying testament to the skill of the workers.



Establishment of Kyakusui system (area without cost allocation)

The Uwae Canal was constructed over the course of 130 years in three phases, and every time the canal grew, the number of villages increased. As a result, it was necessary to have a large canal to get enough water downstream. Since areas upstream and related villages would have to give up some of their land for this, they would not always agree to help extend the canal. But thanks to the unique water management method wherein downstream villages agreed to fully cover the water management costs of the upstream areas, it was possible to manage the entire Uwae Canal.

This system is called "Kyakusui" (area without cost allocation) and allowed for about 200 hectares of rice field to use the Uwae Canal without any cost allocation. Even after the Land Improvement Law was established in 1947, this system, which was created in the Edo period, was given priority and was continued until just recently. The Uwae Land Improvement District, the management body of the Uwae Canal, merged and became the Sekikawa Water Area Improvement District in 2006 and made a memorandum with the villagers in the Kyakusui area reaffirming the effect of the Kyakusui system and agreed to cover 50% of the cost.

Men of Merit for Excavating the Uwae Canal

The First Phase of Construction - Kyuhachiro Tomisato

Tomisato was the head of the village of Yoshiki. He oversaw excavation from Myoko's Kawakami area to its Yoshikishinden area from 1573 to 1648. When a new village was created thanks to the development of the canal, it was named Yoshikishinden to honor his work and his birthplace.

When the Kawakami Kuriana Tunnel was built in 1810, Kawakami Gongensha was built to wish for the safe completion of the work, where local villagers organize a solemn festival every year on April 21.

The Second Phase of Construction - Matazaemon Shimizu

Shimizu was from a house of local officials and was quite influential in the area. He extended the canal from Joetsu Yonemasu to Kamifukasawa from 1650 to 1694. Thanks to his contributions to the Takada clan (Nakae Canal accountant), his father was assigned as the head of the Uwae Canal irrigation project. He has long been respected, and in 1752, on the 58th anniversary of his passing, the villagers donated a statue of Matazaemon Shimizu seated in Buddhist garb to the Shimizu family. The statue mimics the image of Shimizu busy at work with the accounts and shows him with a brush in his right hand and a ledger in his left. He is still enshrined today at the entrance of the Shimizu house.



The Third Phase of Construction - Tomijiro Shimotori

Shimotori was an influential landowner. He extended the canal from Joetsu Kamifukasawa to Okagi from 1772 to 1781. He fought against the opposition of other villages and worked with his grandfather and father over three generations to petition the local governor for permission to extend the canal. He would finally finish the canal after 80 years. Furthermore, Shimotori used his own rice fields and funds for the construction costs. He believed the god Hokushin Daimyojin would protect the nation from disaster, and never forgot to pray every day for success in his work. When he died, he was enshrined as Uwae Hokushin Daimyojin.



The excavation of the Uwae Canal and the foremen who worked on it are still commemorated in traditional events and festivals, and the story of the Uwae Canal continues to be passed down today.

The Uwae Canal Today

As of 2015, the canal irrigates approximately 2,646 hectares of rice fields. While the Kawakami Tunnel and the Sanjobori are scheduled to be renovated later on, there are no obstructions, and it operates just as it did when it was initially constructed.

After 1890, power companies expanded their work in developing power resources, and in 1907, a hydraulic power plant was built on the Sekikawa River. When the Uwae Canal was first excavated, it dammed up the Sekikawa River and led the river's water into the Uwae Canal. Now, the water passes through 12 hydroelectric power plants as it moves from upstream to mid-stream before entering the Uwae Canal. This makes the water useful both for agriculture and hydroelectric power. Thanks to becoming part of the route for hydroelectric power generation, the loss of water resulting from drainage from the Sasagamine Dam (an agricultural dam) has been reduced, and the water is now sent to the Uwae Canal. Furthermore, there is no need for intake water from the Sekikawa River, so the cost of operating the intake facility is reduced, which greatly reduces the financial burden on farmers. Additionally, thanks to working with hydroelectric power plants, the water also contributes to domestically produced, renewable, CO2-free, clean energy.

As the water for the Uwae Canal runs through the mountains, there has been concern regarding mudslides and flooding owing to fallen trees, mountain streams flowing in, and snowmelt water. To respond to these concerns, during disaster recovery efforts, protection forests were set up in at-risk areas, and those forests still fulfill their role today.

Additionally, on March 7th, 2012, there was an enormous mudslide in the Kokukawa River district of Itakura, Joetsu. The Uwae Canal's main line was damaged by this mudslide, and it became a serious problem to ensure that water would get to some 2,100 hectares of rice field, especially since rice puddling was set to take place on April 25th. To solve this, the Hokuiku Agricultural Administration Bureau worked with related organizations in Niigata Prefecture, Joetsu, and the Sekikawa River Water System Area Improvement District to provide water and create reconstruction plans. Thanks to the rapid response of everyone involved, a temporary canal was finished on April 20, ensuring it was possible to provide water for the 2012 rice puddling and planting. Afterward, the area underwent a national disaster risk assessment, and restoration work was done to the main line of the Uwae Canal, which was finished in March 2013.

Canal's story is noted in elementary school textbooks in the Joetsu region, and is valued as a tool to teach about the agricultural history and development of the region. The Sekikawa River Water System Area Improvement District has created a pamphlet for children and a picture book. Every year they have over 500 students come to see the canal and learn about it, and they strive to teach the next generation about the achievements of their ancestors and the role of agricultural areas.



