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Editor's Preface —

Dr. Sinite C. Yu, Research Group Leader at International Institute for Water Education (TIIWE)

Topics such as water heritage preservation and revitalization used to be embedded in the discussion of other heritage categories. However, climate change-induced crises have spurred international water and culture NGOs into action and created a blueprint for water heritage resource preservation and development. The heritage organization ICOMOS and water organization ICID are the driving force behind this movement and are calling for the international community to bring water heritage systems into sharper focus. At the 7th World Water Forum in 2015, WWC, ICID, ICOMOS, UNESCO and FAO jointly announced the establishment of the World Water System Heritage (WSH) Program, and subsequently created the WSH certification system. At the 8th World Water Forum in 2018, three water systems were recognized and registered in the WSH Program.

Building upon the legacy of the 2019 International Conference "Water as Heritage" held in Taiwan while reflecting the increasing importance of water heritage preservation worldwide, this newsletter features six monographs under the theme of water heritage. The newsletter introduces the most recent international trends in water heritage preservation as well as Taiwan's role in and contribution to the water heritage movement. Case studies include the urban regeneration and water heritage preservation work in the Utrecht Old Town in the Netherlands. Utrecht, which traces its history back to ancient Roman time, had transformed into a metropolis with close connection with its waterscape thanks to its successful urban renewal programs. It now prides itself in both the rebirth of its historic heritage and its forward-looking vision for the future. This newsletter also presents a case study of the Sekikawa Suikei Land Improvement District, Japan, one of the first sites in the world to receive WSH certification, further analyzing key reasons for the site to receive the prestigious certification. In addition, this newsletter features three monographs on Taiwan's achievements in water heritage preservation, including the preservation of Taiwan's hydroelectric heritage and the century-old Er-Feng Irrigation Canal System in Pingtung, Taiwan.

It is hoped that this special edition could encourage more people to value water heritage, attract likeminded activists to be part of the moment in Taiwan and abroad, and promote mechanisms for interdisciplinary exchange and cooperation in international water heritage.



The New International Movement for Preservation and Adaptation of Water Heritage

— Dr. Sinite C. Yu, Research Group Leader at International Institute for Water Education (TIWE)

This paper outlines the creation of preservation systems by UNESCO and World Heritage, the implementation process of the World Water System Heritage Program (WSH), and the establishment of "Water and Heritage" International Scientific Committee by the International Council of Monuments and Sites (ICOMOS) in exploring the new movement for the preservation and adaptation of water heritage systems. This paper also introduces Taiwan's response strategies and current progress in the context of this new international movement.

Conceptional Transformation of Water Heritage Systems in the World

In the wake of the conclusion of WWII and the devastation brought to humanity by the War, the nations of Europe, headed by Great Britain and France, established the United Nations Scientific and Cultural Organization (UNESCO). Created with a goal to prevent the recurrence of the future world wars, its main objectives were to promote education, culture and peace. In 1972, the UNESCO General Assembly adopted the Convention Concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) with an aim to preserve natural or cultural sites of outstanding universal value to all humankind. A system for the preservation of heritage internationally was developed, adopting the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the International Council on Monuments and Sites (ICOMOS), and the International Union for Conservation of Nature (IUCN) as advisory bodies.

Of all the categories of the World Heritage system, discourses on "water heritage" are relatively rare at present. World Heritage preservation has been in place for over 40 years, and its preservation theory and evaluation system have grown more robust and complete over that time. In terms of preservation projects involving water around the world, there has been more discourse on heritage preservation value from the perspective of environmental background, construction technology and cultural landscape. However, discussions focusing on the core values of water heritage such as water resource management remain relatively sparse.

The global water crisis caused by climate change was brought to the forefront at the end of the 20th century; the conventional mindset of "man conquering nature" to control water had begun to shift, turning instead towards water resource development goals of "sustainable development" and "symbiosis with water." In the 3rd World Water Forum in Kyoto, Japan in 2003, issues surrounding "Water and Culture" were raised for the first time to highlight the need to tackle today's water and environmental crisis by integrating traditional perceptions with modern scientific methods. Examining local water culture and extracting useful components for water conservancy planning will provide irrigation works more effective solutions to address the complex and uncertain meteorological variables of the future.



Figure 1. The 3rd World Water Forum Final Report, 2003

To highlight the core values of water heritage, international water and heritage NGOs had begun to focus on key issues and set out to create a blueprint for the development of water heritage. The main drivers of this movement are ICOMOS and ICID in the areas of heritage and water resources, respectively.

Every year on April 18, ICOMOS celebrates the International Day for Monuments and Sites in accordance with the UNESCO resolution, with a focus on global climate change and natural disasters. In 2011, the UNESCO General Assembly's theme was The Cultural Heritage of Water, showing the importance of preserving the cultural heritage of water resources. In 2013 the Assembly was held in

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Amsterdam, resulting in the issuance of the Amsterdam Declaration, the film *Protecting Deltas, Heritage Helps*, and the book *Water and Heritage - Material, Conceptual and Spiritual Connections*, which elaborate on the expansion of water and heritage. In 2016, a conference entitled "Water and Heritage for the Future" was held in Rotterdam, which thematically linked water heritage with climate change and United Nations Sustainable Development Goals (SDGs), and it inspired the 2019 publication of the book *Adaptive Strategies for Water Heritage*.

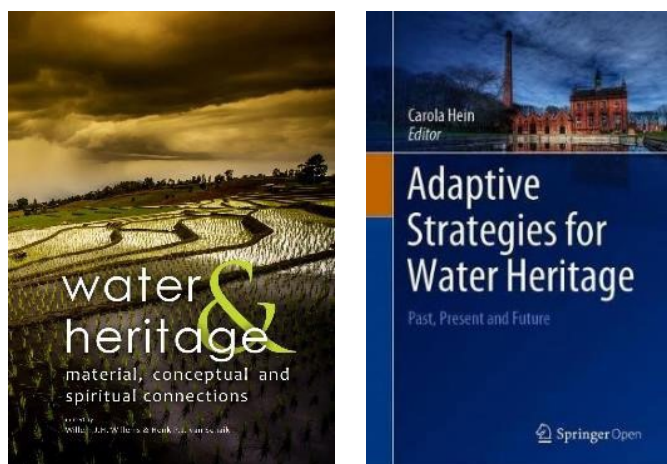


Figure 2. Compilation of Monographs on Water Culture, 2015 and 2019.

International Commission on Irrigation and Drainage (ICID) began evaluation and selection work for World Heritage Irrigation Structures (WHIS) in 2012, and, as of 2019, 80 sites in 13 countries have been recognized. ICID also took part in 2013 the Amsterdam Assembly, where it connected with ICOMOS and began to evaluate the feasibility of launching the World Water System Heritage Program certification in conjunction with international organizations like the World Water Council (WWC), UNESCO and the United Nations Food and Agriculture Organization (FAO).

The Launch of the “World Water System Heritage Program”

The Seventh World Water Forum was held in 2015 in Gwangju, South Korea. Among various water culture related themes, Henk van Schaik, editor of *Water and Heritage- Material, Conceptual and Spiritual Connections*, introduced to the audience the major international irrigation heritage projects detailed in his book. He suggested that using science to manage water heritage systems and assist with flood control preparedness would improve countries' defense against natural disasters. Citing the Netherlands

as an example, he pointed out infrastructure projects that could be adapted to meet future requirements. Henk stressed that water heritage conservation is in the cultural and natural DNA of the Netherlands, and it is necessary to develop solutions accordingly. As a result, the World Water System Heritage Program was launched at the Forum by the WWC, ICID, ICOMOS, UNESCO and FAO. An administrative office was established at ICID, which is responsible for processing applications and related administrative tasks. The main objectives of the WSH certification are: to learn from one another's heritage preservation experiences and integrate old and new knowledge; to promote ancient water heritage conservation wisdom and find new ideas therein, transforming it into knowledge that can be used in the context of a modern world.

The WSH certification process was formally approved at the preparatory meeting for the 8th World Water Forum in mid-July 2016; the planning for associated tasks of other organizations was completed as well. Application for certification subsequently opened, with a deadline set on October 1, 2016. In 2017, judgment discussions were held, and awards were granted in March 2018 at the 8th World Water Forum. The first WSH-recognized systems were the Genbegawa Irrigation Canal System and Sekikawa Suikei Land Improvement District in Japan, and the Sheikh-Bahaei Water Allocation Scroll, Iran.

Water Heritage Investigation, Research, and Preservation in Taiwan

Water heritage is a new field in Taiwanese heritage preservation practice, which explains the absence of a legal category or legislation for "water heritage" in the Cultural Heritage Preservation Act, which includes "historical sites," "historical buildings" and "historical landscapes." Water Heritage preservation requires collaboration between two fields: "water" and "cultural heritage." Three collaborative projects have been launched in Taiwan since 2007: the Taiwan Civil Engineering Cultural Assets Evaluation Standards Research Project by the Bureau of Cultural Heritage, MOC, and the 2007 Cultural Assets Investigation and Oral History of Cultural Assets Project by the Water Resources Agency (WRA), MOEA. The WRA has made an inventory of Taiwan's irrigation project documents, including listing and archiving documents stored in various WRA agencies and offices. Taiwan Civil Engineering Cultural Assets Evaluation Standards Research Project lists irrigation and water supply systems under the "civil engineering" cate-

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gory; it also proposes standards for evaluating civil engineering facilities and methods for categorizing and grading them for preservation purposes.

In line with the international movement for water heritage preservation, the Bureau of Cultural Heritage, Ministry of Culture launched the National Water Heritage Evaluation Pilot Project, Project of Investigation and Evaluation of Taiwan's Water Heritage Sites and Systems (1), and Project of Investigation and Evaluation of Taiwan's Water Heritage Sites and Systems (2) between 2015 and 2018. The National Water Heritage Evaluation Pilot Project investigated Taiwan's regional water heritage systems based on the island's particular water environment. Its goal was to explore the historic context of Taiwan's water heritage by investigating water heritage archives and facilities, creating a foundation for national water heritage preservation and active reuse of heritage resources.

The Water Resources Planning Institute and Northern Region Water Resources Office under the Water Resources Agency, Ministry of Economic Affairs successively implemented successively implemented the "Strategic Plan for Participating in the World Water Heritage Network" and "Plan for Combining Cultural Concepts and Value Creation with Water Resource Development," and "Shimen Reservoir Water Heritage Preservation and Promotion Plan." These projects facilitated interdisciplinary collaboration between the fields of water conservancy and heritage preservation in Taiwan, enabling rich and diverse discussions about water heritage and its preservation. Moreover, the Water Resources Planning Institute and the National Museum of Taiwan History co-organized a special exhibition entitled "Float or Sink- Water Culture in Taiwan"; it is one of the first cases of interdisciplinary collaboration between water conservancy departments and cultural institutes in Taiwan. Furthermore, The Northern Region Water Resources Office was invited to work with Shimen Reservoir to investigate historic documents and update exhibitions on the Reservoir's water heritage. The two organizations collaboratively compiled information regarding changes in Taoyuan Plateau's water environment and the historic development of Shimen Reservoir. The results of their research were published in the book entitled "Shimen Reservoir Water Culture," a publication that highlights Taiwan's efforts in combining water culture, environmental education, and public awareness campaigns.

Taiwan prides itself in its rich water conservancy culture over the past century due to the island's wide-ranging weather patterns and unique geographic environment. Taiwanese government has made every endeavor to compile historic documents and research water heritage in a systematic manner. Taiwan's experience can be shared with other countries and serve as a reference for strategically addressing climate change-induced environmental challenges around the world.



Figure 3. Research and Promotion Achievements of the Taiwan Water Heritage System Investigation and Evaluation Project.



Figure 4. Compilation of WRA's Water Heritage Research and Promotional Efforts.

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International Trends and Progress in Water Culture Conservation

The 19th ICOMOS General Assembly and the Water and Heritage for Future Generations workshop were held in In December 2017 in New Delhi, India. Participants of the Assembly proposed the establishment of an international science committee on water heritage; moreover, Taiwan's Bureau of Cultural Heritage (BOCH) Director Shy Gwo-long proposed that, in order to support the establishment of the committee, Taiwan wished to be the host country for the committee's first international conference. With unanimous agreement from all national representatives present at the assembly, Taiwan was given the opportunity to host this international water culture conference. After several rounds of discussion at the preparatory meetings, the organizing committee finally settled on the title of the conference: 2019 International Conference- Water as Heritage. The conference explored various themes on water culture: Water for Services, Waterscapes, Waterways, Water for Power and Worldviews on Water, hoping to effectively steer international organizations specializing in heritage and water to explore these themes and develop interdisciplinary and inter-departmental networks to create a visionary plan for the future of water culture. The conference lasted for three days, followed by two days of water-related cultural tours for international guests. Representatives from 33 international organizations (including agencies subordinate to UNESCO) and foreign guests from 30 countries actively participated in the event. The main outcomes of the meeting were the Taiwan Statement and the conference planning and core working group lists, all of which were crucial to the preparation of the ICOMOS "Water and Heritage" International Science Committee. The success of the conference symbolizes an important milestone and concrete actions in the preservation of the world's water culture and heritage.



Figure 5. 2019 ICOMOS General Assembly: Key Visual Design.



Figure 6. Group Photo taken in 2019 International Conference 'Water as Heritage'.

Water and Cityscape – The Transformation of Utrecht and the Preservation of Water Culture Heritage

— Xin-Ke Yu, PhD Candidate of Urbanism with Faculty of Architecture and the Built Environment at Delft University of Technology, the Netherlands

Utrecht - City of the Old Jutland Canal

The downstream area of the river Rhine is a stretch of flatland, the elevation of which is lower than the sea level. This area used to be a wide expanse of swamp. The earliest settlers to the area began building dams and developing water irrigation channels to create the area's signature sedimentary farmlands and dry lands. The Rhine would continue change its course in the days to come and diverge itself into Kromme Rijn (Winding Rhine), Oude Rijn (Old Rhine), and manmade canals, forming the dense irrigation system.

Utrecht is the town with the longest history in the area. The city began as a Roman fort to ward off the northern peoples, and in 696, Utrecht became the seat of the local Catholic bishop. The waterways map in Figure 1 illustrates the distribution of the waterways system of Utrecht and the surrounding small towns at the time. This system remains roughly the same to this day and is still in use as a living cultural landscape. The map in Figure 1 shows Utrecht (marked in red in the lower left corner) and the area's sedimentary farmlands, waterways and neighboring villages.

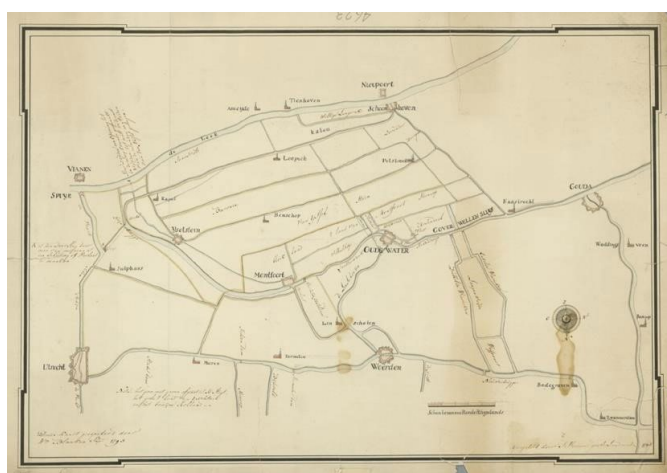


Figure 1. Kaart van de Lopikerwaard met omliggende landen (Photo Credit: The National Archives of the Netherlands).

Cultural Landscape of the Old Canal in the City Center

Medieval Utrecht channeled water from the Kromme Rijn (Winding Rhine) to the south as well as the Vaartse Rijn

(a manmade canal connecting to the Rhine) to build a moat around the inner city, and a canal was dug in the town center. This canal, now called Oudegracht (old canal in Dutch) passes through the inner city (Binnenstad), creating the extraordinary landscape of Utrecht inner wall (see Figure 2).



Figure 2. Utrecht Town Map drawn by Willem Blaeu in 1652 (Photo Credit: Utrecht University Library).

Construction of the Southern Dam in 1922 caused the water level of the nearby Rhine to drop. After the town's sluice gate system was completed in 1275, the water level remained constant, enabling the creation of new quays, cellars and warehouses, and wharfs (Dutch: werven) below street level. Today, over 700 years later, the water level has still not changed, but many of the warehouses have been converted into restaurants and cafés. The inner-city landscape, from riverside residences, underground warehouses, canals and water management systems interweave to form the “inner core” of the city's water heritage system, all parts relying on each other. The outer city Rhine landscape, sedimentary farm system and dam also form a cultural landscape, namely the “outer core.” The inner and outer systems reflect each other and stand as testament to the city's 1000 years of history.

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Cultural Heritage and Urban Renewal: Regeneration through Building Transport Hubs, Street-facing Business Centers, and Housing Services

In 1976, the inner city (Binnestad) was designated as an historical monument, and the city government launched a series of guiding principles for historic landmark preservation. The most important of these is "lifestyle preservation," preventing "museumification" and "specimen treatment" of the city's heritage due to its long lifespan. After determining that the urban morphology and canal landscape are inalterable features of the city, the city's vitality can thus be improved by working on other spaces, adding attractive amenities, and initiating business transformation. After a series of community participation programs, which granted legal power to citizens in a referendum in May 2002, the city government declared a visionary master plan for regenerating the train station and the surrounding area. The plan outlined several major directions: improving new urban functions and inner-city connections, enhancing access to modes of transportation (especially for pedestrians), and improving the overall quality of public spaces.

The regeneration plan was the culmination of over a decade of consultation, with participation from rail companies, residents, corporate representatives, business executives and other stakeholders. Why is this kind of operating method so vital? Besides the interests of the participants themselves, more important is the extended time that the residents have invested in working and building their lives in the community. The people and community itself form an integral part of the cultural landscape that can live on. This regeneration plan was not formulated top-down, nor was it bottom-up, rather, it was circular, with strategic decisions being continuously circulated using the city government's consultation and communication platform.

The Master Plan Includes Three Specific Programs of Action:

I. Safe and livable:

The inner city becomes the heart of the city. Regeneration of the train station area will make it the city's lungs (exchanging fresh air, boosting metabolism, attracting more people to come here for work, civic life and leisure). As the heart of the city, the inner city's primary goal is to attract more residents who like the inner city lifestyle and quality of residence. For quality of residence, it is most important to establish quality open spaces in the neighborhood and quality

walking spaces, using the transit-oriented development (TOD) concept. This is one of the few cases of historical protection strategies which emphasized the importance of residence quality from the very beginning. This is rare, even in Holland, which is known for social housing and high-quality residences. Before refurbishment, the large, functionally different pedestrian spaces between the train station and inner city were full of unsafe corners known for drug and criminal activities. The lack of signage systems and clear way-finding designs made the area unfriendly to users. In order to better implement the TOD concept, "stitching" together the train station and inner city, new public square and public buildings was required. Passenger flows would be designed following strict rules and corridors are created to accommodate and guide pedestrians. The city blueprints start from the ground floor connections before rethinking ways to connect different modes of transport three-dimensionally. After this work was completed, then came the next stage of architectural programming and design.

II. Centre enlarged:

Guide the New to Protect the Old; Equal Emphasis on the Old and the New

The city has been expanding and the population density increasing. The expansion needed to be guided to the west of the railway. If new development were to be pushed west of the railway, the cultural heritage of the old city to the east can be preserved.



Figure 3. Axis of Urban Growth and Development (Photo Credit: Masterplan Stationsgebied Utrecht Samenvatting).

III. At the same time, the strategy for controlling development intensity categorized the area into four zones at different levels:

- Small: Buildings in the inner-city area are strictly limited to 3 floors and should not exceed 25m in height.

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It is mainly used as residential and pedestrian commercial space.

- ▶ **Medium:** Buildings are limited to 25m-45m in height in the corridor space and the belt of the newly developed commercial-residential quarters in the inner city and designated station area.
- ▶ **Large:** High-rise buildings in the designated station area are limited to 45m-80m in height; this includes office buildings surrounding the station concentrated in the New West District.
- ▶ **Extra Large:** Buildings in the core of the designated station area are limited to 45m-80m in height, including the station building, a large-scale compound shopping mall and high-rise commercial offices.

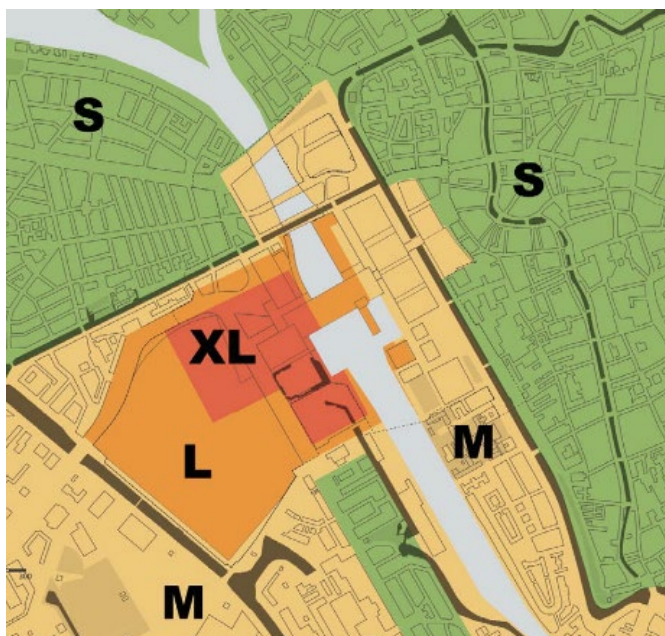


Figure 4. Development Intensity Control (Photo Credit: Masterplan Stationsgebied Utrecht Samenvatting).

This strategy of limiting the over-development of the old city and guiding the development to the west and the station area is in line with the concept of transit-oriented development (TOD). The old inner city, station area and the newly developed western district are connected by a corridor.

I. Railport of the Netherlands

The Utrecht station reconstruction project, which began in 2006, is the largest station redevelopment project in the Netherlands and one of the most successful TOD development models in Europe. As a large city on the east side of Randstad, a western ring of cities in the Netherlands, Utrecht itself is at the center of the Dutch railway system and the main artery of the

north-south railway, with over 1,000 trains stopping there daily. This means that the flow of pedestrians going to and from the station are a driving force of urban development. Airport design principles were introduced, and the passenger flow became the axis for development connecting the station with the surrounding areas. The primary goal was to use the mixed-use model from the 1970s onwards, using stations as nodes, with pedestrian spaces linking the old town, old shopping streets, new shopping malls, and office buildings. A multi-level bus and metro station lies on both sides of the railway, the main design principles being pedestrians on the upper floor and cars below. The upper floor forms a large platform for pedestrians, with commercial spaces, restaurants and shops arranged in a line. The large steps lead into the intentionally created large opening, which connects to the passenger flow of the square in the old town. Bicycle lanes follow the moat of the old town, and the station provides a free parking lot for 12,500 bicycles, reducing the use of private cars.

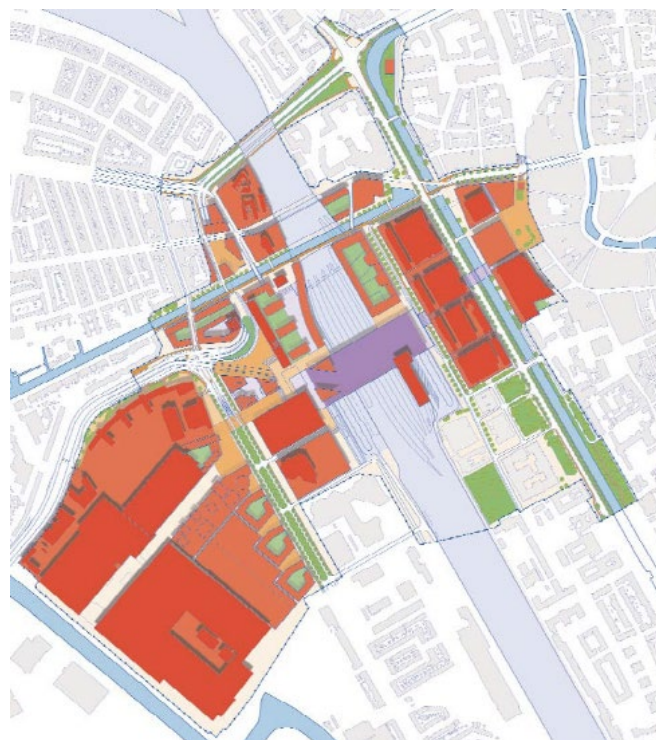


Figure 5. Scope of the designated station area and the surrounding newly developed residential and business mixed use area (Photo Credit: Masterplan Stationsgebied Utrecht Samenvatting).

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II. "Stitching" the Waterways

After the automobile became popular in the middle of the 20th century, more space was needed in the city center for small sedans. Therefore, the moat on the west side of the old city was drained and converted into an expressway for north-south crossing. Nearly 50 years on, the north-south traversing traffic had replaced the water flow, but the traffic had not only caused the discontinuity of the pedestrian corridor, but also uneven development on both sides of the road. The development of the old city had been restricted, and the area on the west side of the station had always lacked vitality. Therefore, when bicycles and walking trips slowly began to replace cars, the opportunity to rethink the expressway presented itself. With the emergence of the concept of "urban stitching," the city decided to turn the expressway back into the old moat on the west side of the old city, making the waterway an important element of the urban cultural landscape. Consistent with the overall urban design concept, water was channeled into the original waterway, which further connects with the walking and cycling corridors.



Figure 6. Left: renovated traffic flow, Right: canal is revived after renovation (Photo Credit: www.cu2030.nl).



Figure 7. The preserved old town meets new urban development (Photo Credit: Xin-Ke Yu).



Figure 8. The revitalized moat passes through the new station and shopping center building. The building on the left is the Tivolivrendenburger public performance art hall designed by Herman Hertzberge; on the right is a 1970s high-rise office building, connected by a two-layer walkway above ground (Photo Credit: Xin-Ke Yu).

Summary

A new style of "urban regeneration/renewal/conservation strategy" was used to preserve Utrecht's inner-city water environment. Unlike previous strategies, this one rethinks the importance of cultural heritage for the city, starting from the perspective of the daily lives of residents and users. The innovative governance strategy is inspired by a vision of a futuristic metropolis, where residents are not just passive participants, but partners in implementing the regeneration plan.

In cultural conservation, it is also important not to focus only on the "artefact" itself. Large constructs such as cities and societies need to interact with users on an intimate scale and execute governance through dialogues, because cultural heritage should not be taken out of the context of our daily lives. Simply put, cultural heritage preservation work will most likely fail or incur public criticism if its scope is limited to conserving a single building, an individual landscape, or making decisions based on "cultural value." Preservation should be carried out with the strategy of "reinvigorating cultural value and urban living" from the perspective of city residents, taking into account users' daily lives and directions of future urban developments.