Introducing "The Top 100 Irrigation Facilities in Niigata"

Niigata Prefecture selects irrigation facilities that contribute to its agriculture and villages, that are closely connected to the local residents, and that have both historical and cultural significance for "The Top 100 Niigata Irrigation Facilities," which it uses in publicity activities.

The Uwae Canal is among those selected for "The Top 100 Niigata Irrigation Facilities." For more details, please visit the Niigata Prefecture website. [The Top 100 Irrigation Facilities in Niigata](#)

Since the Uwae Canal was registered as an ICID Heritage Irrigation Structure, we hope that more and more people will come to understand the role of irrigation canals and that they will be able to contribute greatly to the local agriculture and farming villages.



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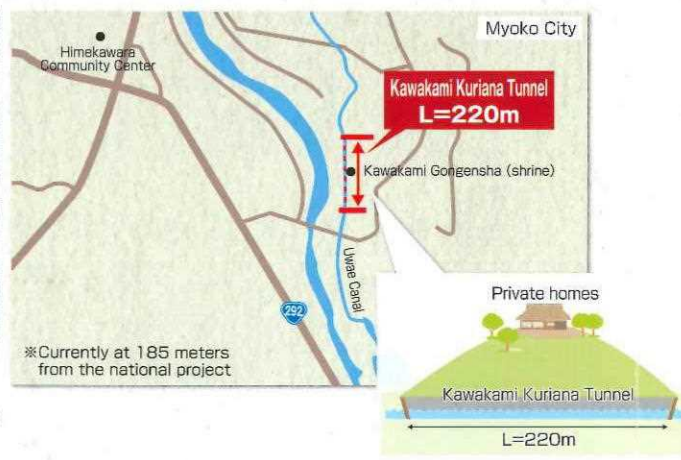
1 The Tohoku Electric Power Company Itakura Control Pond
(Right gate) To Nakae Canal (partially to the Uwae Canal)
(Center gate) To Uwae Canal
(Left Gate) To the Sekikawa River as discharge



2 The Uwae Canal Memorial Park
Monument of the former intake at the former intake site. The monument and cherry blossom trees are places of relaxation for the local residents.
※The monument was restored using stones from the intake dam.



3 Kawakami Kuriana Tunnel
In 1931, large-scale repairs were made after parts of the tunnel collapsed due to flooding.



4 Kawakami Gongensha
In 1810, during the construction of the Kawakami Kuriana tunnel, the Kawakami Gongensha (Kawakami, Myoko) was founded to pray for the safety of the workers as they took on the dangerous mountain excavation work. Every April 21, the local villagers hold a solemn festival.



5 Itakura Power Plant
After producing the hydroelectric power, some of the water in the steel tube pours into the Uwae Canal, while the rest is poured into the Nakae Canal.



Nojiri Lake is located 654 meters above sea level, and its coastline is shaped like a leaf of cotton rose, so it's also referred to as "cotton rose lake." It can be used for 9.77 million tons of water for agricultural use from June 1 to September 10.



6 (Top left) Hokuiriku Shinkansen Tunnel
(Bottom left) The Uwae Canal passing through the Takada Plains eastern mountainous area
(Right) Renovation of the Uwae Canal in Yonemasu in 1915

Uwae Canal touris



The Uwae Canal irrigates approximately 1,100 hectares, serving a wide area of farming land. Its use decreases production costs, allowing for more effective agriculture.



Sasagamine Dam (Myoko Suginosawa) waters approximately 7,000 hectares of farm land on the Takada Plains. Volume of 9,200,000 tons.

First phase of construction (1573-1648), approximately 6 kilometers

Second phase of construction (1650-1694), approximately 10 kilometers

Third phase of construction (1915-1915), approximately 10 kilometers

spot map



7 In March 2012, there was an enormous mudslide, and the Uwae Canal was damaged. The left picture shows its state after the damage, and the right picture shows after the recovery.



8 Matakaemon Shimizu in Buddhist Garb
Even now, long after he passed away, the villagers respect Matakaemon Shimizu. In recognition of his efforts, the villagers donated a statue to the Shimizu family which is now carefully preserved in the Shimizu family garden.



10 The Uwae Hokushin Shrine (at festival time)

In the Uwae Hokushin Shrine in Sanwa Kawaura, a festival is held every year on July 17 in honor of Tomijiro Shimotori's great achievement.



9 Sanjobori

Excavating the Kushiike-gawa River tunnel was the most difficult part of constructing the Uwae Canal and was completed under the supervision of Tomijiro Shimotori, who provided his own property. (Left: Inlet; Center: Outlet; Right: Inside the canal)



Ornamental apron of Manrikizeki, Tomijiro Shimotori's bodyguard

The current Hokushin Shrine is in the corner of Tomijiro Shimotori's old house, and next door to the Northwest is the home of Manrikizeki, an Edo sumo wrestler. (Mr. Heiji Hayashi, who lives in Tokyo, is his descendant.)

Manrikizeki was a giant at 175cm tall and weighing in at 105kg. He accompanied Tomijiro Shimotori as his bodyguard whenever he visited the Tokugawa clan to make a request for the Uwae excavation.

Having gained popularity as an Edo sumo wrestler, in 1752, Manrikizeki's sponsors presented to him an ornamental apron, a set of short swords, and a spear. He was so powerful as to walk to Tonome in geta (wooden clogs) while carrying two bags of rice (19.5 kg each). The ornamental apron was worn when he was very

popular in Edo sumo wrestling. It is now displayed in the Hokushin Hall in Kawaura, Sanwa.



11

Sanpo (Sanwa, Okagi Area)

Since the Uwae Canal excavated by Tomijiro Shimotori downstream flows three directions, it is called "Sanpo" (three directions).