An Overview on World Water Heritage System - Sekikawa Suikei Land Improvement District, Japan

— Chao-Zong Wu, Research Engineer at the Taiwan Water Conservancy Technology Research Foundation

World Water System Heritage (WSH) Certification

In the early 2010s, international research into water culture began to focus on issues of heritage preservation and practical use of "assets." The International Commission on Irrigation and Drainage (ICID) and International Council on Monuments and Sites (ICOMOS) jointly proposed the World Water System Heritage (WSH) Program. In honoring the spirit of the World Heritage preservation system, the program conducts systematic case by case research and conservation and adaptation work on water heritage systems so as to explore the wisdoms and philosophies of conservation pioneers before us, familiarize the public with water culture, and provide insights into response measures taking place in the water conservation community. The WSH Certification system was officially launched in the 2015 WSH 7th World Water Forum. In March 2018, it was announced that the first three systems approved for WSH certification were the Genbegawa Irrigation Canal, Japan, Sekikawa Suikei Land Improvement District, Japan, and the Sheikh-Bahaei Water Allocation Scroll, Iran (1571-1692). This article will briefly discuss the Sekikawa Suikei Land Improvement District and justification for its recognition.

WSH certification case: Sekikawa Suikei Land Improvement District - Kyakusui Area Levy Reduction/Exemption System

I. Sekikawa Suikei Land Improvement District

Sekikawa Suikei Land Improvement District is a stretch of farmland spanning approximately 5,800 hectares on the Takada Plain, south-western Niigata Prefecture, Japan. The Seki River crosses this area from South to North, known since ancient times as the "barn zone". This area contains two main irrigation waterways: the Uwae Irrigation Canal and the Nakae Irrigation Canal. The Uwae Canal spans 26km, is mainly used by local farmers, and was constructed by a cooperative joint fund of powerful people such as landowners and gentry. Construction began in 1537, and took many years from beginning to end, finally concluding 1781. The Nakae Canal spans 26km, and was funded by the Takada Daimyo, a feudal domain of Edo period Japan (1603-1868). Construction began in 1673 and finished in 1678. In the Shōwa Period (1926-1989), the Uwae Canal and Nakae Canal subsequently became prefectural and national projects, and were renovated with prefectural funding, continuing to support Niigata as one of Japan's main food producers.

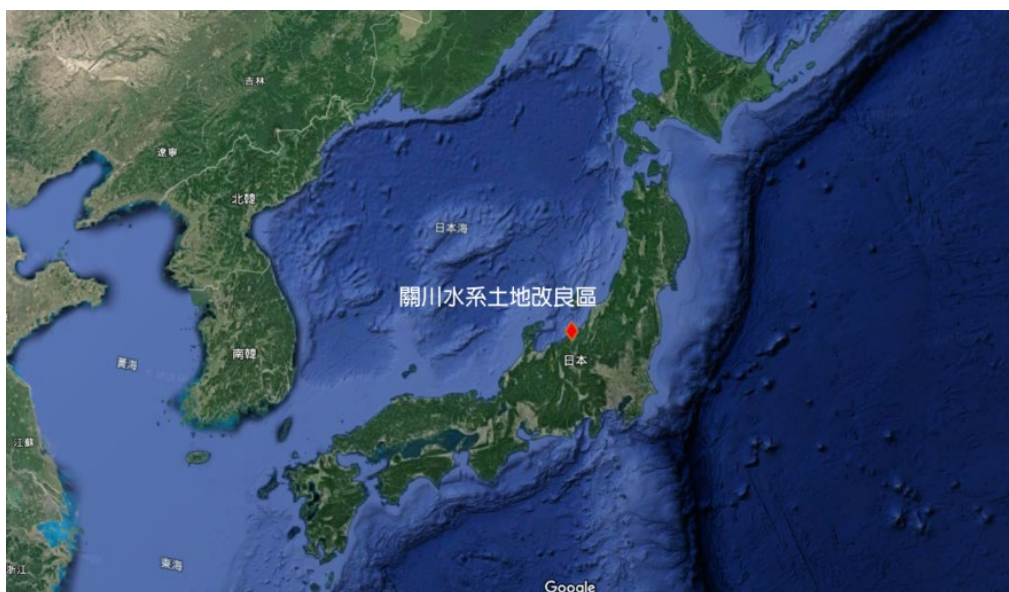


Figure1. Geographical location of Sekikawa Suikei Land Improvement District.

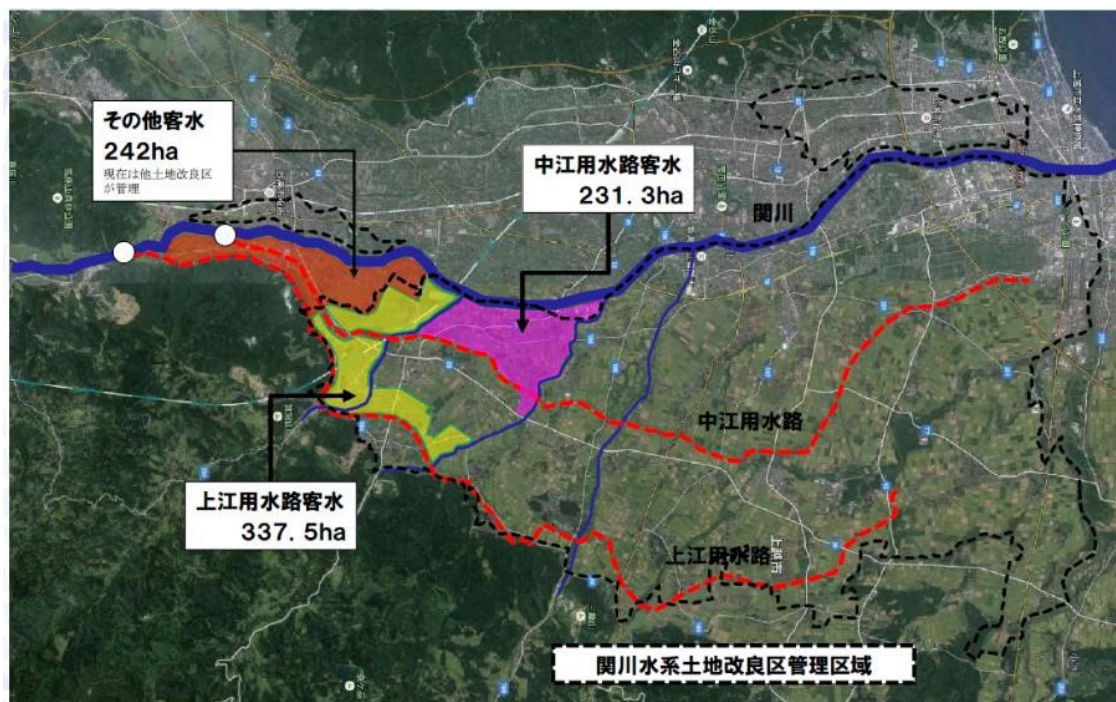


Figure 2. Sekikawa Suikei Land Improvement District "Kyakusui Area" (The left-hand side of the map is North).

II. Kyakusui Levy Reduction/Exemption System

Since the Edo era, overall maintenance of the Uwae and Nakae Waterways has been managed through the "Kyakusui Levy Reduction/Exemption System." This refers to the downstream farmers' burden of water conservancy fees for upstream farmers, that is, the maintenance and management costs of the irrigation waterways. This set of systems emerged to ensure the supply of water resources in the areas through which irrigation water passes.

Construction of irrigation canals uses up some of the available land; the wider the canal, the more land it occupies. In the process of flowing from the upstream to the downstream part of the canal, the water is inevitably depleted, so the upstream flow needs to be sufficient in order to supply the downstream farmers with enough water. This suggests that the upstream waterway needs to be sufficiently wide to accommodate enough water; but if a larger area of farmland is used, the arable land of the upstream farmers will be reduced, and they will lose profit. Therefore, in order to ease the pressure off farmers in upstream areas, the

two canals were combined under one system in 1675, which kept the waterway operational through the "Kyakusui Levy Reduction/Exemption Scheme." The upstream part of the irrigation canal passes through 500-600 hectares of farmland, which does not have to bear the burden of maintenance costs in order to use the irrigation canal's water resources. In this way, the profits and losses made by the farmers are balanced, and sufficient water can be obtained in the downstream areas.

Even after the enactment of Japan's Land Improvement Act, this canal upkeep cost reduction and exemption system remained in use thanks to the custom of honoring existing Edo Period contracts. However, due to changes over time, the backdrop to the agreement changed compared to 300 years ago. The downstream farmers have proposed amendments to the agreement, calling for new provisions that were more appropriate for modern times. In 2006, following adjustments to the Sekikawa area irrigation management system, the Uwae and Nakae canals were combined under the Sekikawa Suikei Land Improvement System, conduct-

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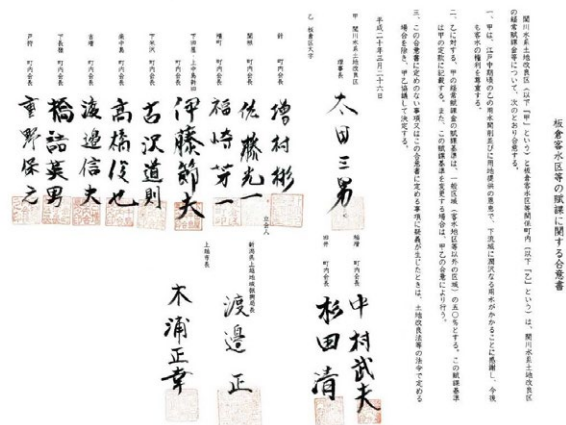


Figure 3. Left: 2008 Sekikawa Suikei Land Improvement District management body reaches new terms with Kyakusui representatives; Right: Bilateral contract with new terms.

ing system adjustments while honoring the rights of Kyakusui residents. In 2008 the Land Improvement District management body agreed to new terms with all Kyakusui representatives, stipulating that the upstream farmers must also pay 50% of the irrigation costs.

III. Reasons for Receiving WSH Certification

According to the World Water Heritage Registration Certificate issued by the WSH, the Sekikawa Suikei Land Improvement District has been recognized for "continuous collaboration between upstream and downstream communities on irrigation costs and water resources through inter-generational community participation for over 340 years."

The Value of Water Heritage- Case studies

The purpose of the Kyakusui Levy Reduction/Exemption System of the Sekikawa Land Improvement Zone is to share the valuable water resource through a system that honors the interests of both upstream and downstream farmers. The formation of this system was not an accident of history; rather, it is a mutually accepted result formed through long term collaborative research in an area with mutually conflicting water resource interests. The mutually beneficial spirit of this kind of water resource sharing reached through consultation was the key that enabled this system to be maintained for 340 years. This is a true reflection of the value of water heritage.



Figure 4. Sekikawa Suikei Land Improvement District WSH Certificate.

Sustainable Preservation of Hydroelectric Heritage by the Taiwan Power Company

— Taiwan Power Company

Preface

Development of Taiwan's power industry accelerated the country's economic and industrial development. These changes and evolution highlight the development history of the Taiwan Power Company (Taipower) and embody the process of industrialization and modernization of Taiwan over the past century.

Hydraulic power illuminated the Taipei nightscape for the first time in 1905, after the first run-of-the-river hydroelectric plant in Taiwan (Old Kueishan Power Plant) in Xindian, New Taipei City, began to supply electricity. It signified an important step toward modernization for the island of Taiwan. Under Japanese rule, hydraulic power was Taiwan's main source of electricity, and was the only form of electricity Taiwan could produce by itself, representing a source of pride for the nation. Until the 1960s, Taiwan's electricity supply primarily relied on hydroelectricity. After the 1910s, due to the increase in demand for electricity, the Governor-General's Office surveyed the potential of all drainage systems in Taiwan to investigate Taiwan's potential water resources. In 1911, a national hydroelectric map was drafted, indicating a promising hydroelectric blueprint for the whole island. From the national hydroelectric network completed in 2018, it can be seen that Taiwan's current hydroelectric network is very closely related to the hydroelectric map drafted in 1919.

Following the push for construction of power infrastructure, Taipower's tangible and intangible industrial heritage is the most authentic and indispensable evidence of the development of Taiwan's history, and can serve as an important source of reference materials for contemporary and future generations. Taipower has inherited the century-old power industry in Taiwan and shoulder its mission of preserving history. As instructed by former chairman Wenchen Chu in December 2016, and in accordance with the government's announcement of the newly revised "Heritage Preservation Act," Taipower's "Major Heritage Preservation and Maintenance Project" was launched. Based on its responsibility to pass on historical heritage and sustainable business philosophy, Taipower promotes the preservation of heritage through heritage inventorying, archiving, and

document management. By interpreting and exhibiting cultural relics and maps, they are given value once more, with the aim of achieving the following goals:

- Preservation: Document the precious cultural assets of Taipower, and discover the common memories of the development of Taiwan's power industry in order to promote unity and common understanding among employees.
- Research: Record the history of the interdependent growth of the power industry and Taiwan's economy, presenting the culture and legacy of Taipower, serving as the information and history center of Taipower.
- Public communication: Taipower is expected to serve as a center for sustainable development and an information media center for the public, boosting regional development and connecting with society.

Taipower Heritage Preservation—A Status Report

Taipower had maintained a large number of hydroelectric power plants, buildings and waterwheel generators for over 50 years. Some of the original plants no longer exist or have stopped operation, and components or equipment for maintenance are no longer in existence. But thanks to the hard work of Taipower employees, maintenance skills have been passed on from generation to generation and new methods have been developed, enabling operation of old-fashioned waterwheel generators and ensuring that power is available. This is an example of circular economy. For example, Daguan Power Plant (Sun Moon Lake's first power plant) began operation in 1934 and is still operational today. Many blueprints, operation records, technological documentation and photographs left over from the period of Japanese rule have also been preserved. Towards the end of the 20th Century, Taipower developed the idea of preserving hydraulic power industry heritage, and when the Tsukung Power Plant was renovated in 1987, the original building from 1909 was kept intact. Only the waterwheel generator was replaced, and the original generator was preserved. More and more buildings were subsequently declared historic sites and historic buildings. Taipower has a group of enthusiastic staff that devote themselves to preserving and recording power plant history, in order to pass on the wonderful traditions to younger generations.

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The types of hydroelectric heritage structure managed by Taipower are:

National historic sites (1 site), Regional historic sites (1 site), and Historic Buildings (11 sites).

In December 2016 Taipower launched the "Major Heritage Preservation and Maintenance Project," and formed a cultural relics collection working group to discuss matters related to collection and preservation of cultural relics. In the planning process, the group observed and learned from overseas examples, benefitting from previous experience and practice of industrial heritage preservation. Planning related to heritage preservation work is as follows:

1. Organizational Structure and Personnel

Since the Major Heritage Preservation and Maintenance Project was launched in 2016, Taipower's heritage preservation work was divided into document and non-document categories (including machinery, equipment and buildings). Firstly, a company level promotion team and unit level work group were set up, and experts were consulted for cultural artifact inspection and preservation related proposals. In the early stage, the goal of the company's preservation work was to collect historic information and established task units responsible for cultural heritage preservation.

(1) Company-level Working Group:

The deputy general manager Hong-zhou Lee was appointed the convener of the working group, and the company's secretary was the coordinator. The group's tasks were divided into "collect and research" and "display and educate," managed respectively by the Secretariat and Department of Public Relations.

a. Collect and Research:

This team is managed by the Secretariat, and is responsible for artifact collection, archiving, and research. The tasks are further divided into six parts according to the organizational structure of the company: General Management, Transmission and Supply, Distribution of electricity, Hydrothermal Power, Nuclear Power, and Engineering. Each Division has its own theme, all of which are coordinated by the Secretariat of Taipower.

b. Display and Educate:

This team is managed by the Public Relations Department; it is responsible for managing and developing exhibition halls and exhibitions.

(2) Heritage Preservation Project Consultants:

Chang Yui-tan, director of the Chinese Association of Museums, Professor Hong Zhi-wen of NTNU Geography Department, and Director Liao Ying-jie of Yilan History Museum were all hired as consultants for Taipower. They took part in heritage preservation planning, providing consultation and suggestions.

(3) Division-level Working Groups:

Each division's working group is convened by its supervisors at deputy director level or above, and regular meetings of the heritage inventory and collection groups are held to consolidate the results of the group's inventory. All hydraulic power plants also participated in the inspection, preservation, and display of historical materials.

(4) Responsible Organizations and Personnel:

a. The Secretariat's Historic Archive Team:

Documents historic data and assists in the inspection and collection of both document and non-document heritage. It is responsible for the preservation of document-based heritage as well as in-situ conservation of large-scale equipment of historic importance.

b. Real Estate Management Team under the Department of Finance:

It is responsible for the overall management of historic sites and monuments of historical interest.

2. Key Guidelines for cultural Heritage Preservation

(1) In order to collect the company's heritage artifacts and improve the system of heritage preservation, protection and management, on August 30, 2019 the Taiwan Power Company issued the Key Guidelines for Taipower Heritage Preservation.

(2) In accordance with the current status of heritage management and preservation, a heritage preservation handbook is now being compiled, which includes eight chapters: overview, inventory, collection, valuation, preservation and collection, establishment of storerooms, promotion and application, and exhibition. The handbook aims to bring the preservation of heritage closer to the goals of informatization, professionalization, and standardization.

(3) Special standards and regulations regarding heritage such as monuments and historic buildings are laid

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out in the "Real Estate Management Handbook."

3. Planning

Taipower's "Major Heritage Preservation and Maintenance Project" has established key working guidelines, including "archive before museum," "collect before research, then "exhibit before educate." The short-term plan is to begin artifact inventory for "themed exhibitions," collecting and curating based on specific themes.

(1) Four Main Preservation Themes of 2018

a. Inventory of cultural artifacts:

In order to show the progression in Taipower's documented culture from gradual progress to full-scale development, four main themes are given priority: the Chu-tsu-men Hydropower Plant, Old East-West Power Line, Zhuoshui River Basin Hydroelectric System and Dajia River Basin Hydroelectric System. The Secretariat conducted the relevant artifact inventory and collection work relating to hydroelectric construction, power generation, and power supply.

b. Taipower Exhibitions and Display Period:

- ▶ The exhibition "Power Infrastructure as Landscape- Taiwan Power Cultural Heritage" was held in Songshan Cultural and Creative Park from September 28th to October 21st, 2018.
- ▶ The Baileng Dajia River Power Culture Museum opening event was held on October 18th, 2018; "Mother River is Born - a Century of Power Heritage" exhibition was opened.
- ▶ On October 27th, 2018, Kaoping Power Plant (national historic site Chu-tsu-men Hydropower Plant) held a celebration and special exhibition for the 110th anniversary of the Zhumen freshwater pipeline.

(2) Cultural heritage preservation work in 2019:

- a. Taipower continued to research the Xindian River Basin Hydroelectric System and Eastern Hydroelectric System. The Power Generation Division assisted the Secretariat in conducting related investigations on cultural artifact inventory and collection.
- b. Themed exhibition schedule and venue:
 - ▶ "Just Flow 2019 - Taiwan Power Culture Exhibition" was held at the Cultural Heritage Park Taichung September 6th to 29th, 2019. The



Figure 1. 2018 Power Infrastructure as Landscape exhibition.



Figure 2. Poster for the 2018 Power Infrastructure as Landscape Exhibition.

exhibition then moves to Sun Moon Lake Art Gallery for display from October 4th, 2019 to January 5th, 2020, and the National Museum of Taiwan History from October 8th, 2019 to January 5th, 2020.

- ▶ On September 11th, 2019, Eastern Power Plant set up the Mugua River Heritage Ecology Story Museum and held a special exhibition.

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Figure 3. Taipower Exhibition: Power Infrastructure as Landscape.



Figure 4. Poster for the Exhibition "Just Flow 2019."

(3) Results of implementation include exhibits, films and books:

- Exhibit: through inventorying and collecting themed historical data, Taipower collated and studied relevant historical context and conducted oral interviews on selected themes. A story line was created for a subsequent exhibition, and the research results were physically displayed in the exhibition venue.
- Films and Books: the diagrams and articles from the research, oral history interviews and relic inspection process were all recorded on paper or on film, further adding to the value of the company's preservation efforts.
- Digital Archive and Digital Museum: Themed exhibitions are digitally archived through photographing and scanning exhibits. The files are then converted into online museums for the

public to enjoy online and can be integrated with company policy to reach target audience for the purpose of education and networking.

- Power Plant Preservation Exhibitions: Dajia River Power Plant, Kaoping Power Plant, Daguan Power Plant and Eastern Power Plant have all set up regional exhibition rooms to preserve important cultural and historical data regarding large-scale equipment and power plants.

(4) Plans for the Artifact and Archive Center:

- Short-term Plan: The 1st and 2nd floor rooms (around 330 square meters) of Gongguan Warehouse will serve as the Artifact and Archive Center. All artifacts that are found to meet the requirements of the company's collection policy will be stored at Gongguan, as it fulfills the environmental control requirements of suitable temperature and humidity levels and monitoring and maintenance systems.
- Long-term Plan (after 2021): The 4th floor of the Wanlong Power Transformer and the Yuxinxin Building will be used for the collecting, sorting and studying of historical Taipower materials. These buildings are designed with temperature and humidity control systems, fire protection facilities, and floors with load-carrying capacity.

(5) Educational Training Courses for Beginners and Experts:

- Briefings to raise awareness of heritage preservation: In order to help Taipower employees understand the importance of preserving cultural heritage and give them ideas on how it can be maintained, in June, 2017, four Taipower heritage preservation briefings were held around the country, showing the company's determination to preserve heritage.
- Workshops: The "Major Cultural Heritage Preservation Workshop" was held on July 3rd and 4th, in collaboration with Center of the National Survey of Moveable Heritage. Heritage survey teams from Feng Chia University and Tainan National University of the Arts were invited to teach the basic concepts of heritage survey work and archiving techniques.
- Seminars: in order to make industrial heritage

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protection work part of the company's sustainable development, the "Industrial Heritage Seminar" has been held twice a year since 2017.

Visions for the Future

1. **Piecing Together the Jigsaw Puzzle of Taipower's History**
Since 2016, Taipower has inventoried, collected and exhibited historical materials under four main themes and carried out heritage preservation work throughout the organization. It has also completed a series of themed heritage survey work based on water, fire, nuclear, renewables, power supply systems and construction engineering, all to complete the jigsaw puzzle of Taipower's history and reveal its historic soft power.

Taipower's historic survey themes in 2020 will be: Operation and Decommissioning of Nuclear Power Plants, Thermoelectric Generation on Outlying Islands, and Power Distribution Systems. Working groups will be established to carry out heritage survey, with the help from the company's Secretariat, Nuclear Power Division, Nuclear Backend Operation Division, Transmission and Supply Division, Business Division, and Power Generation Division.

2. **A Virtual Reality Exhibition System for Public Communication**
The establishment of an online database (digital archive system) for the preservation of cultural resources will help with examining, logging, archiving, and subsequent management and maintenance operations. Entries are then integrated with the online museum, allowing the public to access cultural and historical data and browse the digital collection. Enabling free, extensive study of Taipower's history and cultural artifacts will help improve the company's overall image and bring us closer to the people.
3. **A Support Network of Experts and Academics**
Taipower will continue to connect with experts and scholars through forums, seminars, education and planning training, so that the professional community understands the work of preserving the resources of Taipower and vice versa. It also introduces professional cultural perspectives and integrates field practice to

inject vitality and new ideas into the work of preserving Taipower's heritage.

4. **Connecting Power Industry Heritage with Local Communities**

Taipower will add value to power plant culture by presenting it within the historical context of local development; local historians and members of the public will continue to be invited to take part.

5. **Identifying Suitable Ways to Organize and Develop the Preservation of Taipower's Heritage**

The scope of heritage preservation is extensive and includes surveying, archival research, preservation, maintenance, and educational displays. Its specialized nature requires participation of professionals with a background in heritage preservation. Experts from Chung Yuan Christian University have been invited to assist the Taipower to establish a business-oriented and organized system, evaluate relevance of its exhibition halls and digital collection development, conducting all-round reviews, and making relevant adjustments where necessary.

Conclusion

Taipower hopes that the themes explored in the "Important Cultural Assets Preservation and Maintenance Project" will help the company and the general public understand the importance of preserving historic heritage in the power industry. The focus on historic documents and materials has gradually expanded to encompass preservation and maintenance of cultural assets such as machinery and equipment. Piecing together the cultural and historical puzzle of Taipower not only preserves the collective memory and identity of Taiwanese society, but also enables the preservation of industrial heritage in line with the sustainable development goals of the company.

The Current State of Research on the First Complex Mapping of the Taiwanese Hydropower Plants – Section Historical Powerhouses, the Case of Shanping Hydropower House

— Stefan Tkac, Associate Professor of American University of Phnom Penh, Cambodia

Taiwanese hydropower got 114 years of history starting from 1905 when the first hydropower plant called Guishan (龜山) lighted up light bulbs in Taipei city. Until 1962 hydropower was the leading electric source in Taiwan but for the past decade hydropower in Taiwan is experiencing its boom again. Currently, there are 12 branches and 49 operating units, 2 units are momentarily in try out period, about 4 units are under the construction and in the planning stage, 10 units are operated by Taipower, but privately owned under the IPP – Independent Power Producers agreement from 1995. Further, there are around 7 sustainable micro and pico cases reported in 2018 usually acting as local farm initiatives to cut down the electricity prices. Last but not least there are 2 large and 1 small scale PS – Pumped storage power plants and at least 1 is in the planning stage. But the interesting fact is that despite the constant modernization from all the currently operable units 16 are considered historical and besides that, there are also 22 actual historical hydro-power plant sites evaluated by my research as destroyed or decommissioned. These sites include an interesting history, faith and most importantly a unique technological solution yet to be re-discovered.

The localization of the historical hydropower plant sites is part of my research initiative from 2012 regarding the very first complex mapping of Taiwanese hydropower plants. Me and my team, we are engaged to physical excavation since 2016 and so far we managed to mark over 10 historical sites currently leading excavation activities at the 3 of them namely Guanshan (關山 (1927)), Zhiben (知本 approx. 1956) and Shanping (扇平 (1956)). The further text is talking about the latter case.

Shanping hydro-power plant was one of the isolated hydro-power plant projects originally designed by Taiwan Power Company (台灣電力公司), Gaoping (高屏) power plant - Liugui unit (六龜) formerly known as Tulong (土壠灣) power plant. Its role was to supply the remote area dedicated to wood hauling, later quinine plantation up to

the nowadays open space botanic garden. Design drawings were prepared between 1951-1954 and the building process ended in February 1956. The installed capacity was 3kW which was later updated up to 5kW.



Figure 1. Original photo of the Shanping power house before it was struck by typhoon and destroyed.



Figure 2. Shanping - excavated 3 phase 5kW generator with wooden anti-vibration mat and concrete base.

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The Shanping powerhouse excavation site is located in southern Taiwan, Kaoshiung City, Maolin District (茂林區) within the Shanping Forest Ecological Scientific Garden (扇平森林生態科學園). The traces of hydraulic structures are scattered along the upper riverbed of the Shanping creek. They are including the former diversion weir, inflow tunnel, parts of the headrace e.g. water supply canal, trash rack section, forebay tank, aqueduct fragments, and water accumulation shaft.



Figure 3. Shanping - excavated and cleaned horizontal axis open flume Francis turbine.

Shanping hydro-power plants, as well as the other units from the early hydro-power generation era in Taiwan, are considered to be the technological heritage of civil and mechanical engineering that reflects later in all the further projects up to nowadays modern Taiwanese hydro-power plants. They also represent the first efforts to power up the remote areas, hence struggle with typhoons, earthquakes, and landslides were significant, but well-recorded which could be only essential for nowadays hydraulic civil works. Shanping powerhouse was also one of the predecessors of the further electrification of Taiwan, therefore it represents uniqueness in construction, turbine application and thus its worth to study.



Figure 4. Shanping - excavation site - before the excavation process.



Figure 5. Shanping - excavation site - final day of the turbine excavation process.



Figure 6. Shanping - recent excavation - phase 2 back of the water accumulation shaft - former machinery room.

Unfortunately, most of the hydro-power houses from the older periods were severely damaged or destroyed by natural causes which were also the case of Shanping. On August 8th, 2009 the severe typhoon Morakot caused the Shanping riverbed to expand beyond its premisses starting series of landslides. The Shanping was exposed to both frontal and lateral forces which caused torque that cut the only pile that serves as an anchor for the water accumulation tower that later twisted, fell and was pushed to its final resting position.

On March 28th, 2017 and June 6th, 2018 the initial on-site mapping and later measurement of the remaining structures were carried away. These mappings brought up development sketches of the original form of the hydro-power civil structures, but there was still a big question, where is the turbine since the generator was already found? Based on my sketches, a study of historical documents and videos provided by the Liuguei Forestry Institute branch office (六龜研究中心) I have finally concluded that the turbine that was installed in the Shanping powerhouse was a unique German open flume Francis type, really rare type

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in Taiwan. This is the only case where the horizontal open flume Francis turbine was found. These turbines were used in Europe between the 30s and late 60s to retrofit the old watermills that mostly used shafts to store the water and higher the water pressure even though the water discharge was low, just like in case of Shanping. This assumption led me to the fact that the turbine is still in the shaft.

On April 1-3rd, 2019 we clean the entire water shaft and on the bottom found the relatively conserved small Francis turbine. Later I have estimated that the rest of the machinery is located on the other side of the shaft pushed towards the hill. On November 10th, 2019 we managed to excavate the remaining machinery as guided vanes regulator, shaft, flywheel, and tailrace. The tailrace structure uncovers another mystery. Originally there were disputes on how the water exit the power plant as these type of turbines usually got a draft tube installed directly in the water shaft or outside in the machinery room, but in case of Shanping

there was a special cavity wall forming a hole between the turbine and the shaft outlet in the machinery room. After discussing this case with my colleagues it seems that it is a unique technological solution as none of us has ever encountered a similar one. Once we finish the entire excavation process and document the rest of the fragments there is a plan with the TFRI - Taiwan Forestry Research Institute (行政院農業委員會林業試驗所) and Taipower to either conserve the site and turn it into the museum or bring the fragments down to the old Zhuzimen powerhouse (竹子門發電廠) as a part of the Industrial heritage exposition.

Acknowledgment

I would like to express my gratitude to Taiwan Research Forestry Institute, Shan-Ping Forest Ecological Garden and Taipower-Zhuzimen branch, for their support with the research work. I am truly thankful.

UN 2030 Sustainable Development Goals: A Case Study of Er-Feng Irrigation Canal System (EICS) in Pingtung and Its Value as Water Heritage

— Szu-Ling Lin, Associate Professor of Department of Cultural and Creative Industries, National Pingtung University, Taiwan

The Er-Feng Irrigation Canal System (EICS) in Pingtung was constructed by the Taiwan Sugar Company in 1923 to irrigate sugarcane plantations and rice fields during the Japanese colonial rule. The purpose of constructing EICS and its subterranean weir was to collect subsurface water under the riverbed to solve the water shortage problem during dry season on Taiwan's Pingtung Plain without altering the natural environment and water quality in the region. This year (2019) marks the 96th year of EICS's operation; the canal system is still fully functional and continues to be used for irrigation purposes to this day.

The subterranean weir of EICS consists of four parts: a trapezoidal weir, an arched tunnel, a catchment culvert, and a water inlet tower (with maintenance manhole). The inlet tower's foundation is laid underground with the rest of its structure extending above ground; the trapezoidal weir, arched tunnel, and catchment culvert, are laid under the gravel alluvium of the riverbed, about 2 meters to 7 meters beneath the riverbed. The trapezoidal weir is 2.87 meters high, 0.91 meters wide at the top, and 3.94 meters wide at the bottom. Its water intake surface consists of inclined concrete columns arranged to create a 25% slotted seepage surface, forming a right-triangular water channel that is 1.82 meters wide at the bottom and 1.82 meters high.

The trapezoidal weir, the main structure of the canal system, has a total length of about 328 meters, stretching from east to west at a gradient of 1/100. The western end of the weir is connected to the eastern end of the arched tunnel, which allows subsurface water to flow from the weir into the water inlet tower. The tower, which is the endpoint of the structure, is about 1.5 meters in width and 8.4 meters in height. The subsurface water flows from the arched tunnel through the water inlet tower and eventually enters the water diversion structure. The water channel of the diversion system is about 3.5 kilometers long. Figure 1 shows subsurface water entering the trapezoidal weir. The two historic photographs, Figure 2 and Figure 3, show the Er-Feng Irrigation Canal System under construction.

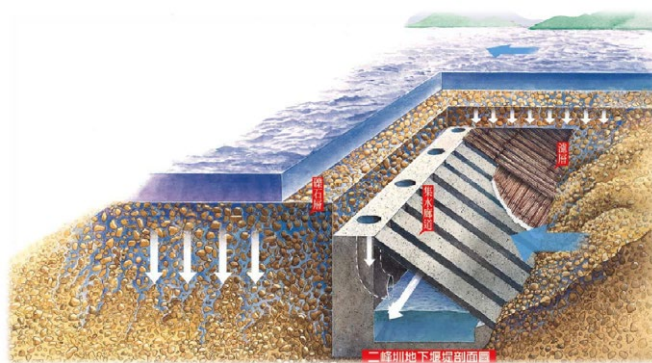


Figure 1. Cross-section of the trapezoidal weir, Er-Feng Irrigation Canal System (Photo Credit: Li-Ping Wu et al., 2004: 78-79).



Figure 2. Construction of the trapezoidal weir of the Er-Feng Irrigation Canal System; photo taken between 1922 and 1923 (Photo Credit: Taiwan Sugar Corporation).



Figure 3. Layers of Simpleleaf Chastetree branches on top of the weir for water filtration; photo taken between 1922 and 1923 (Photo Credit: Taiwan Sugar Corporation).

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The Er-Feng Irrigation Canal System (EICS) epitomizes excellence in irrigation technology development and is therefore a valuable cultural heritage site. Based on Taiwan's Cultural Heritage Preservation Act, the Pingtung County government declared EICS to be an important cultural heritage site in 2008. Not only does EICS fall under the category of water conservancy engineering, it also embodies the cultural legacy of the Taiwan's sugar production industry. The artistic value of EICS may not parallel that of other cultural heritage sites, but the technological excellence it represents makes it worthy of research and preservation. The design of EICS took into account the regional landscape and local weather pattern; therefore, EICS has served as a stable source of irrigation water, successfully increasing sugar cane yield in the region. The intricate design of water conservancy structures and outstanding technological know-how of EICS represent ancestral wisdom and knowledge of sustainable ecological engineering that should be passed down to future generations.

The site of the registered EICS Cultural Landscape is located between point A and point D in Figure 4. The unique water conservancy structures of EICS include the second water intake tower, which has a maintenance manhole (literal translation from Japanese), the trapezoidal weir under the riverbed, arched tunnel, catchment culvert, and the diversion structure located in front of Taiwan Sugar Company's Wanlong Plant. In Figure 4, Point A, B, C, D represent the second water inlet tower, the canal waterway outlet, the lateral overflow weir (such as the overflow channel), tunnel waterway outlet, and water diversion structure, respectively.

Figure 5 shows a map indicating the initial irrigation area of EICS upon completion. This map was created by Nobuhei Torii, the Japanese engineer who built EICS in 1936 and delineates three main irrigation areas. Figure 6 shows the original EICS irrigation area on a present-day map, marked by a dashed line.

With the construction of the water diversion structure (represented by D in Figure 4), Xin-zhi, Jia-zuo, and Nan-an water canals began to supply water to Wanlong Plant.



Figure 4. Distribution of Er-Feng Irrigation Canal System along the Linbian River. A: Water inlet tower; B: Canal waterway outlet and lateral overflow weir (overflow channel); C: Tunnel waterway outlet; D: Water diversion structure (Map data ©2019 Google).

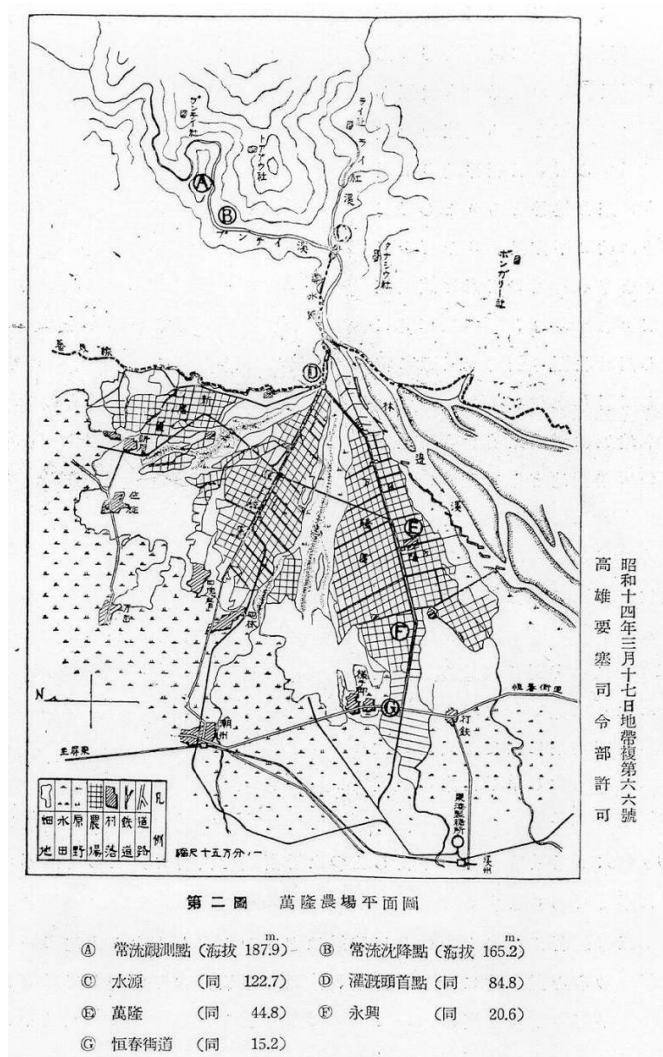


Figure 5. Map of Wanlong Farm and its irrigation system. Source: Nobuhei Torii (1936) *Using Subsurface Water to Irrigate Barren Land: Establishment of Wanlong Farm by the Taiwan Sugar Company*.



Figure 6. The original EICS irrigation area on a present-day map, marked by a dashed line. A represents the second water intake tower; D represents the water diversion structure (Map data ©2019 Google).

The blueprint of each canal was created based on the local topography, and they each have different cross section design to ensure steady water supply, reflecting the accuracy of land survey and civil engineering design at the time. In 2017, the subterranean weir of EICS suffered serious damage and large-scale repair work was carried out. The riverbed was dug open and the subterranean weir was exposed during the repair period.

The 2030 Agenda for Sustainable Development (2030 Agenda) adopted by the United Nations in 2015 has been regarded as the most important common goal for the various affairs promoted by the UN. The Cultural Heritage, the UN Sustainable Development Goals, and the New Urban Agenda was subsequently adopted by ICOMOS (International Council on Monuments and Sites) on February 15th, 2016. The ICOMOS Agenda was proposed by several scientific ICOMOS committees as a response to the indicators in the 2030 Agenda. The 2030 Agenda marks the very first time that “cultural heritage” has been included as an

indicator for evaluating sustainable human development, and the UN Sustainable Development Goals will become an important benchmark for a wide range of developments around the world over the next 11 years.

ICOMOS Cultural Heritage, the United Nations Sustainable Development Goals and the New Urban Agenda stated that cultural heritage preservation must be based on the sustainable development goals of urban communities. With the rising number of cultural heritage sites within cities, economic considerations are becoming increasingly important. As challenges and opportunities arise from the current social, economic, and environmental, and political context, the issues of cultural heritage preservation and sustainable development have moved centerstage. We must first acknowledge the need to adopt a more human-centered and eco-friendly approach given the status quo of the urbanization process. This means that culture, cultural heritage, and cultural landscapes will play a key role in realizing the new humanistic and ecological model of sustain-

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able cities. Likewise, the United Nations considers urban development combined with cultural heritage to be more sustainable, diverse and inclusive. This approach is conducive to the creation of a green economy as it enhances urban sustainability and provides employment opportunities to reduce poverty. Furthermore, reusing and revitalizing heritage to enhance the urban recycling process is a key feature of sustainable development; it promotes “regenerative” urban economy through the process of economic “decarbonization.” Finally, heritage preservation combined with sustainable urban development has the potential to unite citizens with the goal to enhance social cohesion and harmony.

Several of the 17 UN Habitat’s Sustainable Development Goals (SDGs) can only be achieved through preservation

of cultural heritage. For example, the most frequently quoted indicator SDG 11: “make cities and human settlements inclusive, safe, resilient and sustainable” proposes a close relationship between cultural heritage and living environment. SDG 8: “promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all” echoes with the benefits of heritage preservation, namely the promotion of tourism and economic activities. In addition to SDG 11 and 8, the heritage preservation work at the Er-Feng Irrigation Canal System also corresponds to SDG 6: “ensure availability and sustainable management of water and sanitation for all.” (Figure 7 and Figure 8) The preservation of water cultural heritage in the future will play an instrumental role in realizing the 2030 Sustainable Development Goals.



Figure 7. Lateral overflow weir, Er-Feng Irrigation Canal System (Photo Credit: Szu-Ling Lin).



Figure 8. Water canal, Er-Feng Irrigation Canal System (Photo Credit: Szu-Ling Lin).

2019 the International Conference on Water as Heritage in Chiayi, Taiwan, 27-29 May

— Hsiao-Wei Lin & Meisha Hunter & Irene Curulli, Member of the International Committee for the Conservation of the Industrial Heritage

The International Conference on Water as Heritage in Chiayi, Taiwan, 27-29 May had gathered around 200 participants with 33 representatives from different water related organizations from 30 countries. The aim is to achieve better water futures through the inclusion of water heritage in community engagement, engineering and policy making. To support this goal, it is aimed to involve ICOMOS, International Scientific Committees, the water sector, governments, associated communities and NGOs. The conference was organized by ICOMOS Netherlands and the Centre for Global Heritage and Research of the Universities of Leiden, and TIIWE from Taiwan. The conclusion of this conference is to set up a working group to prepare the consequence work in order to submit the proposal for the new ISC on Water Heritage in the ICOMOS GA 2020 in Sydney, Australia and a Taiwan Statement to proceed the following cooperation.

Three TICCIH members had participated in the conference, Irene Curulli, Meisha Hunter and Hsiao-Wei Lin. On behalf of TICCIH, Hsiao-Wei Lin, Board member of TICCIH, delivered the statement of TICCIH related water heritage achievement in the opening ceremony and lead Theme 3 Waterway together with Irene Curulli in the Conference on 'Water as Heritage' at the International Conference Wa-

ter as Heritage 2019 in Chiayi, Taiwan, 27-29 May. Meisha Hunter (TICCIH member) from New York presented in the conference.

The objective of the conference was to bring together key organizations, heritage groups and other stakeholders engaged in agricultural water management under one platform with the idea of identifying water-related heritage across the world. The diversity of papers from different driplines highlight the importance of water heritage and the knowledge embedded in it. This may show a better way in attaining sustainability with balance between water heritage and development. A selection of papers will be published until the ICOMOS GA 2020 in Sydney.

The contents of the papers with 5 themes: Water for Service, Waterscapes, Waterways, Waterpower and Worldviews on Water. There are different disciplines of presentations from planning, landscape architecture, engineering, historian and community empowerment. In addition, the issue of climate change effects on the water heritage is also essential for the discussion.

According the conference statement: the further action of the conference outcome will be:

- Developing methodologies, training, policies and design processes that respond to heritage significance in the water world
- Showcasing and promoting best practice examples of water heritage management
- Exploring and developing the interlinkages with water heritage managers, designers, planners, and a broad range of relevant organizations

In addition, the priority work of the further steps will be:

- Identification of approaches and synergies
- Establishment of a common language
- Emphasizing the relevance to the SDGs
- Intensification of Climate action planning
- Promotion of the Water Heritage Awareness Shield



Figure 1. Opening speech by Henk van Schaik from ICOMOS Netherlands

ICOMOS-IFLA International Science Committee on Cultural Landscape Industrial Heritage: Understanding the Past, Making the Future Sustainable

— Hsiao-Wei Lin, Assistant Professor of Department of Architecture, Chung Yuan Christian University, Member of the International Committee for the Conservation of the Industrial Heritage

Background

The concept of “cultural landscape” first appeared in Taiwan’s Cultural Heritage Preservation Act in 2005. Since then, Taiwan has made every endeavor to advocate and promote cultural heritage preservation. In 2019, the “Alishan Forestry and Railway Cultural Landscape” was designated by the Ministry of Culture as the first “important cultural landscape” in Taiwan. The designation of over 50 cultural landscapes to date underscores the rising awareness of preservation issues across the island. Several heritage sites, including the Tainan Park in Southern Taiwan, are now in the process of drafting strategic heritage management and maintenance measures. This trend reflects the increasing importance of conserving the overall environment when it comes to cultural landscape preservation; it is rooted in a “thematic” approach to the landscape and requires participation of various stakeholders, resources for operation, and continuous improvement.

The author of this report participated in the 2019 joint annual assembly and academic symposium co-organized by the International Scientific Committee on Cultural Landscapes of the International Commission of Cultural Monuments and Historic Sites (ICOMOS-ISCCL) and the International Federation of Landscape Architects (IFLA) between June 15 and 25, 2019. Under the theme of “Industrial Heritage: Understanding the Past, Making the Future Sustainable,” the conference provided insights on the thought-provoking advocacy work of the ICOMOS-ISCCL. Known for presenting new ideas and perspectives on cultural heritage, ICOMOS-ISCCL has functioned smoothly thanks to the active participation of its members.

The ICOMOS-ISCCL was established in 1981 and is one of the world’s most influential committee of its kind. ISCCL has been a strong advocate of the preservation, investigation, archiving, research, and visibility of cultural landscapes worldwide. In 1992, the World Heritage Convention became the first international legal instrument to recognize cultural landscapes; it was a watershed document with significant impact on heritage preservation around the world. A plethora of research papers and reports on cultural heritage preservation practices have been published over the years. These efforts have led to the creation of more landmark documents such as the World Rural Landscape Initiative in 2013 and ICOMOS-IFLA Principles Regarding Rural Landscapes as Heritage in 2017 (“Rural Landscape Heritage Principles” in short), all of which seek to explore the complex relations between humans, cultural, and natural environments.

Conference Themes and Outcomes

This 2019 annual conference also called for an integrated approach to the preservation of rural landscapes, including respecting traditional land use that is resilient and sustainable, maintaining local biodiversity, and preserving regional cultural diversity.

The purpose of the conference is to stimulate discussions about the preservation of cultural landscapes and explore human-land relations using specific case studies. The Irish speakers also shared their heritage preservation experience with the participants. This year’s meetings were mainly

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divided into two parts: the annual assembly and the academic seminar. This academic seminar was held in Dublin, based on the theme of “Nature/Culture Spectrum: Conversations about Cultural Landscape in Ireland in an International Context.” It seeks to present new ways of thinking regarding landscapes, societal changes, and sustainable development in the face of today’s new challenges. Speakers from various landscapes such as Oman and Morocco also presented international perspectives on local cultural heritage preservation.

In addition to the academic seminar, the conference organizer also arranged tours of the natural and cultural heritage sites in Ireland, including the Castletown House, Clara Bog, Manchán of Lemanaghan, and Clonmacnoise Monastic Site. The tours provided opportunities for participants to explore new perspectives on thematic and dynamic preservation.

One of the important outcomes of the 2019 conference is the establishment of different working groups based on a variety of themes to further explore cultural landscape preservation issues. For example, the definition of “rural landscape” in the Principles of Rural Landscape Heritage was expanded to include the following: “terrestrial and aquatic areas co-produced by human-nature interaction used for the production of food and other renewable natural resources, via agriculture, animal husbandry and pastoralism, fishing and aquaculture, forestry, wild food

gathering, hunting, and extraction of other resources, such as salt.” The conference featured many monographs submitted by landscape scholars, historians and designers; in addition to the academia, conference participants also came from the public sector and civic and conservation organizations.

Papers presented in the conference reflected the rising importance of “continuously-evolving landscapes” and “associative cultural landscapes.” They underscored the landscape’s relationship with the participating communities and the importance of social participation from the bottom up. The papers also suggested a new value recognition and evaluation system for each of the existing elements in the landscape and the intangible cultural assets generated by culture-nature interaction. Life-related, living cultural landscape cases are increasingly being recognized as essential elements of cultural heritage, expanding the spatial and conceptual scope of cultural heritage areas. These international trends can help to address the challenges facing Taiwan’s cultural heritage communities today: the designation of heritage sites which encompass multiple types of landscapes and multiple administrative districts. These key takeaways from the conference offer inspiration for formulating and implementing sustainable heritage landscape development strategies in Taiwan.

Asia Pacific Heritage and Tourist Rail Organization (APHTRO) 2019 Conference in Amman, Jordan

— Nai-Yi Hsu, Vice Chairman of the Asia Pacific Heritage and Tourist Rail Organisation (APHTRO)

The 2019 annual conference of the Asia Pacific Heritage and Tourist Rail Organization (APHTRO) was convened at the headquarters of the Hijaz Railway in Amman, Jordan from November 8th to 11th, 2019.



Figure 1. Chartered Train Crossing a Landmark Bridge

The Jordan Hijaz Railway was constructed by the Ottoman Turkish Empire in 1908. With a track gauge of 1050mm, the railway operates between Damascus, Syria, and the holy city of Medina, Saudi Arabia. After suffering serious damage during War World II, it now operates on a route of a few dozens of kilometers near Oman. Currently there is no set timetable for the Hijaz Railway; only charter train rides for group tourists are available. Most local residents, including taxi drivers, are not aware of the existence of the railway.

The author of this report and Mr. You-wei Liu from Taiwan participated in the 2019 annual conference on behalf of the Railway Cultural Society, Taiwan. Other participating members included Kyoichi Oda, Chairman of APHTRO, Sallah Allouzi, General Manager of Jordan Hijaz Railway, and Duha Rahaleh, information engineer of Jordan Hijaz Railway. Representatives of railway organizations worldwide also joined the conference, such as Christopher Clark and Peter Kennan from the UK Wollstyn Experience, Stephen Wiggs, Chairman of NERHT (New Europe Railway Heritage Trust), and Heimo Echensperger, German Vice Chairman of FEDECRAIL (European Federation of Museum & Tourist Railways), etc. Regrettably, some members were unable to physically attend the conference in Jordan

due to lack of funds. The conference organizer had planned to use online video conferences to allow members from afar to participate in the discussion, but the internet bandwidth was too narrow so the plan had to be canceled. Despite the minor setback, members managed to reach consensus over several important issues during the conference. First, Kyoichi Oda from Japan was re-elected as president. Second, the issue of WATTRAIN's high membership fees was brought up. WATTRAIN's prohibitive membership fees have prevented some Asian and African members from fully participating in the organization's activities. APHTRO strongly urges WATTRAIN to lower membership fee rates, creating equal opportunities for all members to attend and interact in the organization's events. Third, members agreed that the organization should make more use of video conferences and other forms of internet-based communication to enable broader participation. Fourth, the next APHTRO annual conference will be held in Indonesia. Fifth, members agreed that APHTRO needs to enhance its interaction with other organizations and scholars.

After the official conference concluded, participants exchanged their opinions on fundraising for the Hijaz Railway. Considering that the Hijaz Railway was constructed using the generous contributions from Muslims all over the world, participants from UK suggested that Hijaz Railway should set up fan clubs or rail enthusiasts associations to leverage external funding sources.



Figure 2. Al Jeza Station, which has been restored, is the train's current terminal station



Figure 3. The Amman Station, water tower, turn table and crane, built in 1908, are still in use today

During the keynote sessions in the conference, speakers from the UK talked about assisting Eastern European railway administrators to operate and conserve heritage railways. Speakers from Jordan introduced the history and status quo of the Hijaz Railway. The author of this report introduced the sister railway relationship between UK's Welshpool & Llanfair Light Railway and Taiwan's Sugar Railways, as well as the successful showcase of W&LLR's Dougal steam engine in Taiwan for a period of 3 months. Lastly, Kyoichi Oda, president of APHTRO, shared successful case studies on how heritage steam trains worldwide had catalyzed heritage conservation and community development. The inspiring presentations offered insights on the preservation and revitalization of heritage railways around the world.

After the conference concluded, participants rode the steam train between Amman Station and Al Jeza Station on the Hijaz Railway on October 10th. The steam locomotive in use was Engine No. 52 manufactured by Jungenthal of Germany in 1955 and later restored in 2013; it was the majestic vintage locomotive featured in the movie *The Return of the Mummy*. The train made three photo stops along the way, allowing passengers to alight and snap pictures of the rare steam train.

The Jordan Hijaz Railway was the first railway constructed in the Middle East. The Amman Station, water tower, water crane, and turntable in use today were built in 1908. Due to the unique gauge of the railway, the maintenance

work of the rail and rolling stock have been carried out entirely by the highly skilled and talented staff of the Hijaz Railway. The steam engine and other station facilities at Al Jeza, the destination of our train ride, were all restored by the Railway's staff themselves.

Known for the hospitality of its people, Jordan is an enigmatic country located in West Asia and is the only region in the Middle East unaffected by racial or religious conflicts. Since the inception of APHTRO, the Jordan Hijaz Railway has been an active and loyal member of the organization. For years, APHTRO members had wanted to convene its annual conference in Jordan, and the wish finally came true in 2019. The worthwhile and meaningful conference enabled participants to gain deeper understanding of the country of Jordan; it also fostered closer relations and mutual understanding among all participating members and organizations.

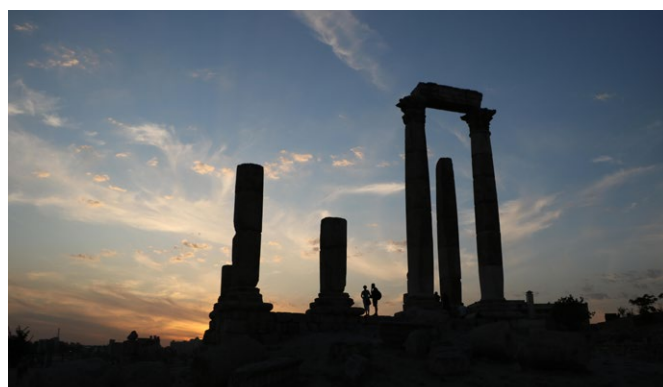


Figure 4. Remains of the Temple of Hercules in Amman

Report on the ERIH Annual Conference 2019 in Berlin, Germany

— Christiane Baum, European Route of Industrial Heritage (ERIH) Secretary General

In October, ERIH, the European Route of Industrial Heritage, held its 16th annual conference. Its topic: "Industrial heritage tourism - it's all in the mix. Successful industrial heritage marketing through connections with other tourism offers". 90 participants from 19 countries exchanged ideas on how to attract more visitors with cross-marketing strategies. The conference was jointly hosted by the ERIH Anchor Point German Technical Museum and the Berlin Center of Industrial Heritage.

What kind of inspirations did the lectures provide?

Following opening addresses by the host, Prof. Joseph Hoppe, and ERIH President Prof. Dr. Meinrad Maria Grewenig, the first guest speaker, Dr. Anna Hochreuter from the Berlin Senate Department for Economics, drew a line from Berlin's historic status as Germany's largest industrial city at the beginning of the 20th century to its current role as a major tourist attraction. The possibilities in this respect were explained by Bettina Quäschnig from visitBerlin, Berlin's official tourism and congress marketing organisation. On the occasion of the 100th anniversary of the Bauhaus, for example, visitBerlin designed a "Grand Tour of Berlin Modernism", which makes historical relics of industrial heritage a priority. On the visitBerlin website, industrial heritage will also be playing a more important role in the future.

Keynote Speaker and ERIH board member John Rodger stated that although industrial heritage is no longer a niche market it still has little relevance for large tour operators. That's why he favours additional attractions like high-profile art exhibitions as demonstrated by the ERIH Anchor Point World Heritage Site Völklingen Ironworks. Harald Spiering from the Ruhr Regional Association (RVR) and Jochen Schlutius from the Ruhr Tourism Ltd. (RTG) talked

about the evolution of the new brand *radrevier.ruhr*, which attracts a broad audience by connecting cycling tours and industrial monuments. Regina Rauch-Krainer, founder of the Austrian tour operator TLS Reisekultur, and Raffaele Caltabiano President of the volunteer industrial heritage association Associazione Amideria Chiozza, Italy, shared their fruitful cooperation by highlighting an emotionally stimulating guided tour of the former, usually restricted, Chiozza chemical factory.

Cornelia Magnusson from ERIH Anchor Point World Heritage Grimeton Radio Station, Sweden, demonstrated how visitor numbers can be increased significantly. Her winning formula: a marketing mix including the cooperation with a hop-on hop-off bus, connecting 15 sights within the region, as well as high-profile climbing tours to one of the site's 127 meter high aerial towers. Concluding the lectures, Dr. Peter Wakelin, independent writer and consultant in arts and heritage, reflected on the role of industrial heritage in the context of developing natural environments for tourism. Referring to the Welsh national parks of Snowdonia and Brecon Beacons and the popular Dee Valley, he traced the roots of industrial tourism back to the Romantic period and discussed the extent to which sites of industrial heritage add to natural tourist attractions. As success factors for industrial heritage tourism he identified: professional products, regional partnership and marketing, coordinated visitor management, interest from tour operators and strong industrial experiences. The last point is secured by the unique selling propositions (USPs) of industrial heritage, which are – according to Peter – rides, underground, immensity, enterprises and people.

All lectures are available for download on the ERIH website.

What were the topics discussed in the workshops?

The ERIH Conference workshops have become established as panels for discussion. Participants could choose from a range of three subjects:

- successful tourism products and offers
- cooperation with Destination Management Organisations (DMO) and tour operators
- tourism marketing for regional networks and routes

Each workshop was provided with a prepared questionnaire as a basis for discussion. The questions covered, among other things, opportunities and challenges of working with tourism stakeholders or asked whether marketing measures are already in use and which target groups they are supposed to address. In addition, each workshop collected suggestions how ERIH might support individual sites or regional networks.

In particular, two issues were repeatedly raised in the discussions. The first relates to the different perspectives of industrial heritage sites and tourism organisations. Target groups, key topics and USPs often differ from each other. In addition, tour operators usually lack an understanding of the scope and potential of industrial heritage. With this in mind, the workshops developed a whole series of recommendations, such as linking own tourism products to major cultural events or cooperating with other industrial heritage sites to create exciting stories and experiences. Another idea is to increase collaboration between industrial museums and operating companies, because looking behind the scenes of present-day production processes is particularly attractive to visitors. Another recurring topic of discussion was market research as an indispensable instrument for designing tourism products by investigating and defining relevant target groups and their specific needs.

The fact that regional routes are not the only option when it comes to successful tourism marketing for regional networks was an essential finding of the participants of the 3rd workshop. A good example for a new approach is the "Industry Open" conference at Pilsen, Czech Republic. Being a platform for project-based partnerships between industrial heritage sites and local companies and entrepreneurs, it aims to promote the industrial heritage of the Pilsen region and turn it into a visitor attraction. Meanwhile, "Industry Open" has been successfully established as a brand and provides the starting point for the establishment of a regional network. In contrast to the Route of Industrial Heritage in the German Ruhr area or the Route of Technical Monuments in the Silesian Voivodeship, Poland, the Pilsen regional route evolves from an event and not vice versa.

How can ERIH support these efforts?

There have been many suggestions on this question. The need to promote industrial heritage and the ERIH brand in the travel industry more vigorously was one of the major concerns. ERIH is also sought after in the field of market research, for example by commissioning a research on target groups and their relevance for industrial heritage. In addition, it was suggested to set up a task force to advise regional routes on networking and events. This led to the idea of offering a workshop exclusively for regional route coordinators at the next ERIH annual conference.

ERIH currently lists over 1,850 sites in all European countries. Since May 2019 ERIH is officially entitled "Cultural Route of the Council of Europe".

Plantation Industrial Heritage in Medan, Indonesia

— Hasti Tarekat Dipowijoyo, Founder of Heritage Hands-on

Plantation City

Medan is the capital of North Sumatra Province, Indonesia, a city of about 2, 5 million inhabitants. The city is a multicultural society with influences from India, China, Europe, Java, Malay, Aceh, Batak and other ethnics. This multiculturalism due to the fact that in the colonial era the Dutch-Indies government has imported labors from outside to open plantations. The local ethnics, Batak and Malays, have refused to cooperate with the colonial government, enforced the authorities to attract the Indians and Chinese overseas especially from the Malacca Straits to come to Medan.

The tobacco was introduced in 1863 by the Dutch and soon it took over the world market together with the Cuban's cigars. There was 120 thousand hectares tobacco planted in Medan in the 19th century by 170 plantation companies. The famous commodity was called Deli Tobacco because Medan area was in the hand of the Deli Sultanate. Deli Tobacco has given a huge impulse for development of Medan with imposing buildings and gardens. Besides tobacco, Medan has also produced tea, palm products and rubber. Tobacco and rubber productions were so successful that they were called the Wonders of Deli.

Most of plantations were stagnant during the Japanese occupation 1942-1945 and then nationalized after the Independence of Indonesia (1945). Most of plantation companies are now under management of the state-owned companies called PTPN (Perusahaan Terbatas Perkebunan Nusantara).

Plantation industry in Medan now focus more on palm products. Nevertheless, the leftover of the glorious period of Deli Tobacco, rubber and other commodities are still vivid and relatively intact. This legacy that was promoted during the Festival of Plantation Industrial Heritage, 8-11 November 2019 in Medan, by the Indonesian Plantation Museum (Musperin).

Musperin was established about two years ago in location of former office of the Association of Rubber Plantations in East Coast of Sumatra. The museum aims as an information and public education center about plantations. The Festival was one of the methods to achieve the aims.



Figure 1. The Indonesian Plantation Museum (Photo Credit: Rero Rivaldi)

The Festival was organized in collaborations with the state-owned companies of PTPN, universities, government agencies, Sumatra Heritage Trust, Urban Sketchers Medan and many other communities.

During five days, there was an exhibition about plantation commodities (tea, tobacco, rubber, cacao, cane, coffee and palm). For children there were various competitions such as sketches, coloring, drawing and storytelling. For adults, there were heritage trails, talk show, gathering for heritage societies and national seminar.

The National Seminar on Plantation Industrial Heritage of Indonesia

Plantation theme doesn't receive much attentions as deserved from the industrial heritage professionals and researchers in Indonesia specifically and in Asia generally. But for Medan, the theme of plantation is very relevant and urgent. Musperin, Sumatra Heritage Trust and other organizers determined that the theme would be raised no matter number of abstracts that would come. Plantation industrial heritage needed attention from the authorities, the press and the professionals before more and more assets would have gone.

Luckily, our concern was not grounded. We have received sufficient abstracts and finally there were 18 researches presented during the seminar plus 4 keynote speakers. It might be useful to share the list of topics of researches that have been conducted in Indonesia as references for other Asian countries who have rich plantation industry. The research topics are:

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No.	Research Theme	Contributor
1.	Tobacco Drying Barn Architecture on Its Cultural Landscape	Titien Saraswati
2.	Synergy of Adventure Trail and Potentials Plantation in Advancing Tourism of Bali Aga Belandingan Village Bali	Ni G.A. Diah Ambarwati Kardinal
3.	Study of Chinese Architecture in House of Tjong A Fie and House of Cheong Fatt Tze	Novrial, Natasha Shafira Jiemy
4.	Indonesian Plantation Museum in Safeguarding the Plantation Industrial Heritage	Sri Hartini, Isnen Fitri
5.	The Strategic Position of Magelang City as a Plantation Area in the Dutch Colonial Period	Wahyu Utami
6.	Sugar Factory Syndicate Building in Surabaya, One Building with Two Face	Joko Triwinarto Santoso
7.	Plantation Archives as History Heritage	Ratna, Suprayitno, Edi Sumarno
8.	Environmental Communication Synergy of PT Tirta Madu with Other Stakeholders for Promotion of the Bukit Kerang Kawal Darat (BKKD) Site Area in Bintan Regency	Defri Elias Simatupang
9.	Plantation and Migration of Chinese People in Medan 1865-1942	Handoko
10.	Maimun Palace: A Monument to the Triumph of the Plantation Industry in Deli Land	Rudolf Sitorus, Isnen Fitri
11.	The Typology of Sugar Industry Complex and its Relation to the 19th Century Javanese City Form	Yulia Nurliani Lukito, Riski Dwika Aprilian
12.	The Indonesian Plantation Museum: Cultural Capital and the Development of the Millennial Generation Creative Economy of Medan City	Asmyta Surbakti, Vaneisia Amelia Sebayang

13.	AVROS Building in Kesawan Area as a Milestone in the Development of the Rubber and Palm Oil Plantation Industry on the East Coast of Sumatra in the Early 20th Century	Isnen Fitri, Ratna, Amy Marisa
14.	Freehand Sketching as a Documentation and Data Collecting Tools for Industrial Heritage in Medan and Its Surroundings	Yulianto
15.	The Conservation of Plantation Heritage Area in Maluku	Maulana Ibrahim
16.	The Existence Value of Tea Plantation and Sidamanik Springs in Community Based Natural Tourism Development	Pindi Patana, Achmad Siddik Thoha, Nurdin Sulistiyono, Alfian Gunawan, Ahmad, Yunus Afiffudin, Dimas Adji Sutara
17.	Tanah Lapangan Merdeka, Spatial Structure and Central City Field Activity	Miduk Hutabarat, Lucas Partanda Koestoro
18.	Social and Cultural Value of Kebon Currencies in North Sumatra	Rita Margaretha Setianingsih, Lila Pelita Hati, Fitriaty Harahap

The keynote speakers were:

1. Ir. Soedjai Kartasasmitha, one of the founding fathers of plantation industry of Indonesia and also the initiator of the Indonesian Plantation Museum. He talked about history of plantation industry of Indonesia;
2. Dr. Ir. Abdul Gani. MSi, the Director of the state-owned company PTPN II. He was represented by the Director of Research Center of Palm Oil, Dr. Edwin Lubis M.AgrSc., who talked about visions for the industrial heritage assets of the company;
3. Hilmar Farid, the Director General of Culture, Ministry of Education and Culture. He was represented by the Head of the Agency for Cultural Heritage Conservation of Aceh and North Sumatra, Bambang Sakti Wiku Atmojo, who talked about legal base for industrial heritage conservation;
4. Dra. Hasti Tarekat, MSi, co-founder Sumatra Heritage Trust who talked about the legacy of plantation industrial heritage of the Dutch-Indies in the Netherlands.



Figure 2. The speakers of the National Seminar on Plantation Industrial Heritage in Medan, 11 November 2019.

Conclusion

All of the participants and stakeholders agreed that plantation industrial heritage deserves attention as subjects for public education and potentially as agriculture tourism destinations.

The Indonesian Plantation Museum (Musperin) plays an important role as main hub between the internal stakeholders and the general public. This museum has opened the second location at the city center of Medan. Nevertheless, there is no substantial and sustainable funding resources for Musperin who survives so far on the foundation of voluntary passions and generous donations. The plantation authorities and cultural heritage professionals should formulate more sustainable funding mechanism to support Musperin.

Other important conclusion was that the state-owned plantation companies PTPN in North Sumatra were willing to cooperate with private sector and communities to exploit their industrial assets for public education and tourism.

They welcome any initiatives and investors who want to make use of plantations, buildings and other assets.

Hopefully the plantation theme will be highlighted on Asia and international level as well as other themes of industrial heritage. What it has been discussed in Medan was only a fraction what Indonesia and Asia have.



Figure 3. Heritage City Tour around Medan during the Festival of Plantation Industrial Heritage, 8-11 November 2019.

Pan-sumatra Network: from Sumatera for Heritage Preservation

— Sri Shindi Indra, Lecturer of Landscape Architecture, University of Pembangunan Panca Budi, Indonesia



Figure 1. Group Photo at Pan-Sumatra Network Gathering held on November 9th 2019 at Museum of Indonesia Plantation (Photo Credit: Yuanita FD Sidabutar).

The movement to preserve cultural heritage in Sumatra began separately in each region in Sumatra. In 1998, the establishment of Sumatra Heritage Trust or Badan Warisan Sumatra (SHT/BWS) in Medan had marked as one of the starting points of the heritage movement in Sumatra. This organization aims to preserve the historical and cultural heritage in Sumatra through community and government participation. The focus of SHT is the activities of Conservation, Publication, and Documentation, Sumatra Network for the Conservation of Cultural Heritage, Public Education, Development of Human Resources in the Field of Cultural Heritage Conservation.

The movement towards conservation in Sumatra has not been carried out jointly because of the limited sources of information, communication, and inadequate means of transportation. For this reason, in 2000, the Sumatra Heritage Trust initiated a meeting and gathering to share knowledge and experience from fellow conservationists and enthusiasts in Sumatra. Simultaneously with this meeting, the initiation of the preservation network for Sumatra or abbreviated as Pan-Sumatra Network was initiated.

PanSumnet has a network spread from all over Sumatra and also neighbouring islands, starting from Aceh, Nias, Medan, Padang, Pekanbaru, Jambi, Bengkulu, Palembang, Bangka, Belitung, Lampung, Jakarta, and of course Malaysia and Singapore. The first PanSumnet meeting was successful in bringing representatives from Aceh, Nias,

Padang, Palembang, and Bangka. Then proceed to the next meetings held in the year:

Year	Venue
2000	Medan, North Sumatra
2001	Bangka, South Sumatra
2002	Padang, West Sumatra
2004	Bengkulu, Central Sumatra
2015	Sawahlunto, West Sumatra
2018	Muntok, West Bangka
2019	Medan North Sumatera

In addition to the PanSumnet meeting was also organizes training and Seminars attended by heritage organizations from other areas in Indonesia and neighboring countries in Southeast Asia such as Malaysia and Singapore. The training and seminars were held on and with the theme:

Year	Venue	Theme
2004	Bukittinggi, West Sumatra	"The capacity building training for conservation in Sumatera" as a starting phase
2006	Bangka, South Sumatra	The closing phase of "the capacity building training for conservation in Sumatera"
2018	--	A workshop on Heritage Urban Landscape (HUL)
2019	--	A seminar on Plantation Industrial Heritage together

The regional gatherings and training play essential roles in keeping heritage movements alive, especially in the region and in Indonesia generally. They function as well as a means to attract local young professionals to get involved and improve knowledge and capacity in dealing with challenges to save local heritage.

Sumatra consists of many regions that are ranging from North to South. It is essential to maintain communication

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within our networks and keep up updates among us. Thus, in this digital era, where information is just one click away, we created a simple phone application group chat for PanSumnet people. The members are ranging from different kinds of backgrounds but sharing the same purposes to conserve and preserve our cultural heritage.

PanSumet will always continue to widen the network to invite communities, individuals, governments, and any parties who have the same vision to preserve historical and cultural legacies. Through gathering activities, seminars, and also publications, PanSumnet invites all parties not only on Sumatra but also on other islands and even in Asia or the world to jointly think about the spirit of conservation and preservation.



Figure 2. Group Photo at Pan-Sumatra Network Gathering held on November 9th 2019 at Museum of Indonesia Plantation (Photo Credit: Sri Shindi Indira).

One of the meetings carried out was by holding a Pan-Sumnet gathering on November 9, 2019, in Medan. Together with the Indonesia Plantation Museum, we hold seminars and PanSumnet sharing attended by new communities and fresh young people with various millennial-style programs. The meeting was attended by new communities that inspire us, who share their passion, experience, and dreams of preservation.

There are Archpedition, Medan Heritage, Urban Sketcher Medan, Kerintji Heritage Institute, Divre1railfans, and North Sumatera Heritage. Archpedition is a community that runs an Architectural Expedition in Medan as well as in other cities and countries. Medan Heritage is a community-based organization consists of young people who love to do heritage walks, which means by doing a tour among heritage buildings. Urban Sketcher Medan is a branch of Urban Sketchers international in Medan who loves to sketch buildings and urban scenery, especially on heritage buildings and sites. Kerintji Heritage Institute is a new initiated organization to help to guard and preserve the

heritage in Jambi. Divre1Railfans is an organization that consists of people from different backgrounds who fond of anything related to Trains and Railways. They have done many searching for old trains and old rail tracks. The last and not least is North Sumatera Heritage who shared cultural, culinary preservation from North Sumatera.

We do hope that PanSumnet will last from generation to generation as a legacy that we presented for our networks. Preservation connects and brings people together. Because in the matter of safeguarding and doing conservation, one cannot do solely but to walk and hand in hand together.



Figure 3. Pan-Sumatera Networks Lists and Logos.



Sustainable Building Conservation: Theory and Practice of Responsive Design in the Heritage Environment

Author: Oriel Prizeman

Pub Year: 2019

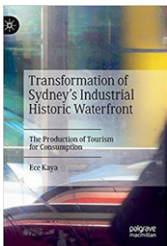
Publisher: RIBA Publishing

ISBN: 978-185-94-6542-4

More at: <https://reurl.cc/Rdoqo6>

This book incorporates UK and international case studies and essays to identify the overlaps in the interests of energy and building conservation.

The relevance and adjustments of qualitative and quantitative frames of reference are introduced, alongside the various expertise of the contributors: architects, designers, conservation consultants and academics. The second part of the book showcases sustainable domestic and non-domestic heritage projects, translating the preceding research into information that practitioners can use in their everyday work.



Transformation of Sydney's Industrial Historic Waterfront: The Production of Tourism for Consumption

Author: Ece Kaya

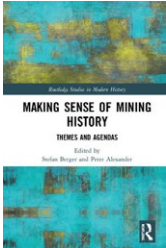
Pub Year: 2019

Publisher: Palgrave Macmillan

ISBN: 978-981-13-9667-0

More at: <https://reurl.cc/drong8>

This book examines the impacts of tourism-led transformations on the industrial historical waterfront at Darling Harbour and The Rocks in Sydney, Australia in the context of urban restructuring and deindustrialisation. The book also offers an extended reflection on the paradoxes between tourism and heritage. This discussion is not a new concept. However, this book critically explores the significance of the industrial heritage assets of these areas and the implications of the transformation procedures.



— **Making Sense of Mining History: Themes and Agendas” (Routledge Studies in Modern History)**

Author: Stefan Berger & Peter Alexander

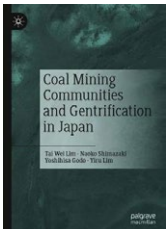
Pub Year: 2019

Publisher: Routledge Studies in Modern History

ISBN: 978-036-71-9868-8

More at: <https://reurl.cc/NaoQg6>

This book draws together international contributors to analyse a wide range of aspects of mining history across the globe including mining archaeology, technologies of mining, migration and mining, the everyday life of the miner, the state and mining, industrial relations in mining, gender and mining, environment and mining, mining accidents, the visual history of mining, and mining heritage. The result is a counter balance to more common national and regional case study perspectives.



— **Coal Mining Communities and Gentrification in Japan**

Author: Tai Wei Lim, Naoko Shimazaki, Yoshihisa Godo & Yiru Lim

Pub Year: 2019

Publisher: Palgrave Macmillan

ISBN: 978-981-13-7219-3

More at: <https://reurl.cc/24OYVE>

This book offers a multidisciplinary analysis of approach in the field of energy studies of Japan, examining post-closure coal mining towns in Japan and their gentrification. It considers the impact of closures on the agricultural industry, the re-absorption of laid off coal miners into service and industrial sectors, and the gentrification of former coal mines into agricultural farms and communities. It also considers the historical process of gentrification in terms of origins, social history, continuity/discontinuity and cooperation/resistance. The historical background of coal mine closures analyses nostalgic recollection about mine closures and Sakubei's UNESCO drawings of life in the coal mines and other cultural materials related to coal energy and the mining industry in general in Japan.

- Taiwan

Railway Technology Overseas — Exchanging Exhibition of the Railway Museum in Omiya, Saitama Prefecture, Japan

Date: July 18, 2019 – June 30, 2020

Place: Kaohsiung, Taiwan

Organizer: Ministry of Culture (Taiwan); Bureau of Cultural Affairs, Kaohsiung City Government, Taiwan; Kaohsiung Museum of History, Taiwan; The Railway Museum in Omiya, Saitama Prefecture, Japan

Official Web: <http://hamasen.khm.gov.tw/eng/home01.aspx?ID=1>

More at: <https://anih.culture.tw/index/en-us/events/15257>

- Mexico

The International Scientific Committee on Cultural Routes (CIIC) of ICOMOS Scientific Meeting “Living the Cultural Routes”

Date: February 10 – 17, 2020

Place: Chihuahua, Mexico

Organizer: ICOMOS CIIC

Official Web: <https://www.icomos.org/en/member-area/60073-call-for-presentations-living-the-cultural-routes-2>

More at: <https://anih.culture.tw/index/en-us/events/16566>

- Japan

The 16th International Docomomo Conference Tokyo Japan 2020

Date: March 15 – September 15, 2020

Place: Tokyo, Japan

Organizer: Docomomo International; Docomomo Japan; ISC/Educational

Official Web: <http://docomomo2020.com/>

More at: <https://anih.culture.tw/index/en-us/events/14587>

- Australia

Abstract Submission Portal Now Open for the ICOMOS GA2020 Scientific Symposium

Date: October 5-9, 2020

Place: Sydney, Australia

Organizer: ICOMOS

Official Web: <https://icomosga2020.org/abstracts/>

More at: <https://anih.culture.tw/index/en-us/events/18874>

- Canada

TICCIH 2021 | Industrial Heritage Reloaded

Date: August 30, 2021 – September 4, 2021

Place: Quebec, Canada

Organizer: Canada Research Chair on Urban Heritage; Canadian Industrial Heritage Centre; Écomusée du fier monde; Association Québécoise pour le patrimoine industriel; TICCIH

Official Web: <https://sites.grenadine.uqam.ca/sites/patrimoine/en/ticcih2021>

More at: <https://anlh.culture.tw/index/en-us/events/18022>



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- 〈首次臺灣水力發電廠複雜製圖研究的案例—扁平水力發電室的歷史意義〉—柬埔寨美國金邊大學副教授 Stefan Tkac
- 〈從聯合國 2030 永續目標，談「臺灣屏東二峰圳灌溉系統」水遺產保存〉—國立屏東大學文化創意產業學系副教授 林思玲

三、國際動態

- 〈「2019 水文化國際研討會」於臺灣嘉義市舉辦〉—國際工業遺產保存委員會理事會 (TICCIH) 委員 林曉薇、Meisha Hunter、Irene Curulli
- 〈2019 年 ICOMOS-IFLA 國際文化景觀科學委員會暨國際景觀建築連盟聯合年會及學術研討會趨勢觀察〉—中原大學建築系助理教授、國際工業遺產保存委員會理事會 (TICCIH) 委員林曉薇
- 〈亞太遺產暨旅遊鐵道組織 (APHTRO) 2019 年約旦安曼年會〉—APHTRO 副主席 許乃懿
- 〈2019 柏林歐洲工業遺產路徑 (ERIH) 年會報告〉—ERIH 秘書長 Christiane Baum

- 〈印尼棉蘭的農園產業文化遺產〉—Heritage Hands-on 創辦人 Hasti Tarekat Dipowijoyo

- 〈泛蘇門答臘遺產保護網絡：發跡於蘇門答臘的文化資產保存〉—印尼班加布迪發展大學 (University of Pembangunan Panca Budi) 景觀設計學講師 Sri Shindi Indra

四、出版資訊

- 《永續建築保存：文化資產環境中響應式設計的理論與實踐》
- 《澳洲雪梨工業歷史濱水區的轉型：觀光消費的生產》
- 《了解礦業史：專題探究》(英國羅德里奇出版社現代史系列)
- 《日本煤礦社區與仕紳化》

五、活動資訊

- 哈瑪星臺灣鐵道館「跨海的鐵道技術」—日本大宮鐵道博物館交流展
- 國際文化紀念物與歷史場所委員會文化路徑國際科學委員會 (ICOMOS CIIC) 「文化路徑的活化」徵件活動
- 2020 東京國際現代運動建築、場所及鄰里文件與保存國際委員會國際學生研討會
- 國際文化紀念物與歷史場所委員會 (ICOMOS) GA2020 科學研討會徵稿中
- 2021 國際工業遺產保護委員會 (TICCIH) 會第十八屆國際會議「再現工業遺產 (Industrial Heritage Reloaded)」會議及論文徵集開跑

編輯團隊

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臉書專頁

編者的話一

水文化資產保存與活用以往多隱藏在各個產業類別文化資產的面向中，而因著氣候變遷所帶來的危機與如何因應的挑戰，促使國際上水與文化的非政府組織開始關注相關議題，並積極著手擘劃水文化資產發展藍圖。其中主要推動潮流的來源有：文化資產領域的國際文化紀念物與歷史場所委員會 (ICOMOS)，以及水資源領域的國際灌溉排水協會 (ICID)。因應重視水文化資產系統的國際呼聲，以致在 2015 年舉行第七屆世界水論壇 (World Water Forum 7, WWF 7) 會議中，由 WWC、ICID、ICOMOS、UNESCO、FAO 共同宣布成立世界水文化資產系統計畫 (World Water System Heritage Programme，簡稱 WSH 計畫) 國際認證，進而產生了 WSH 認證作業的推動，也於 2018 年第八屆世界水論壇會議中，頒授了首批 WSH 認證登錄的三處世界水文化資產系統。

延續 2019 International Conference 'Water as Heritage' (2019 年水文化國際研討會) 在臺灣舉辦，以及呼應全球水文化保存議題的興起，本次專刊特別以水文化資產為主題，收錄 6 篇專題文章包括「國際水文化資產保存與活用新潮流」簡要介紹水文化資產近年來在國際上的緣起與動向，同時也概述臺灣在這個潮流中所扮演的角色；荷蘭「烏特勒支舊城更新與水文化資產保存」，介紹這個源於羅馬時代的古城，在現今城市更新的過程中，如何讓水與城市再生緊密扣合，一方面重現歷史場域再生的意涵，同時又顯現未來城市的雄圖；日本「關川水系土地改良區」是首批獲得世界水文化資產系統 WSH 認證案例之一，文中簡述這個獲得認證的主要關鍵重點；此外，介紹臺灣的水力發電文化資產保存及百年屏東二峰圳等三篇文章，展現臺灣對於水文化資產保存的進程。期望透過這次專題的內容，能夠激起更多人對水文化的重視，並且鼓勵有志之士積極參與水文化資產保存工作，一起展開守護地球資源的行動。

游進裕 博士



國際水文化資產保存與活用新潮流

—— 國際水利環境學院 (TIIWE) 教育研發組組長 游進裕博士

有關國際水文化資產保存與活用新潮流，可從聯合國教科文組織 (UNESCO) 與世界遺產 (World Heritage) 保存制度的形成、世界水文化資產系統計畫 (World Water System Heritage Programme，簡稱 WSH 計畫) 的推動、國際文化紀念物與歷史場所委員會 (International Council on Monuments and Sites，簡稱 ICOMOS) 推動籌設「Water and Heritage」國際科學委員會等方面分別簡述；同時，也簡要介紹臺灣對於此國際新潮流的響應與進程。

世界水文化資產系統概念的轉變歷程

第二次世界大戰結束後，以英、法為首的歐洲盟國有鑑於世界大戰帶給人類的毀滅性破壞，為了防止日後再度爆發世界大戰，而發起成立了以教育、文化、和平為宗旨的聯合國教科文組織 (UNESCO)。1972 年 UNESCO 大會通過《保護世界文化和自然遺產公約》，致力於保存對全人類都具有傑出普世性價值的自然或文化處所，正式啟動世界遺產的國際保護機制，並且以「國際文物保護和修復研究中心 (ICCROM)」、「國際文化紀念物與歷史場所委員會 (ICOMOS)」、「世界自然保護聯盟 (IUCN)」同為世界遺產的諮詢機構。

就遺產保存論述的層面而言，目前在世界遺產體系下的各類型遺產，以「水文化資產」為主體的保存論述與案例相對較少。世界遺產保存從發軔至今已超過 40 年，相關保存理論與價值體系亦趨完備。但若盤點世界遺產中與水相關的保存案例，多著重於建築物本身的時空環境背景、施工技術與文化景觀等面向，鑑定其是否具備有形遺產之保存價值的論述較多，針對水資源經營管理等水文化資產核心價值的論述則仍偏少。

就人類水利事業發展史的層面而言，20 世紀末期以來，伴隨著氣候變遷而導致的全球性的水危機，傳統「人定勝天」式治水思維已逐漸開始調整，轉而朝向「永續發展」、「與水共生」的水資源發展目標。因此，2003



圖 1：2003 年第三屆世界水論壇成果報告

年在日本京都舉辦的第三屆世界水論壇 (World Water Forum 3, WWF 3) 首次提出「水與文化」議題，強調必須透過結合傳統的文化思維與現代的科技方法，才能面對當前的水環境危機。因此，探究在地的水文化，從中萃取出具有價值的成分，作為水利工程規劃的參考，將能提供水利事業更多的解決方案，以面對未來複雜多變的氣候環境。

為突顯水文化資產的核心價值，國際上水與文化的非政府組織開始關注相關議題，積極著手擘劃水文化資產發展藍圖。其中主要推動潮流的來源有，文化資產領域的國際文化紀念物與歷史場所委員會 (ICOMOS)，以及水資源領域的國際灌溉排水協會 (ICID)。

ICOMOS 依照 UNESCO 決議，自 1983 年起每年舉辦「國際文化紀念物與歷史場所日」，在關注全球氣候變遷及自然災害的視角下，2011 年大會的主題為「The Cultural Heritage of Water」，揭示了水資源文化遺產保存的重要性。2013 年在荷蘭阿姆斯特丹舉行研討會，發表阿姆斯特丹宣言及「Protecting Deltas, Heritage Helps」影片，並彙編出版「Water and Heritage –

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material, conceptual and spiritual connections」專書，開始具體闡述水文化資產 (Water and Heritage) 並推廣。2016 年於荷蘭鹿特丹舉辦「新世代的水文化資產」研討會，將水文化資產與氣候變遷及聯合國永續發展目標 (SDGs) 開始連結，2019 年彙編出版了「Adaptive Strategies for Water Heritage」專書。

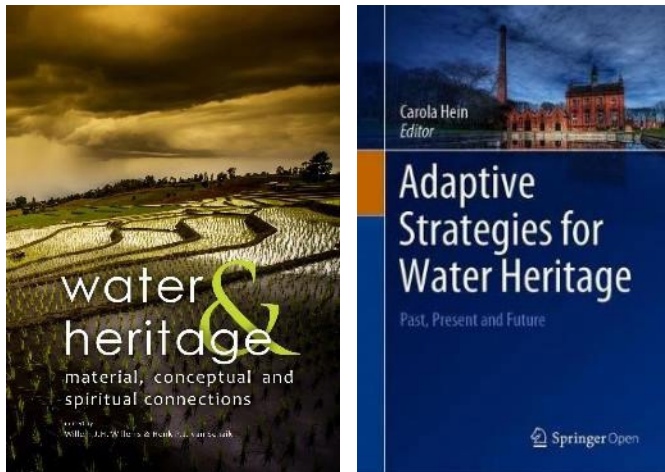


圖 2：2015 年及 2019 年國際水文化專書

國際灌溉排水協會 (ICID) 自 2012 年起開始進行世界遺產灌溉構造 (World Heritage Irrigation Structures, WHIS) 的評選作業，迄 2019 年已有位於 13 國的 80 處獲得認證。ICID 並參與了 2013 年阿姆斯特丹會議，與 ICOMOS 聯結，開始研究結合世界水理事會 (World Water Council, WWC)、UNESCO 與 FAO 等國際組織，共同討論世界水系統文化資產認證的可行性。

世界水文化資產系統認計畫推動

2015 年在韓國光州舉行第七屆世界水論壇 (World Water Forum 7, WWF 7)，其中在水文化議題中，由「Water and Heritage – material, conceptual and spiritual connections」專書編者 Henk van Schaik，介紹書中所彙編國際間重要的水系統遺產，提出若能將科技引入管理水文化資產，協助防洪抗災，將可以提升國家的抗災能力；並以荷蘭為例，指出可配合未來需求所調適的水利工程建設。Henk 強調與水有關的文化資產是荷蘭的文化和自然的 DNA，是發展解決方案不可或缺的。因此，在該次國際會議中，由 WWC、ICID、ICOMOS、UNESCO、FAO 共同宣布成立世界水文化資產系統 (World Water System Heritage, WSH) 國際認證計畫，並於 ICID 內設立秘書處，負責受理認證申請文件及處理相關行政事宜。而 WSH 認證的主要目標為：(1) 從這些資產系統中學習經驗，把新舊知識融合；(2) 將這些古老的智慧發揚光大，

從中萃取出新的概念，轉換成可以運用於當代時空脈絡下的知識。

第八屆世界水論壇籌備會議於 2016 年 7 月中旬正式通過 WSH 認證辦法，並完成相關作業組織及程序規劃，開放候選名單的提名申請作業，申請期限為當年 10 月 1 日，於 2017 年間辦理現地評鑑，並於 2018 年 3 月第八屆世界水論壇會議中頒授認證。首批 WSH 認證登錄之世界水文化資產系統，分別是日本源兵衛川灌溉運河系統、日本閩川水系土地改良區、及伊朗 Sheikh-Bahaei 水分配系統等三處。

臺灣水文化資產調查研究與保存的進行式

由於在現行《文化資產保存法》中並無「水文化資產」之法定類別與規範，因此不同於「古蹟」、「歷史建築」、「文化景觀」等法定文化資產類別，水文化資產在臺灣文化資產保存實務上算是一個新的範疇，是一個必須兼顧「水」及「文化資產」兩個不同領域價值的思維與協作。2007 年起文建會文化資產總管理處籌備處推動的「臺灣土木文化性資產評定準則研究計畫」，以及經濟部水利署配合推動的「經濟部水利署 2007 年度文化性資產清查計畫」、「經濟部水利署文化性資產口述歷史」等三個計畫來看，水利署初步完成了水利事業文獻清查，包括各機關、事業單位及水利會之文獻盤點、造冊，啟動了水利單位重視歷史性水利系統規劃作為現代水利建設參考的開端；臺灣土木文化性資產評定準則研究計



圖 3：臺灣水文化資產體系調查與價值評估計畫研究推廣成果

本期專題：水文化資產

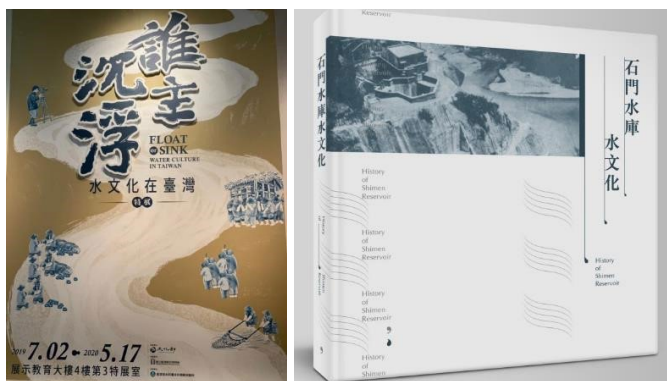


圖 4：臺灣水利部門水文化資產研究推廣成果

畫，則嘗試將灌溉、自來水等設施歸類為土木類文化資產，提出了土木設施文化價值評估和分級保存的基準。

因應國際推動水文化資產保存的趨勢，文化部文化資產局於 2015~2018 年期間陸續推動了「國家水文化資產價值融創先導計畫」、「臺灣水文化資產體系調查與價值評估計畫(一)」、「臺灣水文化資產體系調查與價值評估計畫(二)」，開始依據臺灣地理環境特殊性進行區域水文化系統的盤點，希望透過文獻與設施現況的清查結果，釐清臺灣水文化資產歷史脈絡，做為推動全國水文化資產保存與活用的基礎；水利部門方面，由經濟部水利署所屬的水利規劃試驗所及北區水資源局於 2015 年~2019 年也陸續推動了「參與世界水文化資產系統策略規劃」、「水資源發展導入文化思維之融合與價值建構」及「石門水庫水文化資產建置推展」等計畫，展開了水利專業與文化保存的跨域思考，讓水文化資產的價值探討，更加多元豐富。水利規劃試驗所並與國立臺灣歷史博物館共同攜手辦理「誰主浮沉—水文化在臺灣」特展，開展了水利部門與文化部門的跨域合作之窗；北區水資源局配合石門水庫的檔案整理與環境教育場域更新之際，彙整桃園臺地的水環境變遷與石門水庫的歷史發展脈絡，編印「石門水庫水文化」專書，將水文化融入環境教育的推廣體系。

臺灣因氣候變化急遽，加上島嶼地理環境的特殊性，近百年來所造就的水文化治理成果相當豐富，藉由文獻史料的整理與系統化建構，預期將來可以成為全球環境變化因應策略的參考視窗之一。

國際水文化的潮流與階段性進程

2017 年 12 月在印度新德里舉行的 ICOMOS 第 19 屆會員大會，同步舉行「未來世代的水與文化資產工作坊」，該次會中熱烈提出 ICOMOS 設置有關水文化資產國際科學委員會的議題，會間臺灣代表施國隆局長大力呼應並希望能在臺灣舉辦首屆的國際會議。在該次



圖 5：2019 年水文化國際研討會大會主視覺



圖 6：2019 年水文化國際研討會大會合影

ICOMOS 與會各國代表一致支持之下，臺灣獲得舉辦 2019 年水文化國際研討會的機會。該國際研討會經過多次籌備會議的研商，最後定名為「2019 International Conference 'Water as Heritage' (2019 年水文化國際研討會)」，期望從水務 (Water for Services)、水景 (Waterscapes)、水道 (Waterways)、水力 (Water for Power; Power of Water) 及水觀 (Worldviews on Water) 等五大主題面向，能有效促使文化資產領域及自然領域之相關國際組織，共同討論「水與文化」議題，發展跨領域、跨部門的網絡工作，為日後水文化推動創造前瞻願景。該會議於 2019 年 5 月在臺灣嘉義市舉行三日國際研討會及兩日水文化亮點案例參訪活動，共有 33 個國際組織 (含數個 UNESCO 下屬認定組織) 代表、以及來自 30 個國家的專家學者參與。此次國際研討會的主要成果，包括臺灣宣言 (Taiwan Statement)、籌備會議紀錄、核心工作小組名單等，都將提供作為 ICOMOS 'Water and Heritage' 國際科學委員會籌備要件，也宣告國際水文化保存、守護行動的正式起跑。

水與城市－荷蘭烏特勒支舊城更新與水文化資產保存

—— 荷蘭代爾夫特科技大學建築學院都市學博士候選人 于欣可

烏特勒支 (Utrecht) - 日德蘭古運河之城

萊茵河流域下游，是一片平均海拔低於海平面的地勢平坦地區，曾經是一望無際的沼澤地。最早來到這裡的人類，經過數百年的築壩，修水道，慢慢形成淤田、乾地。不斷改道的萊茵河，一分為多：Kromme Rijn（彎的萊茵河）、Oude Rijn（老萊茵河），和人類開鑿的運河，在這裡形成了密佈的水道系統。

其中，烏特勒支是此地區歷史最悠久的城市。城市始於羅馬人對抗北方民族的城寨。西元 696 年，烏城成為該地區天主教區主教的所在地。圖一的水道地圖，清楚地記錄了當時烏城與周邊較小城市的水道系統，直到今日，這個系統還大致沒有改變，並且持續使用，是活的文化地景。圖一地圖展示的即是烏城（左下角紅色）及週邊地區淤田系統、水道與鄰近貿易城鎮的。

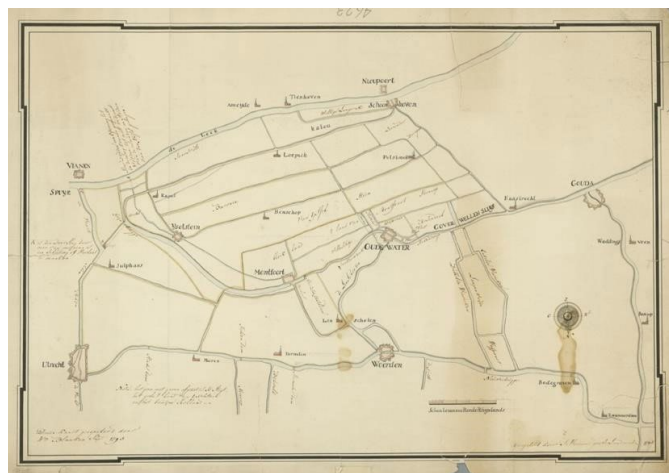


圖 1：Kaart van de Lopikerwaard met omliggende landen（圖片來源：荷蘭國家檔案中心）

市中心老運河的文化景觀

中世紀的烏城，引水自城南的 Kromme Rijn（彎萊茵）與 Vaartse Rijn（一條連接萊茵河的人工運河），建成環繞內城一周的護城河，並在城市中心開鑿人工運河，這條現被稱為 Oudegracht（荷文：舊運河）的運河穿過內城（Binnenstad）中心，成為烏特勒支內城中最特殊的景觀（見圖二）。

1122 年，由於南邊水壩的建成，附近萊茵河的水位下降，因此當城市水閘門系統在 1275 年完工時，水位即下降到目前的水位，幾乎不再改變。因此，與其他地區不同，烏城舊運河沿岸，碼頭、酒窖、倉庫及運河

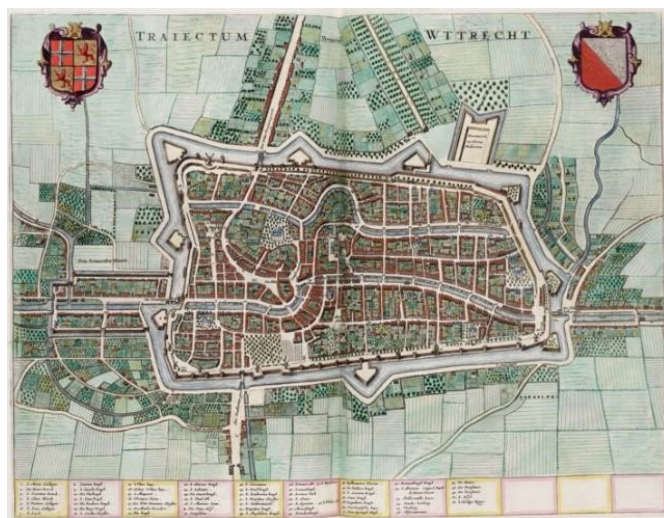


圖 2：1652 年 Willem Blaeu 繪製的烏特勒支城市地圖（圖片來源：烏特勒支大學圖書館）

唯位於地下一層的另一平面上（荷蘭語：werven）。700 多年後的今日，水位依然沒變，只不過碼頭倉儲空間許多已被改建成餐廳和咖啡館。內城的景觀、由沿河住宅、地下倉庫、運河、治水管理系統，交織而成，形成一完整的水文化資產（內核），缺一不可。把範圍拉大，城外的萊茵河景觀、淤田系統與水壩，亦同時構成了文化地景（外核），內核與外核，相互輝映，訴說著千年的人與自然的建城歷史。

文化資產與都市更新：交通節點、沿街商業中心、住房的都市再生計畫

1976 年，內城（Binnestad）被指定為歷史保護區，市政府接著進行一連串的保存指導原則。其中最重要的概念，是「生活式保存」，避免因為長期生活累積而生的都市文化資產被「博物館化」、或「標本式的保存」。在確立了城市結構型態（Urban Morphology）與運河地景為不能妥協的條件後，透過其他空間元素可以增加城市活力，吸引力的設施與新的商業改造開始進行。市府初步的想法，在經過了一連串的居民參與方案產出後，2002 年 5 月，經過市民公投的合法權賦予，市政府頒布了一個大膽的車站周邊再生主要計畫（Master Plan）。計畫勾勒出幾個大方向：新都市功能與內城的連結、增加交通（步行）可及性及公共空間品質增進。再生計畫的操作，依靠十數年間不斷的共識凝聚與方案彙整。來自鐵路公司、居民、企業代表、商業經營者以及其他利害關係者的參與。為何這樣的操作方法至關重

本期專題：水文化資產

要？除了參與者本身的利害關係以外，更重要的是他們在當地工作、生活已經累積了非常久的時間，人與社區本身就是文化景觀得以延續的一部分。這個再生計畫的生成不是由上而下，也不是由下而上，而是循環式的，是由市政府建立協商溝通平臺，不斷的循環決策。

由 Master Plan 的概念進一步延伸出三個具體的行動方案：

（一）Safe and livable（安全好行的社區）

內城成為城市之心。車站地區的再生，預計成為城市之肺（交換新鮮空氣，促進新陳代謝，意指吸引更多來此工作、生活及休閒）內城作為城市之心，首要目標是吸引更多喜歡內城生活方式與居住品質的居民，因此，居住品質如：鄰里開放空間品質、步行空間（TOD 概念）被首要確立，這是很少數一開始就強調居住品質重要性的歷史保護策略，即便是在以社會住宅與高品質住宅區聞名的荷蘭都是少數。另外，改建前的大型功能分離型車站與內城間的步行空間充滿了各種不安全的角落，時常有吸毒與犯罪行為發生。缺乏空間指引性與自明性的空間也不容易使用，因此，為了更落實 TOD 概念，與「縫合」車站與內城區，新的廣場與公共建築物被要求，必須嚴格控制動線、留設廊道，引導步行者，所有的設計圖必需要從地面層的廊道開始發展，再作立體化的動線串接。這一工作完成了，才是接下來的建築 Program 跟設計。



圖3：都市成長發展軸線（圖片來源：Masterplan Stationsgebied Utrecht Samenvatting）

（二）Centre enlarged（引新保老，老新都重要）

城市在擴張，密度在提高，因此，需要引導發展到鐵路的西邊。因為新的開發如果能被引導到西邊，東邊的老城區的文化資產才會得以保障。

（三）開發 4 種強度分區的管制策略

1. Small：內城區，被嚴格控制在 3 層樓，且不超过 25 M 高度，主要用作住宅與步行商業空間。
2. Medium：內城區與車站特定區之廊道空間與帶狀新開發住商混合區，25m-45m 高度。

3. Large：車站特定區高樓層，45m-80m，大型場站周邊辦公樓。集中在新西區。

4. Extra Large：車站特定區核心，45m-80m，車站、大型複合式商場，高層商辦。

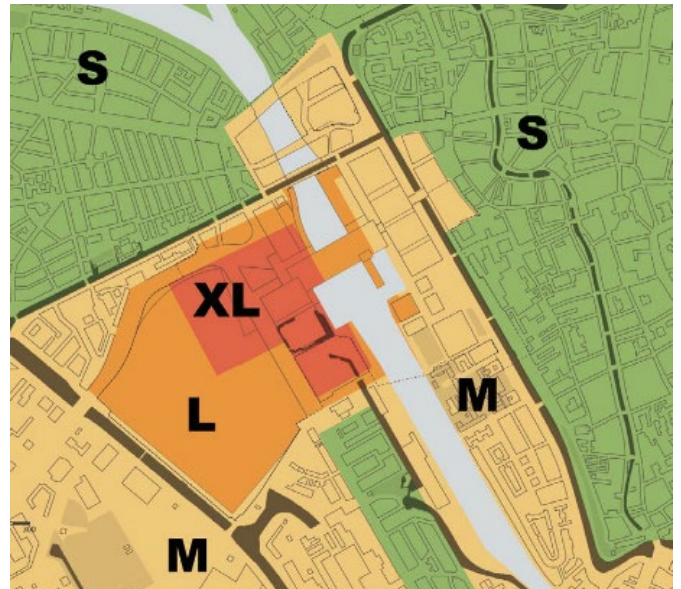


圖4：發展強度控制（圖片來源：Masterplan Stationsgebied Utrecht Samenvatting）

以此策略，限制老城區發展，引導發展能量至西區與車站特定區，符合 TOD 發展概念。並透過廊道串起老內城、車站特定區及新發展的西區。

（一）鐵港再造（Railport of the Netherlands）

2006 年開始的烏特勒支車站改建計畫，是荷蘭最大型的車站再開發計畫，也是歐陸最成功的 TOD 開發模式之一。烏城本身作為荷蘭西部環型城市 Randstad 的東邊大城，是荷蘭鐵路中心，也是南北鐵路大動脈要衝，每日停靠列車班次超過 1000 次。因此，車站人潮產生的人行動線是城市發展的動力，空港的概念被引入，動線成為串起車站、車站特定區與周邊的發展軸線。首要目標是以 70 年代後的混合使用模式為基礎，以車站作為節點，並用步行空間串起老城區沿途經過舊的商店街、新的 shopping mall 以及辦公大樓。鐵路沿線兩側，做立體化的公車與輕軌場站，人走上層，車走下層，是最大的原則，人步行的上層，形成一個步行者的大平臺，商業空間、餐廳、賣店，沿著動線排列，再透過建築物的大階梯與刻意創造的大開口，接上老城區廣場上的人行動線。自行車道沿著老城護城河走，車站並提供一個 12,500 輛的免費自行車停車場，減少私家車的使用。

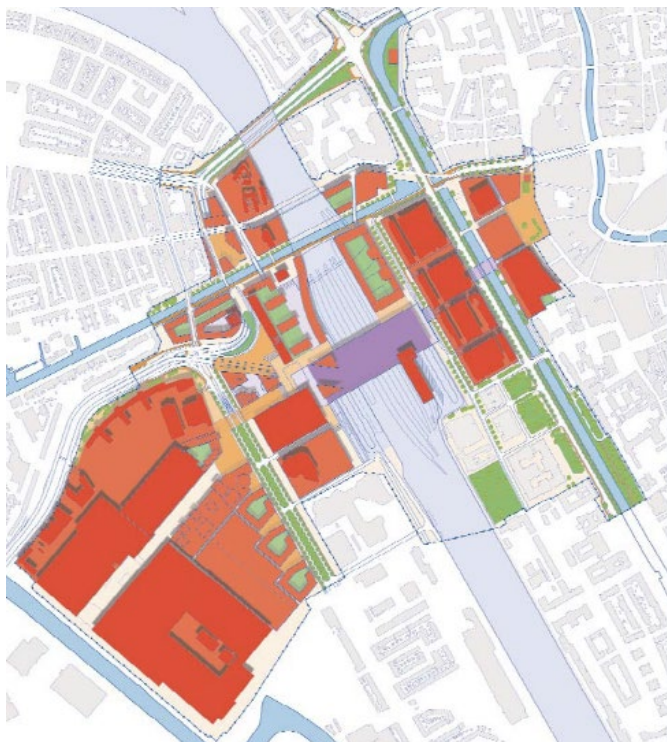


圖 5：車站特定專用區及周邊新開發住商、辦公混合使用區範圍（圖片來源：Masterplan Stationsgebied Utrecht Samenvatting）

（二）水道縫合術

20 世紀中期以降，私人運具流行起來，市中心的土地需要更多的空間留給小汽車，因此，老城區西側的護城河就抽乾水做道路使用，作為南北穿越的快速車道使用。在將近 50 年的時間裡，南北向的穿越性車流，取代了水流，只是，穿越性的車流，不僅造成了步行路廊的不連續，道路兩側的發展也不均，老城區的發展面臨極限，而車站西側的區域則始終缺乏活力。因此，當自行車、步行旅次慢慢取代小汽車時，重新思考穿越型道路系統的機會就來了。這個時候，都市縫合的概念出現，原有車道復舊為老城西側的舊護城河意象，成為了行動方案，水道作為重要的都市文化景觀，把水道原址重新把水流引入，配合周邊都市設計手法，串連步行與自行車廊道。

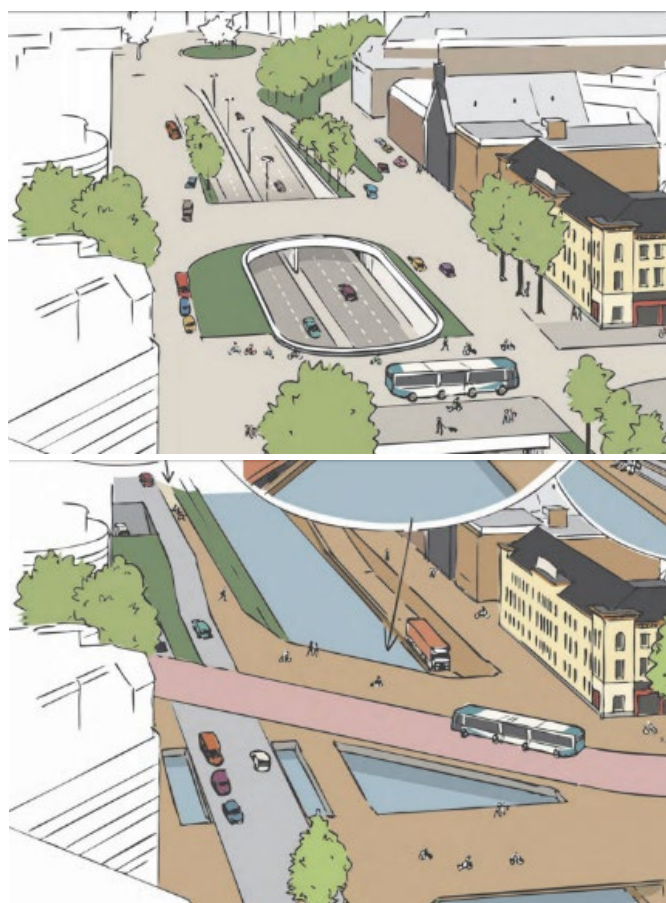


圖 6：上——更新前車流，下——更新後水道復興（圖片來源：www.cu2030.nl）



圖 7：舊城保存與新都市發展鑲嵌（圖片來源：于欣可）

小結

烏城的內城水環境保存，是新型態的『都市再生、都市更新型的保存策略』。跟過去不同的是，策略重新思考文化資產之於城市的意義，從市民（使用者）的每日生活角度出發，發想有未來感的都市願景，提出創新的治理策略（軟體同樣重要），並貫徹執行，市民是計畫的夥伴，不是只是被動的參與者。

更重要的精神是：不該只關注在『物件』本身，大的涵構跟框架（都市與社會）需要密切互動及對話治理（governance）能力的展現。因為文化資產不應該被特殊化，或是抽離出我們的日常生活¹。

更直接一點說，如果文化資產保存工作還停留在單棟建築物，單個地景的保護，或是只從「文化價值」層面來思考，而沒有從市民，從使用者日常生活，從城市新發展的角度來做「文化價值與都市生活價值的加值」的策略，那失敗或遭致批評的可能性會非常大。



圖8：打開的護城河穿過新車站既購物中心建築量體。左側建築為Herman Hertzberger設計的Tivolivrendenburger公共表演藝術廳，右側為70年代高層辦公樓，透過地上二層之步行大平臺串連（圖片來源：于欣可）

¹ 溝通變得非常重要，烏特勒支市政府在許多方面是有彈性的，大原則確立之後，這些新的管理規定，更仰賴與居民跟其他利害關係人的協調，而非由上而下的管制。

世界水文化資產系統案例介紹—日本關川水系土地改良區

—— 財團法人臺灣水利環境科技研究發展教育基金會研究工程師 吳兆宗

世界水文化資產系統 (WSH) 認證

2010 年代起，國際水文化研究開始重視「Heritage」，亦即「遺產」的保存、或「資產」應用面向課題。其中由國際灌溉排水協會 (ICID) 與國際文化紀念物與歷史場所委員會 (ICOMOS) 等共同提出的世界水文化資產系統 (WSH) 認證，乃是延續世界遺產保存制度的精神，透過水文化資產重點個案進行制度化的研究、保存與再利用工作，以發掘潛藏的先民水文化智慧，提升世人對於水文化的認識，並提供當代面臨氣候變遷之下水環境變遷的因應之道。世界水文化資產系統認證制度於 2015 年第七屆世界水論壇正式啟動，2018 年 3 月公布第一批三處 WSH 認證登錄之世界水文化資產系統，分別是日本源兵衛川灌溉運河系統 (The Genbégawa Irrigation Canal, Japan)、日本關川水系土地改良區 (Sekikawa Suikei Land Improvement District, Japan)、伊朗 Sheikh-Bahaei 水分配系統等 (Sheikh-Bahaei Water Allocation Scroll 1571-1629)。本文將簡要介紹關川水系土地改良區的案例與登錄原因。

WSH 登錄案例：關川水系土地改良區—客水地區賦課金減免制度

(一) 關川水系土地改良區

關川水系土地改良區 (Sekikawa Suikei Land Improvement District)，是一片大約 5,800 公頃的農業水田地帶，位於日本新潟縣西南部的高田平原，關川由南向北橫貫這個區域，自古以來就是穀倉地帶。本區有兩條主要的灌溉水路：上江用水路和中江用水路。上江用水路全長 26 公里，主要是由在地農民，以及大地主、仕紳等有力人士共同出資合作構建，1537 年開始建造，前後經過 130 年的時間，最終於 1781 年完工。中江用水路全長 26 公里，是由江戶時代 (1603-1868 年) 的高田藩 (江戶時代的封建藩國) 出資籌建，屬於藩營事業，始建於 1673 年，1678 年完工。昭和時期 (1926-1989 年)，上江用水路與中江用水路先後成為縣營事業與國營事業，並由國家投入經費改修，持續支撐著新潟縣作為日本重要糧食供應基地。



圖 1：日本關川水系土地改良區位置圖

(二) 客水地區賦課金減免制度

上江用水路和中江用水路，從江戶時代開始即透過被稱為「客水地區賦課金減免制度」的運作機制，來維繫整體水路的維持管理，至今已持續 340 年以上。「客水地區賦課金減免制度」，指的是下游農民負擔上游農民的水利費，亦即灌溉水路的維持管理費，上游減免水利費的區域稱為「客水地區」。這套運作機制出現，目的是要保障灌溉水路經過區域的水資源供給。

灌溉渠道的構築，必須佔去部分可用的土地；渠道的寬度越寬，所佔去的土地也越多。水從灌溉渠道的上游流至下游的過程，必然有所耗損，下游若要獲得充足的灌溉用水，則必須確保上游能有充足的水源流往下

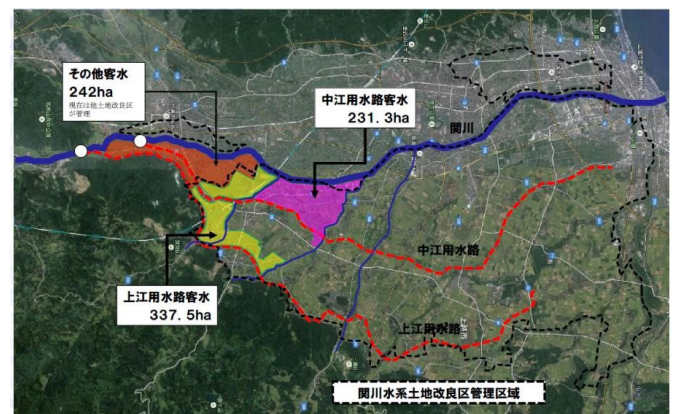


圖 2：關川水系土地改良區的「客水地區」(地圖左方為北方)

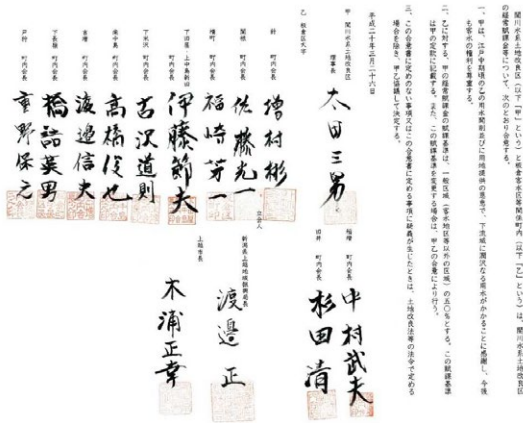


圖 3：(上)2008 年關川水系土地改良區管理單位與客水地區所在各町代表簽訂新規約；(下)雙方簽訂新規約之合意書

游。這樣的話，灌溉渠道的上游水路必須有足夠的寬度，才能容納足夠的水；但渠道寬度越大，佔用的土地（農地）面積也隨之增加，使得上游農民的可耕作的土地相對減少，造成利益損失。因此，為了減少上游地區農民的利益損失，從 1675 年開始上江用水路和中江用水路兩套灌溉系統，即透過「客水地區賦課金減免制度」來維持運作，灌溉水路通過的上游地區共約 500~600 公頃的農田區域，無須負擔維持管理費，也能使用灌溉水路的水資源。這樣就能平衡了上游農民因灌溉渠道通過而導致可耕農地減少所帶來的利益損失，下游地區也能獲取充足的灌溉水資源。

「客水地區賦課金減免制度」，即使在 1949 年日本土地改良法制定之後，這套水利費減免制度仍因江戶時代契約優先原則一直延續下來。不過，隨著時代的變遷，「客水地區」水利費減免制度的時空背景已不同於 300 年前，下游的農民屢有提出調整這套制度、訂立合

乎當代之新規約的呼聲。2006 年隨著關川地區灌溉管理制度的調整，上江用水路和中江用水路被整併入「關川水系土地改良區」，遂在尊重「客水地區」權益的精神之下進行制度調整，2008 年土地改良區管理單位與客水地區所在的各町代表簽訂新的規約，規定用水路上游地區的農家也必須負擔 50% 水利費用。



圖 4：關川水系土地改良區登錄 WSH 之證明書

（三）入選 WSH 理由

根據 WSH 頒予的「世界水遺產登錄証」，關川水系土地改良區由於「上游與下游社群之間持續的協力之下，在有關灌溉費用與水資源利用方面，透過 340 年間各個世代成員的參與，對於地域社會提供了貢獻」的理由受到肯定，而登錄為 WSH。

案例參考之水文化資產價值

關川水系土地改良區的「客水地區賦課金減免制度」，目的在使灌溉水路上、下游地區，都在彼此利益受到尊重的情況之下，共同分享寶貴的水資源。這套制度的形成並非歷史的偶然，而是水資源利用的不同利益關係群體彼此在利益衝突之下，經過長期協力研商所得、彼此都能接受的結果。這種透過協商而達成的水資源「分享」的互利精神，是為這套制度能維繫 340 年的關鍵，誠為水文化資產彌足珍貴的價值。

台灣電力公司永續保存水力發電文化資產的努力

—— 台灣電力公司

前言

臺灣電力事業發展推動國內經濟與工業發展進程，其變動與演進所顯現的不僅是臺灣電力公司（以下簡稱台電）之發展歷程，更體現臺灣百年來工業化、現代化之進程。

臺灣地區從 1905 年第一座位處新北市新店的川流式水力發電廠（舊龜山發電所）完工開始供電後，水力點亮了臺北城的夜晚，也宣告臺灣步入現代化軌道。在日治時期水力一直是臺灣電力的主要來源，也是臺灣唯一能夠自產的電力來源，曾是臺灣最引以為傲的成就；直到 1960 年以前，臺灣電力供應主要都是仰賴水力發電。1910 年代後因電力需求大增，為了解臺灣水資源潛能，臺灣總督府普查全臺灣各水系發電潛能，1919 年繪製出全臺灣水力發電地點略圖，標示出全島有潛力的水力發電所藍圖。從 2018 年完成的全臺灣水力發電網絡，可以發現臺灣的水力發電脈絡和 1919 年水力發電地點略圖是非常相當有關聯性。

伴隨電力建設推動，台電各項有形、無形之產業文化資產，實為見證臺灣歷史發展最真實且不可或缺之明證，可提供當代或後代人士作為參考。台電傳承臺灣百年電業，更應承擔所肩負之歷史保存使命。2016 年 12 月依據朱文成前董事長指示，依照政府公布施行新修訂之「文化資產保存法」，啟動「重要文物資產保存運維專案」規劃。台電基於歷史傳承責任與永續經營理念，推動文化資產保存業務，積極辦理相關清查、整理造冊與建檔管理等相關作業，透過詮釋與展示，重新賦予文物、圖資價值，並期望能達成以下目標：

- 一、保存：記錄台電珍貴文化資產，發掘臺灣電業發展共同記憶，以凝聚員工情感與共識。
- 二、研究：記錄電業與臺灣經濟共同成長歷程，呈現台電文化與榮耀，成為台電文史資訊中心。
- 三、社會溝通：期許作為企業永續發展、與民貼近之資訊傳播媒介中心，以繁榮地區發展，與社會溝通。

台電文化資產保存工作執行現況

台電保存大量超過 50 年水力發電廠廠房及水輪發電機，部分原廠已不存在或停止生產，維修零件、設備已無法獲得，但在台電同仁努力下，維修技術一代一代傳承且研發新工法及技術，兢兢業業的運轉控制，仍維持老舊水輪發電機正常運轉，確保供電無虞，可說是循環經濟的先驅，如 1934 年開始運轉大觀發電廠（原日月潭第一發電所），目前仍維持良好運轉狀態；同時保存大量日治時期留下之圖面、運轉記錄、技術文件及照片等。台電在 20 世紀後期已有保存水力產業文化資產觀念，1987 年粗坑發電廠更新時將 1909 年興建廠房完整保留，僅更新水輪發電機並同時保存既有水輪發電機；陸續有廠房建築被公告為古蹟及歷史建築。台電有一群熱心員工奉獻自己心力投入保存、整理電廠文史資料工作，讓後輩了解電廠光榮傳統及傳承，凝聚同仁向心力。

台電所轄水力發電建物類文化資產包括：國定古蹟（1 處）、縣定古蹟（1 處）、歷史建築（11 處）。台電於 2016 年 12 月開始辦理「重要文物資產保存運維專案」，組成文物徵集工作小組，研議文物徵集、保存相關事宜；規劃過程亦借鏡、觀摩外界經驗，請益產業文化資產保存經驗與實務。有關執行文化資產保存工作規劃如下：

一、組織架構與人力

自 2016 年啟動「重要文物資產保存運維專案」後，將文化資產保存範圍應分為文件類、非文件類（含機具設備、建築），分設公司級推動小組及單位級工作小組，諮詢專家學者提供文物清查、保存相關建議。初期以文史資料之徵集著手，成立專責文化資產保存工作單位。

- （一）公司級推動小組：由李鴻洲副總經理擔任召集人，秘書處擔任統籌單位，並依任務性質「典藏研究」、「展示教育」，分別由秘書處、公眾服務處主辦，說明如下：

本期專題：水文化資產

1. 典藏研究：負責文物徵集、典藏與研究，依台電業務體系分為總管理處、輸供電、配售電、水火力發電、核能發電及工程單位等六大系統/事業部，各系統/事業部依其主題不同，各有其負責單位，並以秘書處為主辦單位。
2. 展示教育：負責展館與展覽規劃，以公眾服務處為主辦單位。

(二) 文化資產保存專案諮詢顧問：延聘博物館學會張譽騰理事長、國立臺灣師範大學地理學系洪致文教授與宜蘭縣史館廖英杰館長擔任顧問，參與文化資產保存相關規劃、提供諮詢與建議。

(三) 單位級工作小組：由各單位副處長級以上主管擔任召集人，定期召開單位內文物清查與徵集工作小組會議，彙整單位清查成果。各水力電廠配合文史資料清查、保存及展示。

(四) 專責組織與人力：

1. 秘書處 檔案組文獻史料課：協助文件、非文件類文化資產清查與徵集作業，並負責文件類文化資產保存，惟具歷史價值之機組、器具等大型物件採現地保存機制。
2. 財務處房地管理組產籍課：負責古蹟與歷史建築統籌管理。

二、文物資產保存相關章則要點：

- (一) 為妥善典藏本公司文物資產，健全文物資產保存、維護及管理制度，於 2019 年 8 月 30 日發布臺灣電力股份有限公司文物資產保存推動要點。
- (二) 為配合文物資產管理保存現況，刻正編撰文物資產保存作業手冊，內容含括總論、清查、徵集、保存價值鑑定、保存及典藏、典藏庫房設置、推廣與應用、展覽等 8 章，俾使文資保存朝向資訊化、專業化及標準化目標邁進。
- (三) 針對古蹟、歷史建築等建物類文化資產，於《房地產管理手冊》訂定專節規範。

三、推動規劃事項

台電「重要文物資產保存運維專案」確立以「先庫後館」、「先典藏研究，後展示教育」之工作方針，短期規劃以「主題特展」方式啟動文物清查作業，藉由特定主題文物之徵集、典藏，以推動研究、展覽進行。

(一) 2018 年四大主題文化資產保存工作說明

1. 文物清查作業：為宣示台電文資保存從漸進至全面展開之涵意，優先針對「竹仔門電廠」、「舊東西線輸電線路」、「濁水溪流域水力發電系

統」、「大甲溪流域水力發電系統」等四大主題，由營建處、供電處與發電處（各相關水力電廠）協助秘書處辦理相關文物清查與徵集作業。

2. 各展覽期程：

- (1) 2018 年 9 月 28 日至 10 月 21 日於松山文創園區舉辦「電力大地—臺灣電力文化資產保存特展」。



圖 1：2018 年電力大地展場



圖 2：2018 年電力大地海報

本期專題：水文化資產

(2) 2018 年 10 月 18 日辦理大甲溪發電廠「白冷大甲溪電力文物館」啟用活動及「母河蘊生，一抹綠水百年電文物特展」開幕。

(3) 2018 年 10 月 27 日高屏發電廠（國定古蹟竹仔門發電廠）辦理「110 周年暨『竹門情水圳行』活動及特展。

(二) 2019 年文化資產保存工作

1. 續就「新店河流域水力發電系統」及「東部水力發電系統」、作為清查主題，由發電處協助秘書處辦理相關文物清查與徵集作業。

2. 各主題展覽期程及地點：

(1) 2019 年 9 月 6 日至 9 月 29 日於臺中文化資產園區辦理「川流電湧 2019 臺灣電力文資特展」，並分別移展至日月潭向山日昇月恆藝廊（2019 年 10 月 4 日至 2020 年 1 月 5 日）、國立臺灣歷史博物館（2019 年 10 月 8 日至 2020 年 1 月 5 日）。

(2) 2019 年 9 月 11 日東部發電廠舉辦「木瓜溪文物生態故事館」開幕及特展。

(三) 執行成果包含展覽、影片與圖書：

1. 展覽：透過主題文史資料清查、徵集作業，推動相關歷史脈絡整理並研究、進行口述歷史訪談，進而形成「展覽」之故事線，此成果將於各展場進行實體展示。

2. 影片拍攝、圖書出版：將研究成果之圖文內容、所拍攝之口述歷史訪談、文物清查工作過程，

轉換為圖書或影片，累積清查成果與效益。

3. 數位典藏、數位博物館：主題策展展品透過拍照、掃描等數位化作業進行數位典藏。並將策展所得之數位美工檔、數位典藏成果，轉換成數位博物館進行線上虛擬展示，以供民眾欣賞，亦可結合公司政策，達到教育溝通之目標。

4. 電廠保存展示：大甲溪發電廠、高屏發電廠、大觀發電廠、東部發電廠分別成立地區性展示室，保存大型機組、器具及電廠發展重要文史資料。

(四) 文史資料典藏庫房規劃

1. 短期規劃：公館庫房 1、2 樓空間（共約 100 坪）做為文物典藏中心，經鑑定符合本公司典藏政策之文物皆入藏公館庫房，其溫濕度、監控與保全系統等皆符合文物典藏環境需求。

2. 長期規劃（2021 年後）：以萬隆變電所 4 樓及遠信大樓做為台電文史資料典藏、整理、研究場所，具有溫濕度控制、防火防災設施、樓地板載重等規劃設計。

(五) 由淺至深規劃教育訓練課程：

1. 推廣說明會佈達文資保存觀念：為使公司同仁瞭解文化資產保存之重要性、建構產業文化資產保存維護觀念，於 2017 年 6 月先後於北、中、南部辦理台電重要文物資產保存工作說明會共 4 場，以宣示文化資產保存之決心。



圖 3：2019 年電力大地展場



圖 4：2019 年川流電湧海報

2. 工作坊：7月3日、4日辦理「重要文物資產保存工作坊」教育訓練，與全國文物普查輔導中心合作，邀請逢甲大學、臺南藝術大學文物普查團隊講授文物清查工作基礎概念與建檔實務。
3. 研討班：為使產業文化資產保存工作於公司內永續發展，自2017年起每年辦理兩梯次「產業文化資產研討班」。

未來努力方向

一、逐步建構台電文史拼圖

台電自2016年以四大主題文史資料清查、徵集與展示，啟動台電文化資產保存工作，嗣後將陸續分系統逐步從水、火力發電、核能發電、再生能源、供電系統、營建工程等進行主題性、系列性文化資產清查作業，以完整呈現台電文史拼圖，展現台電文史軟實力。

爰此，台電訂於2020年度之文史資料清查主題為「核能電廠的營運與除役」、「離島火力發電」、「配售電系統」，由秘書處協助核發處、核能後端營運處、配電處、業務處與發電處，成立清查工作小組、規劃文物清查相關作業進程。

二、建置文資保存特展虛擬實境應用系統與民眾溝通

建置文資保存線上資料庫（數位典藏系統），不僅有助於清查、登錄、建檔與後續管理維護作業，亦可於累積一定清查成果後，與數位博物館整合上線，提供民眾檢索台電相關文物和史料、瀏覽數位典藏物件，使民眾能自由、廣泛研究台電相關文獻史料與文物，有助於提升台電整體形象、使民眾更親近台電。

三、連結專家學者網絡

持續透過論壇、研討會、教育訓練規劃等與專家學者連結，使專業社群瞭解台電文資保存工作，亦引進文資專業觀點與清查現場實務結合，為台電文資保存工作注入活力與新意。

四、電業文資在地深耕

將各電力場域文資與地方發展之歷史脈絡結合、發揮價值，邀請在地文史工作者與民眾共同參與。

五、確立未來台電文資保存最適組織及發展

文化資產保存範疇廣泛，包括清查、典藏研究、保存修護、展示教育等具高度專業性，因此委託具文化資產保存相關背景之專業團隊中原大學，協助本公司確立業務定位與組織體系、展示館所配當性及數位典藏之發展性，進行全面檢討與調整辦理相關事宜。

結語

台電期望以此「重要文物資產保存運維專案」規劃之各主題清查作業為發軔，使公司內部與社會大眾瞭解電力產業文史資料保存之重要性，透過系統化整飭、保存臺灣電力事業百年來所累積之文獻史料，並逐步擴展至機具設備等文化資產保存維護，逐步拼起屬於台電之文史拼圖，不僅為臺灣社會留存過往發展之集體記憶與認同，更使產業文化資產保存工作於公司內永續發展。

首次臺灣水力發電廠複雜製圖研究的案例－扇平水力發電室的歷史意義

—— 柬埔寨金邊美國大學 (American University of Phnom Penh)
副教授 Stefan Tkac

臺灣水力發電已有 114 年的歷史，最早可追溯至臺灣北部於 1905 年建成的龜山發電所，該電廠開始送電後，臺北市才得以大量使用電燈。在 1962 年之前，水力發電是臺灣主要的電力來源，之後沉寂許久，最近十年臺灣又重新重視水力發電的重要性。目前臺灣有 12 座水力發電廠、49 組發電機組運轉中、2 座機組處於試運轉階段、4 座機組檢修與籌劃中。有趣的是，即使所有運轉中的水力發電廠都不斷翻修、更現代化，仍有 16 座電廠被視為具有歷史價值。而我評估研究後發現，另外有 22 座具歷史價值的水力發電廠，目前是損壞或退役狀態。這些電廠遺址有引人入勝的歷史、文化，最重要的是，還有獨特的科技解決方案，等待我們重新發現。

2012 年我開始研究最早的臺灣水力發電廠的複雜製圖，部分動機便來自於這些發電廠遺址的在地化。我的團隊從 2016 年開始實際挖掘探勘，目前已標示出十座遺址，而我們正在其中的關山（1927）、知本（約 1956）、扇平（1956）三座發電廠遺址進行挖掘工作，本文內容討論的是扇平遺址。



圖 1：扇平水力發電室受颱風侵襲受損前的原貌

扇平水力發電室為獨立水力發電廠，由臺灣電力公司高屏六龜發電廠（舊稱土壠灣發電廠）奉命規劃設計，發電室約於 1951 至 1954 年間規劃設計、1956 年二月落成。機組發電量一開始為三千瓦，後提升至五千瓦。原先提供用電給偏遠林場運輸木材，而後用於附近提煉奎寧的金雞納樹林場，現今扇平地區則成立自然生態科學園區。



圖 2：位於扇平的挖掘工作發現了一座五千瓦的三項電發電機（3 phase 5kW generator），底下有木製防震墊與水泥底座



圖 3：在扇平發電室發現了開槽式（open flume）法蘭西斯式水輪機的橫軸，並將之清理乾淨

扇平水力發電室的挖掘探勘點位於高雄市茂林區的扇平森林生態科學園，在扇平溪的上游溪床散落各式水力一處建設的痕跡，種類包括舊分流堰（diversion weir）、湧水隧道（inflow tunnel）、部分引水路（headrace）如供水運河（water supply canal）、攔污柵（trash rack）、前池（forebay tank）、輸水

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道 (aqueduct) 遺跡、集水井 (water accumulation shaft) 等。

對於土木、機械工程領域而言，扇平水力發電廠以及其他臺灣早期建造的水力發電機組都是重要的科技遺產，它們的珍貴之處也反應在臺灣現代的水力發電規劃上，此外，這些發電廠遺跡更象徵前人為偏鄉供電的貢獻。發電廠受颱風、地震、土石流等天災侵襲的痕跡都完整保存在遺跡中，儼然是現代水力工程重要的經驗汲取來源。扇平水力發電室是臺灣早期更進一步發展電力的重要建設，因此它構造的獨特性、水輪機應用等方方面面都值得研究。



圖 4：扇平水力發電室挖掘現場：探勘開始前狀態



圖 5：扇平水力發電室挖掘現場：水輪機探勘階段最後一天的狀況

可惜臺灣大部分早期的水力發電廠皆因天災毀損，扇平也免不了相同的命運。2009 年 8 月 8 日莫拉克颱風來襲，暴雨造成扇平溪床位移，超出原本溪流範圍而引發土石流。扇平水力發電室的前側與左右兩側因此受到衝擊，形成的扭力扯斷集水塔 (water accumulation tower) 唯一的基樁，集水塔因此倒塌，被沖往他處。

扇平水力發電遺址初步的現場地圖繪製於 2017 年 3 月 28 日完成，剩餘的建築量測也於 2018 年 6 月 6 號大



圖 6：扇平水力發電室挖掘現場：探勘開始前狀態

功告成，這些測量圖讓我們可以描繪出水工建築原本的樣貌，不過仍有一個為解決的問題：發電機找到了，水輪機在哪？根據我繪製的測量圖，以及六龜研究中心提供的歷史文件與影像記錄，推斷出：扇平水力發電室設置的水輪機是很特別的德國製的開槽式法蘭西斯式水輪機 (German open flume Francis type)，這款在臺灣非常少見，只有在扇平才找到這款有橫軸的法蘭西斯式水輪機。在歐洲，這種水輪機約是 1930 到 1960 年代流行，功能是替代使用集水井儲水的舊式水車，還有在水源處較低的情形下提高水壓，扇平的水力發電即是此一情況，所以我推論，水輪機應該還在集水井 (shaft) 中。

2019 年 4 月 1 號到 3 號，我們清理集水井時，在井底找到保存相對良好的小型法蘭西斯式水輪機。後來我評估剩下的部分機體應在集水井另一邊、靠山的那一側。2019 年 11 月 10 號，我們成功挖掘出剩下的機體，有導葉調節器 (guide vane regulator)、軸 (shaft)、飛輪 (flywheel) 以及尾水渠 (tailrace)，而尾水渠的結構又揭發了另一項秘密。本來團隊內部對於水如何流出發電機有不同意見，因為這種水輪機通常有一條尾水管 (draft tube) 直接安裝在集水井，或是安裝在輪機室外，但是在扇平這個特別的案例中，水輪機與輪機室的集水井出水口之間有一個特別的孔洞，我與同事討論後認為這是我們從沒見過的特殊技術工法，我們便將此發現與遺跡作完整的記錄。目前針對扇平水力發電室，林業試驗所與台電公司有兩個提議，用建立博物館的方式保存扇平遺址，或是將出土的工業遺物帶回山下的舊竹仔門電廠，做為工業遺產展示的一部分。

致謝辭

我要感謝行政院農業委員會林業試驗所、扇平森林生態科學園、竹仔門發電廠等相關人員的協助，讓本研究工作能順利進行，特此致謝。

從聯合國 2030 永續目標，談「臺灣屏東二峰圳灌溉系統」水文化資產保存價值

—— 國立屏東大學文化創意產業學系副教授 林思玲

臺灣製糖株式會社於日治時期在屏東縣規劃二峰圳灌溉系統，1923 年完工後，二峰圳用來灌溉甘蔗與稻米田，時至今日（2019 年）的 96 年間皆未中斷使用。水圳興建期間，日本人建造了地下堰堤來匯集河床下的伏流水，此舉解決了屏東平原枯水期時農作缺水的問題，同時也維持了自然環境與水質。

在地下堰堤結構部分，主要包括梯型堰堤、拱形隧道、半圓形集水暗渠和進水塔（維修人孔）等四部分。其中，除進水塔由地底建構至地表外，前三個結構物皆埋設於河床礫石沖積層下，距河床面 2 公尺到 7 公尺。梯型堰堤高 2.87 公尺，頂寬 0.91 公尺，底寬 3.94 公尺，其進水面以混凝土斜柱排列成 25% 開縫之滲水面，中空成底 1.82 公尺，高 1.82 公尺之直角三角形渠道。梯型堰堤是工程之主體，總長約 328 公尺，由東向西以 1/100 坡度配置。梯型堰堤西端與拱形隧道東端相接，主要用來接通梯型堰堤，將伏流水導入進水塔中。進水塔內寬約 1.5 公尺，高約 8.4 公尺，是堰堤之終點，伏流水從拱形隧道流經進水塔，即進入導水系統之中，導水渠道共約 3.5 公里長。梯型堰堤汲取伏流水的示意如圖 1 所示。現存的兩幅二峰圳施工的歷史照片可以看出當時梯型堰堤設置的施工情形，如圖 2 與圖 3 所示。

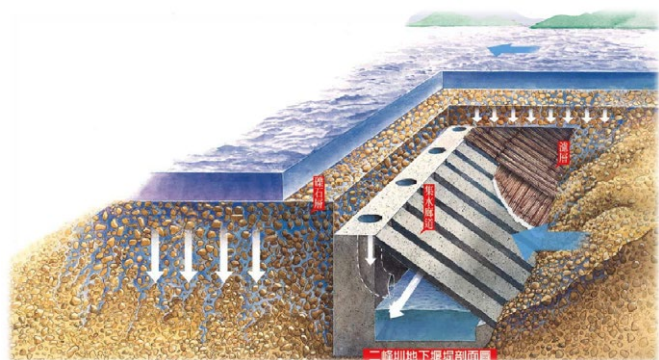


圖 1：梯型堰堤剖面圖示意圖（圖片來源：吳立萍等，2004：78-79）

二峰圳象徵卓越的灌溉科技，是重要的文化資產。屏東縣政府於 2008 年根據《文化資產保存法》，將二峰圳登錄為「文化景觀」。灌溉水圳不僅屬於水利文化資產，也是製糖產業相關的工業遺產，雖說二峰圳在藝術層次並不如其他文化資產突出，但其展現的高度科技

價值，非常值得保存。此外，最初的造圳者因有考量附近地景與氣候，因此二峰圳可以提供穩定的灌溉用水，增加甘蔗田產量。從現代的永續生態工程觀點來看，二峰圳精確的水利設計和技術特點所展現的科學價值，其設計規劃的智慧非常值得後代學習。



圖 2：二峰圳梯型堰堤施工情景，拍攝於 1922 到 1923 年之間（圖片來源：臺糖公司）



圖 3：二峰圳梯型堰堤鋪上埔姜當過濾層，拍攝於 1922 到 1923 年之間（圖片來源：臺糖公司）

二峰圳文化景觀登錄的範圍為圖 4 的 A 點至 D 點，特殊建築是林邊溪旁的第二進水塔（water intake tower）（譯自日文，功能是讓人員進入維修的人孔）、河床下的梯形堰體（trapezoidal weir）、拱形隧道（arched tunnel）、半圓形集水暗渠（catchment culvert）以及臺糖萬隆廠前方的分水工（diversion structure）。圖 4 中，點 A、B、C、D 分別代表第二進水塔、渠道出水口（canal waterway outlet）和側向溢流堰（lateral overflow weir）（如溢

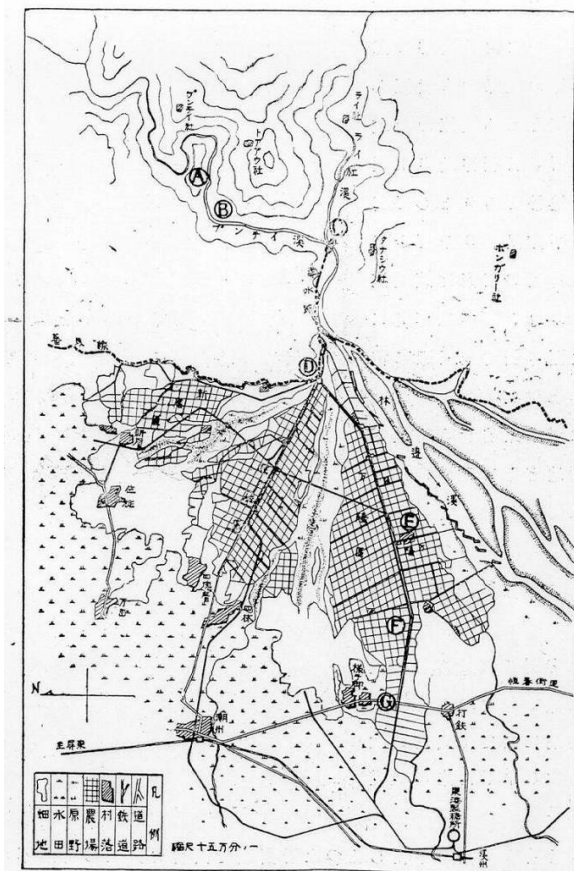
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圖 4：林邊溪旁的集水建築分部。A 代表第二進水塔；B 代表渠道出水口和側向溢流堰（比如溢流道）；C 代表隧道出水口；D 代表分水工。（圖片來源：©2019 Google）



圖 6：原本的二峰圳灌溉範圍以虛線標示於現代地圖上，A 代表第二進水塔，D 代表分水工。（圖片來源：©2019 Google）



第二圖 萬隆農場平面圖

- | | |
|--------------------|--------------------|
| ① 常流觀測點 (海拔 187.9) | ② 常流沈降點 (海拔 165.2) |
| ③ 水源 (同 122.7) | ④ 灌溉頭首點 (同 84.8) |
| ⑤ 萬隆 (同 44.8) | ⑥ 永興 (同 20.6) |
| ⑦ 恒春街道 (同 15.2) | |

圖 5：萬隆農場地圖（圖片來源：《利用伏流水開發荒蕪地——臺灣製糖株式會社萬隆農場設立的經過》鳥居信平，1936）。

流道 overflow channel)、隧道出水口 (tunnel waterway outlet)，以及分水工。圖 5 是二峰圳最初的灌溉範圍，此設計圖由二峰圳建造者鳥居信平於 1936 年繪製，圖中標示的灌溉範圍涵蓋三個主要地區。圖 6 與圖 5 對比，圖 6 是以虛線將原本的二峰圳的範圍標示在現代地圖上。在分水工 (D 點) 建造之後，灌溉農場的幹線主要是新置、佳佐、南岸幹線，每條水道展現出不一樣的水圳設計截面，根據地景設計，確保水流平穩，由此可看出，經過土地調查後的水工規劃技術相當精準。在 2017 年，二峰圳的地下堰堤因損壞進行一次大規模整修，施工過程將河床挖開，讓地下堰堤露明以進行整修²。

回顧聯合國在 2015 年發表的「2030 年可持續發展議程」(the 2030 Agenda for Sustainable Development)，是目前聯合國推動的各種事務中最重要的共同目標，而 ICOMOS (International council on Monuments and Sites) 在 2016 年 2 月 15 日隨即發表「文化遺產、聯合國可持續發展目標與新都市議程」(Cultural Heritage, the UN

²關於二峰圳水文化遺產保存與修復的相關研究，可參閱〈Sustainable Wisdom in Water: Irrigation Engineering of Interflow Water in the Pingtung Area During the Japanese Colonization Period and Its Conservation as a Cultural Property〉(Lin, S. L. & Ting, C. S., 2014) 與〈Instantiating the Concept of Restoration in the Cultural Heritage Preservation Act Through the Implementation of the Repair and New Construction of the Erfeng Irrigation Canal System. Taiwan Water Conservancy〉(Lin, S. L. & Ting, C. S., 2019) 的期刊論文。

本期專題：水文化資產

Sustainable Development Goals, and the New Urban Agenda)，由 ICOMOS 轄下幾個科學委員會所共同提出，以呼應聯合國所發表「2030 年可持續發展議程」(The 2030 Agenda for Sustainable Development) 內的指標。這是聯合國首次將文化遺產納為可持續發展評估的項目之中，而可持續發展議程裡明確承認，城市在促進可持續發展方面的重要作用側重於人民和尊重人權，可持續發展目標在未來 11 年也將成為世界各國各項發展的重要基準³。

在這份「文化遺產、聯合國可持續發展目標與新都市議程」裡提到，文化遺產保存必須在都市社區可持續發展的目標下來思考策略。在一個城市文化遺產數量越來越多的情況下，經濟面的思考也日益重要。由此可知 ICOMOS 對於保存經濟的態度。由於當前社會經濟、環境和政治環境中的一些條件、挑戰和機遇，對文化遺產保護和可持續發展的議題已經浮現，更重要的是確認我們目前的都市化狀況，需要更人文和生態的發展概念模式等新興需求，也意味著文化和文化遺產 / 景觀在實現可持續發展城市這一新的人文和生態模式方面將發揮關鍵作用。因此，聯合國認為融合文化遺產的城市發展更具可持續性、更多樣化、更具包容性，也有助於創造綠色經濟，增強可持續性，提供幫助扶貧的就業機會。此外，遺產的再利用和活化有助於促進循環過程，這是可持續發展的關鍵特徵，也是推動向當地「經濟脫碳」(de-carbonization) 過渡的下一個「再生」(regenerative) 城市經濟。最後，與可持續城市發展相結合的遺產保護，有可能更促進實現社會的凝聚力及和平的目標⁴。

在「聯合國居住可持續發展目標」(UN Habitat's Sustainable Development Goals, SDGs) 17 項目標中，有多項指標都必須由文化遺產的妥善保存方能達到。例如最常被提出的指標，即是 SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable，這個指標提出文化遺產與居住環境之間的密切關係。此外，還有 SDG8: Promote



圖 7：二峰圳側向溢流堰（圖片來源：林思玲）



圖 8：二峰圳輸水圳道（圖片來源：林思玲）

sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all，對應到保護文化遺產的活動，即是妥善保護文化遺產可促進旅遊提升地方的經濟能力。

對於二峰圳這類水文化資產的保存，除了符合上述兩項指標之外，對於 SDG 6: Ensure availability and sustainable management of water and sanitation for all 所欲達到的水資源保護的目的，則更具其指標性意義（如圖 7、圖 8），亦顯見，水文化遺產的保存，將是全球達成「2030 年可持續發展議程」中各項指標的重要項目，是不可忽視的重要議題。

³ 採自 ICOMOS 網頁
<http://www.usicomos.org/wp-content/uploads/2016/05/Final-Concept-Note.pdf>（瀏覽日期：2017 年 12 月 27 日）。

⁴ 採自 ICOMOS 網頁
<http://www.usicomos.org/wp-content/uploads/2016/05/Final-Concept-Note.pdf>（瀏覽日期：2017 年 12 月 27 日）。以上內容詳閱〈創意文化空間中文化資產場域的功能及應用〉（林思玲，2019）的文章

「2019 水文化國際研討會」於臺灣嘉義市舉辦

—— 國際工業遺產保存委員會理事會 (TICCIH) 委員 林曉薇、Meisha Hunter、Irene Curulli

「2019 年水文化國際研討會」在今年 5 月 27-29 日於臺灣嘉義市盛大登場，由 ICOMOS 荷蘭國家委員會、荷蘭萊頓大學全球文化資產與研究中心 (CGHD)、臺灣水利環境科技研究發展教育基金會 (TIIWE) 共同舉辦。本次大會聚集了國際文化紀念物與歷史場所委員會 (ICOMOS)、國際科學委員會、水利部門、政府組織、相關社區及非政府組織的各界代表，會中決議將於 2020 年澳洲雪梨舉辦之 ICOMOS 大會上提案創立「水文化國際科學委員會」，並為此成立籌備工作小組。

本次研討會是因應全球氣候變遷的大環境下，希望邀集世界各國的水利管理單位、重要組織、文化資產保存團隊及其他利益相關者齊聚一堂，就各地所面臨的水文化議題與因應策略等進行研討與對話。研討會論文分為五大主題—水務、水景、水道、水力、水觀，發表者來自不同領域，包括規劃、景觀建築、工程、歷史、社區培力等，此外，氣候變遷對水文化資產的影響也是本次會議的討論重點。來自各方的研究論文豐富多樣，不僅突顯水文化蘊含知識之重要性，也讓我們看見水文化議題的未來展望；而這次研討會的部分論文將被邀請在 2020 年雪梨舉辦之 ICOMOS 大會上發表。

最後，研討會總結提出下一步的行動，包括：

- 應制訂方法、培訓計畫、政策及設計流程以彰顯水文化資產的高度重要性。
- 應展示並推廣水文化資產管理的最佳實踐案例。
- 應探索並加強水文化資產管理者、設計者、規劃者及眾多相關組織間的聯繫。

並建議必須優先採取以下的行動方案：

- 確立方法及協同合作方式
- 建立共同語言
- 強調與永續發展目標之間的關連
- 加強氣候行動計畫
- 推廣水文化資產守護盾



圖 1：ICOMOS 荷蘭國家委員會 Henk van Schaik 致開幕詞

2019年ICOMOS-IFLA 國際文化景觀科學委員會暨國際景觀建築連盟聯合年會及學術研討會趨勢觀察

—— 國際工業遺產保存委員會理事會 (TICCIH) 委員、中原大學建築系助理教授 林曉薇

會議緣起

臺灣在 2005 年將「文化景觀」納入「文化資產保存法」後保存的推動工作上不遺餘力，2019 年「阿里山林業暨鐵道文化景觀」亦經文化部公告為全國首處「重要文化景觀」，此外，超過 50 處的文化景觀登錄益發顯現此議題研究之重要性。幾處進行中的相關管理維護辦法擬定，如：臺南公園等。可以體認到文化景觀是一個與時俱進對於整體環境的保存與維護，根植於文化景觀「主題」的維持，由許多關係人共同參與與運作的需求，也仍有許多進步的空間。

筆者參與本次國際文化紀念物與歷史場所 (ICOMOS) 委員會文化景觀科學委員會與國際景觀設計師聯合會 (IFLA) 合作之 2019 年聯合年會及學術研討會 - 理解過去創造持續的未來 (ICOMOS-IFLA International Science Committee on Cultural Landscape Industrial Heritage: Understanding the Past, Making the Future Sustainable, 2019 年 6 月 15 日至 25 日)。深切體會到 ICOMOS-ISCCL 文化景觀科學委員會多年來對國際文化景觀保存所提出的觀點及努力，並且持續活躍得力於委員會的良好運作。

ICOMOS-ISCCL 文化景觀科學委員會於 1981 年成立，影響力深遠且持續致力於推動國際對文化景觀保存、調查、紀錄、研究、推廣介紹等工作。1992 年發佈的「文化景觀憲章」對世界遺產保存有重大影響，近年持續研究及發表文化景觀執行上的相關文件及資料等。歷年來重要貢獻如：1992 年發佈的「文化景觀憲章」之外，於 2013 年推動的《世界鄉村景觀倡議》，到 2017 年的決議文：《視鄉村景觀為遺產的 ICOMOS-IFLA 原則 (ICOMOS-IFLA Principles concerning Rural Landscapes as Heritage)》，簡稱《鄉村景觀遺產原則》。特別探索人類與自然和文化地方關係的複雜性。

會議內容

今年年會也特別呼籲就鄉村景觀保存維護，採取一種整合性觀點，尊重具有回復力和永續性傳統土地利用，維護當地的生物多樣性，也保存區域的文化多樣性。

這場研討會的目的在於激發討論關於文化景觀的保存意識，從特定的案例進而理解土地與人互動之關係，並在會中分享愛爾蘭的保存經驗。主要分為年會及公開學術研討會二部分。本次學術研討會在都柏林舉行，特別對自然與文化層面：國際脈絡下的愛爾蘭文化景觀保存 (The Nature /Culture Spectrum: Conversations about Cultural Landscape in Ireland in an International Context)，所面對的新挑戰在地景、社會變遷及永續發展提出思考論述。研討會主題為國際化觀點的文化景觀保存向度，發表內容來自多元的地景區域，如：阿曼及摩洛哥等。

本次大會除學術研討會外，亦安排愛爾蘭自然與文化遺產的研習行程，主要研習重點是：卡斯爾敦莊園 Castletown House、克拉拉沼澤 Clara Bog、瑪翰修道院 Manchán of Lemanaghan 及克朗瑪克諾思遺址群 Clonmacnoise。實地研習對主題性保存及動態維護等相關問題的新思維。

本次會議中的重要成果之一為成立不同的主題工作小組進一步實踐文化景觀保存議題及挑戰；如：延伸實踐《鄉村景觀遺產原則》的內容定義為：「鄉村景觀係人類為了生產糧食和其他再生性自然資源，透過農業、畜牧和放牧業、漁業和水產養殖業、林業、可食用之野生動植物採集和狩獵、以及其它例如鹽的礦物資源開採等土地利用活動，與自然交互作用所共同產生的陸域或水域地區。」有許多專文來自景觀研究學者、歷史學家及設計師外，參與者尚有公部門及民間組織保育推動者相當多元。

從發表論文中可見文化景觀的發展趨勢，「持續作用的景觀」和「聯想的文化景觀」類別重要性提升，尤其強調社區參與的緊密關係，突顯遺產保存由下而上的社會參與之重要性。也對人類文化和自然互動下，產生的各項遺存元素及無形文化資產，建議新的價值再認知與評估體系。許多生活相關的文化景觀案例逐漸被認同成為文化遺產的一環，並擴大文化遺產的空間範圍與概念範圍。國際上的思考趨勢對目前國內文化景觀保存問題所遭遇的跨類型、跨行政區指定登錄的操作方式問題，都有助釐清規劃、持續發展因應策略與推動工作的啟發。

亞太遺產暨旅遊鐵道組織 (APHTRO) 2019 年約旦安曼年會

—— APHTRO 副主席 許乃懿

亞太遺產暨旅遊鐵道組織 (APHTRO) 2019 年會於 10 月 8 日至 10 月 11 日假約旦安曼 Jordan Hijaz Railway 總部舉行。



圖 1：通過名景拱橋的專列

Jordan Hijaz Railway 是 1908 年由鄂圖曼帝國所完成，由敘利亞的大馬士革通往回教聖地麥加之 1050mm 軌距的鐵路，歷經兩次大戰之破壞，目前僅只有安曼附近的數十公里路段，由約旦公部門經營，以包租方式行駛，平常沒有定期班車行駛，也因此地方民眾多不知道此鐵路之存在，包括計程車司機亦然。

本次年會計有來自我國中華民國鐵道文化協會代表劉宥緯與筆者、日本的小田恭一 (APHTRO 主席)、約旦 Jordan Hijaz Railway 總經理 Sallah Allouzi 與資訊工程師 Duha Rahaleh 等會員代表出席，另外有英國 Wollsztyrn Experience 的 Christopher Clark 與 Peter Kennan，NERHT 主席 Stephen Wiggs、德國籍歐洲遺產鐵道協會 FEDECRAIL 副主席 Heimo Echensperger 等鐵道組織會。因為不少會員國代表經費拮据，不克前往約旦，故本次大會嘗試以視訊方式進行，可惜受限於約旦網路頻寬不足，訊號遲延太久而作罷。即便如此，本次大會仍通過幾項重大議案，包括：重新選舉日本代表小田恭一為主席；其次是針對世界性的遺產鐵道組織 WATTRAIN 之長期高收費政策導致亞非不少國家成員為之卻步，使得全球性的交流活動遲遲難以推動等事項，決議向 WATTRAIN 提出要求，包括降低收費友善措施，以增進更多國家地區團體的參與和

交流；第三是對於視訊會議及網路聯繫則持續加強；第四則決定 2020 年年會在印尼舉行；第五希望加強與其他組織或學者專家的交流。在正式會議之後，也針對如何協助 Jordan Hijaz Railway 之募款進行意見交換，來自英國的會友建議設立類似粉絲團或鐵道之友會等之組織來向外界籌措資金，如同當初在鋪設時也是有許多的穆斯林贊助才得以完成建設。



圖 2：修復完成做為現在行車終點的 Al Jeza 站

本次大會的專題演講部分，來自英國的會友介紹如何協助東歐各地的團體經營或維護遺產鐵道；約旦地主則介紹 Jordan Hijaz Railway 的歷史與現況；小田主席介紹世界各地因蒸汽火車帶動遺產鐵道活絡發展之經驗；筆者則介紹英國 Welshpool & Llanfair Light Railway 與臺灣糖業鐵道締結姊妹鐵道，以及 W&LLR 的蒸汽火車 Dougal 來臺灣三個月期間交流展示的情形。透過專題演講的分享，也啟發了與會人士對於遺產鐵道保存與活化的各種想法。

大會依據往例也在 10 月 10 日安排與會者搭乘蒸汽火車牽引郵輪列車由 Amman 車站往返 Al Jeza 車站的體驗活動。這部 52 號蒸汽火車是 1955 年由德國 Jungeuthal 公司製造而於 2013 年修復完成，曾經參與電影神鬼奇兵 2 The Return of Mummy 的攝錄工作。火車在途中三個景點進行 Photo Stop，讓搭乘者可以下車拍照或攝影獵取滿意的記錄。



圖 3：1908 年至今的安曼車站、水塔、轉車盤（turn table）、水鶴（crane）

Jordan Hijaz Railway 是中東第一條鐵路，Amman 車站站體、水塔、水鶴及轉車盤也都是 1908 年啟用至今的古物、老建築，由於軌距與眾不同，車輛路線之維修都要靠本身的員工來執行，也練就了員工對於鐵道文化保存的專業度。Al Jeza 站所使用的蒸汽火車等，也全都由鐵路公司自行修復完成。

西亞中東充滿神祕的國度約旦，可是人民和善，也是唯一沒有種族或宗教爭戰的中東國家。Jordan Hijaz Railway 自 APHTRO 成立之始即是忠實的會員，此次能在約旦舉行年會，也完成眾多會員多年心願，也讓我們約旦有較深入的了解，同時也透過這樣的交流增進會員及相關團體之相互認識，真是有意義的一次活動。

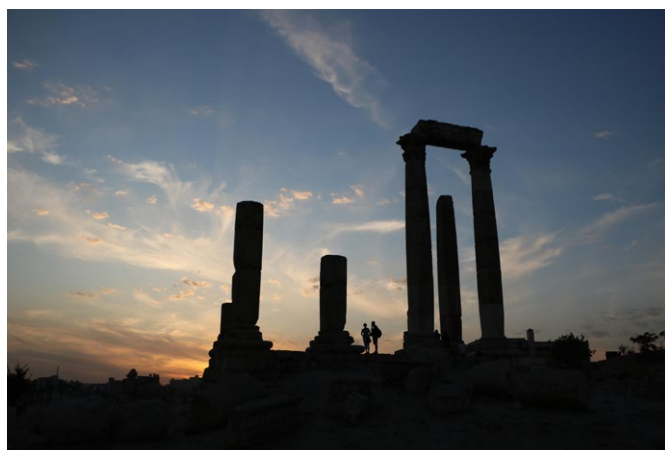


圖 4：安曼古蹟海格力士神殿遺蹟

2019 柏林歐洲工業遺產路徑（ERIH）年會報告

—— ERIH 秘書長 Christiane Baum

歐洲工業遺產路徑（簡稱 ERIH）於 2019 年十月舉行第十六次年會，主題為「工業遺產與觀光的結合：融合旅遊賣點的工業遺產行銷」，共計十九國、九十個單位共襄盛舉。期間與會者彼此互相交流，探討如何透過交叉行銷策略以吸引更多遊客。此次年會由歐洲工業遺產路徑上的定錨點城市（Anchor Point，又翻重要景點）之一的德國科技博物館（German Technical Museum）與柏林工業遺產中心（Berlin Center of Industrial Heritage）共同舉辦。

演講帶來什麼啟發？

在主持人尤瑟夫·霍普（Joseph Hoppe）教授、ERIH 主席曼哈·瑪莉亞·葛利芬尼（Meinrad Maria Grewenig）教授開幕致詞後，首位講者是來自柏林市政府經濟部的安娜·霍懷特（Anna Hochreuter）博士，她將柏林的歷史地位娓娓道來，20 世紀初期，柏林是德國最大的工業城市，而現今則演變成吸引遊客的重要觀光勝地。接著由德國官方柏林旅遊網（visitBerlin）的貝堤娜·克菲斯寧（Bettina Quäschnig）繼續詳述，解釋柏林這樣的脈絡蘊藏什麼可能性，好比德國藝術建築名校包浩斯 100 週年校慶時，柏林旅遊網設計「柏林現代主義之旅」，帶領遊客尋訪柏林的歷史古蹟，並優先選擇工業遺產。柏林旅遊網未來也會將工業遺產視為更重要的景點。

目前擔任 ERIH 董事會成員的英國講者約翰·羅傑（John Rodger）提到工業遺產已不再是利基市場、與大型旅遊業者的連結仍然不多，所以他傾向要增加賣點，例如引人注目的藝術展等，ERIH 招牌景點之一的世界遺產－弗爾克林根鋼鐵廠（Völklingen Ironworks）便多次舉行展覽活動。德國魯爾區域協會（Ruhr Regional Association）的哈爾拉德·史比爾行（Harald Spiering）與魯爾旅遊有限公司（Ruhr Tourism Ltd.）的尤亨·史魯斯爾（Jochen Schlutius）提到新的概念模式－魯爾單車區（radrevier.ruhr）的發展，結合單車旅遊與工業遺產，吸引大量遊客。奧地利旅遊公司－TLS 旅遊文化（TLS

Reisekultur）的創辦人賀吉娜·豪夫凱那（Regina Rauch-Krainer）以及義大利工業遺產志工協會－切奧札澱粉工廠協會（Associazione Amideria Chiozza）的會長拉費耶·卡塔比亞諾（Raffaele Caltabiano）分享他們如何他們在以往沒有對外開放的切奧札舊化工廠舉辦引人入勝的旅遊導覽，成功吸引大批遊客。

來自瑞典的講者寇尼亞·曼努宋（Cornelia Magnusson）向與會者介紹瑞典世界遺產，同時也是 ERIH 招牌景點的瓦爾貝里廣播電臺（World Heritage Grimeton Radio Station），她向聽眾分享大量提高觀光人數的秘訣。她帶動觀光的方法是豐富的行銷組合，包括在該區 15 個景點之間來回載客、乘客可以隨時上下車的固定路線巴士，以及在區內 127 公尺高的天線塔舉辦登塔之旅，成功吸引許多觀光客前來。最後，身兼獨立作家與藝術遺產顧問的彼得·威克林（Peter Wakelin）博士在演講中帶聽眾回顧歷史，在發展自然生態旅遊的脈絡下，工業遺產扮演什麼角色。他提到威爾斯地區的雪墩國家公園（Snowdonia National Park）、布雷肯比肯斯國家公園（Brecon Beacons National Park），以及熱門景點迪谷（Dee Valley），透過這些例子，追溯工業旅遊的源頭至 19 世紀初期的浪漫主義時期，並探討哪種工業遺產會歸類為自然旅遊的範疇。至於工業遺產旅遊的成功要素，他提到優良產品、區域合作與行銷、完善的遊客接待、旅遊業者的興趣、令人印象深刻的工業旅遊體驗等。要創造好的旅遊體驗就必須有該遺產的獨特賣點，威克林博士提到主打遺產小旅行、地下構造、雄偉的規模、企業與人的結合，以創造工業遺產的觀光優勢。

工作坊討論的主題為何？

ERIH 年會的工作坊以小組討論的方式進行，與會者可以從以下三個主題擇一加入討論：

- 成功的旅遊產品與賣點
- 目的地管理組織與旅遊業者的合作
- 區域網絡、區域路徑的旅遊行銷

每一個工作坊都備有問卷作為討論基礎，問題包括：與旅遊業者合作時面臨的機會與困難、何種行銷手法已正在使用、行銷重點的是哪些目標群眾等等。除此之外，每個工作坊會搜集建議，讓 ERIH 了解如何支持獨立景點或是區域網絡。

工作坊討論時有兩個議題反覆出現，第一個是關於工業遺產景點和旅遊公司之間觀點不同。每個單位著重的目標群眾、關鍵主題、獨特賣點都不盡相同，而且旅遊業者時常不了解工業遺產的潛力。基於這個問題，工作坊討論出一系列的建議，比如將特別的旅遊產品和大型文化活動相互結合，還有工業遺產景點之間可以合作，創造令人嚮往的故事以及旅遊體驗。其他點子還有提高工業博物館與旅遊公司之間的合作，因為對遊客而言，一窺現代工業製程的機會頗具吸引力。另一個反覆提及的議題是市場研究，設計旅遊產品需要調查、定義相關的目標群眾以及這些人的需求，因此市場研究是不可或缺的方法。

第三場工作坊中討論出一個重要結論：成功的區域網絡旅遊行銷中，區域路徑設計並不是唯一的選項。捷克比爾森市（Pilsen）的「工業旅遊開放研討會」

（"Industry Open" conference）就是提供新方法的好例子，這個研討會提供平臺給工業遺產景點與當地公司、創業家討論專案計畫、建立合作關係，目的在於推廣比爾森的工業遺產，希望未來成為旅遊景點，「工業開放」已成功打響名號，形成建立區域網絡的基礎。

ERIH 如何支持這些推廣工作？

不少與會者都針對推廣工作提出諸多建言，許多人認為當務之急是向旅遊產業更積極推廣工業遺產和 ERIH 的名號。也有人希望 ERIH 展開市場研究，比方說調查目標群眾與工業遺產的關聯性。此外還有人提議成立專案小組，給區域路徑內的網絡連結、舉辦活動等提供建議。因為最後會原提出了這項提議，主辦單位將在明年的 ERIH 年會舉辦獨立工作坊給區域路徑規劃人員參加。

ERIH 目前列出全歐洲超過 1850 處景點，從 2019 年 5 月開始，ERIH 正式稱為「歐洲理事會文化路徑」（"Cultural Route of the Council of Europe"）

* 所有演講皆可由 ERIH 網站（ERIH website）下載。

印尼棉蘭的農園產業文化資產

—— Heritage Hands-on 創辦人 Hasti Tarekat Dipowijoyo

種植城市

棉蘭是印尼北蘇門答臘首府，擁有 250 萬左右的居民，是個多元文化社會，深受印度、中國、歐洲、爪哇、馬來族、亞齊族、巴塔克族及其他民族文化影響。棉蘭的多元文化背景可以回溯到殖民時期荷印政府從國外引進耕種勞力取代，在當時，當地人、馬來人、巴塔克人拒絕與殖民政府合作，迫使政府必須引進海外——特別是馬六甲海峽的——印度人及華人前來棉蘭。

煙草於 1863 年由荷蘭人引進，不久便和古巴雪茄一同攻佔全球市場。棉蘭在 19 世紀有 170 家種植公司，煙草栽種面積達 12 萬公頃，因為當時棉蘭地區是由德里蘇丹王朝（Deli Sultanate）統治，所以此地生產的煙草在過去被稱作德里煙草（Deli Tobacco）。德里煙草大力推動了棉蘭地區的發展，本地宏偉建築與庭園林立。除了煙草之外，棉蘭也生產茶葉、棕櫚製品和橡膠，當時的煙草及橡膠生產相當成功，曾被譽為「德里的奇蹟」。

1942-1945 年日本佔領期間，多數種植園均處於停滯狀態，1945 年印尼獨立，隨後實施種植園國有化，如今，多數種植公司均納入國營農園企業（Perusahaan Terbatas Perkebunan Nusantara，簡稱 PTPN）旗下管理。

儘管如今棉蘭的種植產業轉為著重棕櫚產品，但德里煙草、橡膠及其他商品在鼎盛時期留下的文化資產依然存在而且相對完整，在 2019 月 8-11 日於棉蘭舉辦的「農業農園文化資產節」上，印尼農園博物館（Indonesian Plantation Museum，又名 Musperin）也推廣了印尼的農業遺產。

印尼農園博物館約兩年前於蘇門答臘島東海岸成立，原是橡膠種植園協會辦公室所在地。博物館的成立目的是為了打造一座農園文化的資訊及公共教育中心，「農園產業文化資產節」便是其實現目標的方式之一。

「農園產業文化資產節」是由 PTPN 國營農園企業、大學、政府機構、蘇門答臘資產信託、棉蘭城鄉紀錄協會（Urban Sketchers Medan）及許多其他組織共同籌辦。



圖 1：印尼農園博物館（圖片來源：Rero Rivaldi）

「印尼農園產業文化資產全國研討會」

在狹義的印尼及廣義的亞洲，「農園」這項主題並未受到文化遺產專家及研究者太多關注，但「農園」對棉蘭來說卻切身相關且極為迫切。印尼農園博物館、蘇門答臘遺產信託基金會及其他機構於規劃會議時決定，無論收到多少投稿摘要，這個主題一定會在研討會上提出；在更多文化遺產消失前，農園產業文化資產需要獲得政府當局、媒體及專業人士的關注。

事實證明我們的擔心是多餘的，我們不僅收到足夠份數的摘要，也在研討會上發表了十八份研究，並進行了四場專題演講。對其他農園產業發達的亞洲國家來說，分享印尼至今做過的研究主題極具參考價值，我們將研究主題清單表列如下：

No.	研究主題	作者
1.	煙草烘乾穀倉之建築及文化景觀	Titien Saraswati
2.	探險小徑結合種植園潛力帶來的觀光發展：以峇厘島的峇厘阿迦村落 Belandingan 為例	Ni G.A. Diah Ambarwati Kardinal
3.	中式建築研究：以張耀軒故居及張弼士故居為例	Novrial 及 Natasha Shafira Jiemy
4.	印尼種植博物館如何保護農園產業文化資產	Sri Hartini 及 Isnen Fitri
5.	荷蘭殖民時期作為種植園基地的馬格朗市之戰略地位	Wahyu Utami
6.	泗水的糖廠聯合大樓——兩面建築	Joko Triwinarto Santoso
7.	農園檔案作為歷史文化遺產	Ratna、Suprayitno 及 Edi Sumarno

8.	印尼 PT Tirta Madu 公司如何與其他利益相關者進行環境交流協同合作，推廣民丹島文化遺產保留區 Bukit Kerang Kawal Darat (BKKD)	Defri Elias Simatupang
9.	棉蘭的農園及華人移民：從 1865 年至 1942 年	Handoko
10.	梅蒙宮：紀念德里農園產業發展的歷史遺跡	Rudolf Sitorus 及 Isnen Fitri
11.	製糖產業類型與 19 世紀爪哇城市型態間的關連	Yulia Nurliani Lukito 及 Riski Dwika Aprilian
12.	印尼農園博物館：棉蘭市的文化資本與千禧世代創意經濟的發展	Asmyta Surbakti 及 Vanesia Amelia Sebayang
13.	柯薩婉的阿芙蘿絲 (AVROS) 建築——標誌 20 世紀初蘇門答臘島東海岸橡膠和棕櫚油種植產業發展的里程碑	Isnen Fitri、Ratna 及 Amy Marisa
14.	徒手素描作為棉蘭及周邊地區文化遺產的記錄及資料蒐集工具	Yulianto
15.	馬魯古種植園文化遺產區之保護	Maulana Ibrahim
16.	茶葉種植及 Sidamanik 溫泉對社區為本的自然旅遊發展有何存在價值	Pindi Patana、Achmad Siddik Thoha、Nurdin Sulistiyono、Alfan Gunawan、Ahmad、Yunus Afiffudin 及 Dimas Adji Sutara
17.	Tanah Lapangan Merdeka 獨立廣場：空間結構及中心城市戶外活動	Miduk Hutabarat 及 Lucas Partanda Koestoro
18.	北蘇門答臘科部 (Kebon) 貨幣的社會及文化價值	Rita Margaretha Setianingsih、Lila Pelita Hati 及 Fitriaty Harahap

四位專題演講者：

1. Soedjai Kartasasmita，工程師，印尼種植產業的領銜人物之一，同時也是印尼種植博物館的發起人。他的演講主題是印尼種植產業的歷史；
2. Abdul Gani 博士、工程師、工學碩士，國營農園企業 PTPN II 的董事。研討會上由棕櫚油研究中心主任 Edwin Lubis 博士（農業科學碩士）作為代表，演講該公司對煙草文化資產的願景；
3. Hilmar Farid，文化總署署長、教育及文化部長。研討會上由亞齊省及北蘇門答臘省文化遺產保護局局長 Bambang Sakti Wiku Atmojo 作為代表，演講關於產業文化遺產保護的法律基礎；

4. Hasti Tarekat 博士，工學碩士，蘇門答臘遺產信託的共同創辦人，演講關於荷蘭保存下來的荷印時期種植產業文化遺產。



圖 2：本篇作者在 2019 年 11 月 11 日於棉蘭舉辦的「農園產業文化資產全國研討會」上發表演說

結論

所有與會者及利益相關團體都贊成農園產業文化資產值得更多關注，不但可以作為公共教育的主题，也有潛力進一步發展成為農業旅遊的目的地。

印尼農園博物館是連結內部利益關係團體及公眾間的橋樑，扮演至關重要的角色，農園博物館如今在棉蘭市中心已開設第二個據點。然而，印尼農園博物館並無大量且持續的資金來源，至今之所以能運作，仰賴的是自願者的熱忱及慷慨捐贈。相關當局及文化遺產專家應該思考如何強化資金來源機制，才能支持印尼農園博物館的永續發展。

另一個重要結論是：北蘇門答臘的國營農園企業 PTPN 願意與私部門及社區合作，將其產業資產作為公共教育及旅遊業之用，同時也歡迎任何提議及有意參與農園、建築或其他資產經營的各界投資者。

棉蘭的農園文化其實僅是印尼及亞洲擁有的一小部分文化，我們衷心期盼農園做為產業文化資產主題能獲得亞洲、國際及其他文化資產組織的進一步關注。



圖 3：2019 年 11 月 8 至 11 日「農園產業文化資產節」期間舉辦的棉蘭遺產城市之旅

泛蘇門答臘遺產網絡：從蘇門答臘角度看遺產保存

—— 班加布迪發展大學 (University of Pembangunan Panca Budi)
景觀設計學講師 Sri Shindi Indra



圖 1：2019 年 11 月 9 號泛蘇門答臘遺產網絡集會團體照，攝於印尼農園博物館 (Museum of Indonesia Plantation) (圖片來源：Yuanita FD Sidabutar)

蘇門答臘的文化遺產保存運動最早是在島上各個區域各別進行。1998 年，蘇門答臘遺產信託基金 (Sumatra Heritage Trust) 設立於棉蘭，為蘇門答臘文化遺產保存的濫觴。蘇門答臘遺產信託基金致力於鼓勵社區、政府一同加入保護蘇門答臘的歷史文化遺產，主要投入與遺產有關的保存、出版、記錄、公眾教育等事務，以及參與蘇門答臘文化遺產保存網絡網 (Sumatra Network for the Conservation of Cultural Heritage)，同時培育文化遺產領域相關人才。

蘇門答臘各地區的文化遺產保存運動欠缺共同合作的機制，起因於資訊流通、溝通管道、交通運輸上的種種限制。有鑑於此，蘇門答臘遺產信託基金於 2000 年開始發起了一場會議，召集島上各方有志之士分享文化保存的知識與經驗。與此同時，泛蘇門答臘遺產網絡 (Pan-Sumatra Network，以下簡稱泛蘇網) 也開始運作。

泛蘇網遍及蘇門答臘本島以及鄰近島嶼，涵蓋亞齊 (Aceh)、尼亞斯島 (Nias)、棉蘭 (Medan)、巴塘 (Padang)、北乾巴魯 (Pekanbaru)、占碑 (Jambi)、明古魯 (Bengkulu)、巨港 (Palembang)、邦加島 (Bangka)、勿里洞 (Belitung)、楠榜 (Lampung)、雅加達 (Jakarta)，以及馬來西亞與新加坡。第一屆泛蘇網大會師成功集結來自亞齊、尼亞斯島、巴塘、巨港、邦加島的代表，之後的大會曾在以下地點舉辦：

年份	辦理地點
2000 年	北蘇門答臘巨港
2001 年	南蘇門答臘邦加島
2002 年	西蘇門答臘巴塘
2004 年	中蘇門答臘巴塘
2015 年	西蘇門答臘沙哇倫多 (Sawahlunto)
2018 年	西蘇門答臘門托克 (Muntok)
2019 年	北蘇門答臘棉蘭

大會之外，泛蘇網也籌劃培訓與研討會，參與的遺產保存團體來自印尼其他地區以及馬來西亞、新加坡等東南亞鄰國。過往培訓、研討會的日期與主題如下：

年份	辦理地點	主題
2004 年	西蘇門答臘武吉丁宜 (Bukittinggi)	「蘇門答臘遺產保存能力培訓」，為訓練的第一階段
2006 年	南蘇門答臘邦加島	「蘇門答臘遺產保存能力培訓」，結訓階段
2018 年	--	「城市景觀作為文化遺產」工作坊
2019 年	--	「農園工業遺產」研討會

遺產保存運動中，區域性會議與培訓扮演不可或缺的角色，對於印尼地區更是如此。這些活動吸引不同專長的在地專業人士共襄盛舉，一同培養相關知識與技能，克服遺產保存的種種挑戰。

蘇門答臘由南而北分為許多不同地區，區域間要維持聯絡網暢通、不斷更新資訊乃是一大重點。科技化的時代下，資訊傳播僅是一鍵之間，因此我們也善用科技，為泛蘇網建立一個簡單的手機群組聊天室，以利各成員溝通。泛蘇網的成員來字各行各業，但都同樣以保存文化遺產為志業。



圖 2：2019 年 11 月 9 號泛蘇門答臘遺產網絡集會團體照，攝於印尼農園博物館（Museum of Indonesia Plantation）（圖片來源：Yuanita FD Sidabutar）

泛蘇網會繼續擴大聯絡網以串連更多志同道合的朋友、社群、政府等個體或群體，一同保護歷史文化遺產。泛蘇網透過聚會、研討會、出版物等方式，誠摯邀請來自蘇門答臘、其他島嶼、亞洲地區，甚至全世界的朋友一起反思文化保存的意義。

其中一場泛蘇網會議在 2019 年 11 月 9 號舉行，地點選在棉蘭。我們與印尼農園博物館合作舉辦好幾場研討會和分享活動，吸引了許多新團體加入，還有年輕新血分享年輕世代的創意計畫。這場會師中，我們認識更多夥伴，他們帶來啟發人心的想法，更分享他們的熱情、經驗，以及對遺產保存的夢想。

這次會議的與會團體有建築巡禮（Archpedition）、棉蘭遺產協會（Medan Heritage）、棉蘭城市速寫者（Urban Sketcher Medan）、葛林芝遺產協會（Kerintji Heritage



圖 3：泛蘇門答臘聯絡網成員列表與組織標誌

Institute）、第一區鐵道迷（Divre1railfans）、北蘇門答臘遺產協會（North Sumatera Heritage）等，建築巡禮這個組織主要在棉蘭以及其他國家、城市舉辦建築導覽；棉蘭遺產協會為社區發起的組織，主要成員是熱愛帶領文化遺產散步、小旅行的年輕人；棉蘭城市速寫者是國際城市速寫者組織的棉蘭分部，成員熱衷於描繪城市、建築風貌，尤其著重古蹟景點；葛林芝遺產協會是剛起步的組織，致力保存占碑地區的文化遺產；第一區鐵道迷（Divre1Railfans）的組織成員來自不同背景，但都是火車與鐵道迷，他們做了許多舊火車、鐵道的研究；北蘇門答臘遺產協會則是主要關注北蘇門答臘的文化與料理保存。

我們由衷期盼泛蘇網能一代一代延續下去，因為有遺產保存工作，志同道合的人才能聚在一起。單打獨鬥難以持續，大家若能同心協力，就能走得更長更遠。



《永續建築保存：文化資產環境中響應式設計的理論與實踐》

作者：Oriel Prizeman

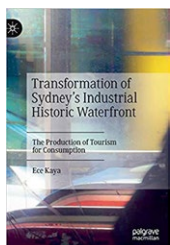
年代：2019

出版：RIBA Publishing

ISBN：978-185-94-6542-4

相關書訊：<https://reurl.cc/Rdoqo6>

本書涵蓋英國及國際之案例研究與論文，從中發掘能源及建築保存的重疊之處，介紹了定性及定量參考框架之相關性及因應措施，以及供稿者—包含建築師、設計師、保存顧問及學者的各種專業知識。本書第二部分則展示了英國境內及境外的永續文化資產計畫，將過去的研究成果轉化為相關從業人員可應用於日常工作中的參考資料。



《澳洲雪梨工業歷史濱水區的轉型：觀光消費的生產》

作者：Ece Kaya

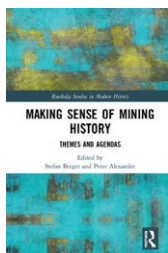
年代：2019

出版：Palgrave Macmillan

ISBN：978-981-13-9667-0

相關書訊：<https://reurl.cc/drong8>

本書探討了在城市改建及去工業化的脈絡之下，以旅遊業主導的轉型對澳洲雪梨工業歷史濱水區的達令港（Darling Harbour）及岩石區（The Rocks in Sydney）的影響，並且進一步反思觀光旅遊與文化資產之間的矛盾，雖然此議題的討論並非新觀念，但是本書以批判性的思維探索了這些地區產業文化資產的重要性及轉型過程中所產生的影響。



《了解礦業史：專題探究》（英國羅德里奇出版社現代史系列）

作者：Stefan Berger、Peter Alexander

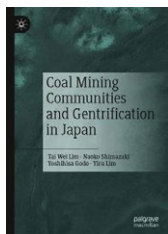
年代：2019

出版：Routledge Studies in Modern History

ISBN：978-036-71-9868-8

相關書訊：<https://reurl.cc/NaoQg6>

這本書邀集來自各國的專家學者分析全球礦業歷史的各種層面，內容涵蓋礦冶考古、採礦技術、移民與礦業、礦工日常生活、國家與礦業、礦業勞資關係、性別與礦業、環境與礦業、礦業事故、礦業視覺史以及礦業文化資產等，並呈現出國家型常見案例與地區型案例研究視角之間相互抗衡的結果。



《日本煤礦社區與仕紳化》

作者：Tai Wei Lim、Naoko Shimazaki、Yoshihisa Godo、Yiru Lim

年代：2019

出版：Palgrave Macmillan

ISBN：978-981-13-7219-3

相關書訊：<https://reurl.cc/24OYVE>

本書對日本能源領域的研究方法進行了多學科分析，並考察了關閉後的煤礦城鎮及其仕紳化現象，並進一步針對礦業停工對農業的影響、煤礦工人下崗後重回服務及產業領域，以及舊煤礦遺址轉型成農場與社區的影響進行研究。另從起源、社會歷史、連續性 / 不連續性，還有合作性 / 抵抗性等方面探討了仕紳化的歷史過程。礦坑關閉的歷史背景除了進一步分析有關礦坑關閉的懷舊記憶、登錄於聯合國教科文組織（UNESCO）之山本作兵衛（Sakubei）煤礦畫，更有擴及整個採礦業之相關文化素材。

- 臺灣

哈瑪星臺灣鐵道館「跨海的鐵道技術」－日本大宮鐵道博物館交流展

活動日期：2019 年 7 月 18 日至 2020 年 6 月 30 日

活動地點：高雄，臺灣

主辦單位：中華民國文化部、臺灣高雄市政府文化局、臺灣高雄市立歷史博物館、日本大宮鐵道博物館

活動官網：<http://hamasen.khm.gov.tw/eng/home01.aspx?ID=1>

活動說明：<https://anih.culture.tw/index/zh-tw/activities/15256>

- 墨西哥

國際文化紀念物與歷史場所委員會文化路徑國際科學委員會（ICOMOS CIIC）「文化路徑的活化」

活動日期：2020 年 2 月 10 日至 17 日

活動地點：赤瓦瓦，墨西哥

主辦單位：國際文化紀念物與歷史場所委員會文化路徑國際科學委員會（ICOMOS CIIC）

活動官網：<https://www.icomos.org/en/member-area/60073-call-for-presentations-liv%ADing-the-cultural-routes-2>

活動說明：<https://anih.culture.tw/index/zh-tw/activities/16565>

- 日本

2020 東京國際現代運動建築、場所及鄰里文件與保存國際委員會國際學生研討會

活動日期：2019 年 3 月 15 至 2020 年 9 月 15 日

活動地點：東京，日本

主辦單位：Docomomo International、Docomomo Japan、ISC 教育培訓

活動官網：<http://docomomo2020.com/>

活動說明：<https://anih.culture.tw/index/zh-tw/activities/14586>

- 澳洲

國際文化紀念物與歷史場所委員會（ICOMOS）GA2020 科學研討會徵稿中

活動日期：2020 年 10 月 5 日至 9 日

活動地點：雪梨，澳洲

主辦單位：國際文化紀念物與歷史場所委員會（ICOMOS）

活動官網：<https://icomosga2020.org/abstracts/>

活動說明：<https://anih.culture.tw/index/zh-tw/activities/18875>

- 加拿大

2021 國際工業遺產保護委員 (TICCIH) 會第十八屆國際會議「再現工業遺產 (Industrial Heritage Reloaded)」會議及論文徵集開跑

活動日期：2021 年 8 月 30 日至 9 月 4 日

活動地點：魁北克，加拿大

主辦單位：加拿大都市遺產研究 (Canada Research Chair on Urban Heritage)、
加拿大工業遺產中心 (Canadian Industrial Heritage Centre)、
Écomusée du fier monde、Association Québécoise pour le
patrimoine industriel、國際工業遺產保存委員會 (TICCIH)

活動官網：<https://sites.grenadine.uqam.ca/sites/patrimoine/en/ticcih2021>

活動說明：<https://anlh.culture.tw/index/en-us/events/18022>