The Conservation of Disappearing Sugar Industry Cultural Landscapes in Taiwan

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Abstract
From the time of the Japanese Colonial Period (1895-1945) until recently, the sugar production industry was an important part of Taiwan's economy. There were as many as 44 sugar factories in Taiwan prior to 1986, and most of them had formed their own industry village, including manufacturing facilities, residential facilities, a railway transportation system, and other facilities. In the past, only the factories themselves were preserved as the monument. However, if all these factories, villages, farms and facilities could be seen together as the cultural landscape of the sugar industry, the conservation efforts would be broadened.

Keywords: cultural landscapes; sugar industry; conservation

1. Introduction
Between 1895 and 1945, Taiwan was colonized by the Japanese for 50 years. Because of the suitable weather and soil condition, and the encouragement of the Colonial Government, 44 sugar factories were erected in the central and southern parts of Taiwan. The sugar industry had become an important part of the Taiwan economy during the Japanese Colonial Period, and had been gaining money from foreign countries beyond the end of that period. Due to rising costs, most of these factories closed after 1986, and only 2 factories remain functioning.

At the same time, conservation of these facilities had begun. Although some factories had been demolished and the use of the land had totally changed, some factories were still preserved. However, while the offices and manufacturing facilities were preserved or restored as museums, people seldom understood the complete process of production because other associated components, especially the sugar cane farms, were excluded during the conservation.

2. Research Objectives and Methods
The objective of this research was to address the new conservation concepts concerning the sugar factories and cultural landscapes, through the representation of the history, components, composition, effect on the development process of cities and regions, and the threat facing these sugar factories. By adopting the concept of cultural landscapes, which represent the "combined works of nature and of man", these sugar factories and their environments will be conserved in a better way.

As for the methods of this research, firstly, the important development process of the sugar factories of Taiwan will be reviewed, and the flourishing and declining history of the factories will be analyzed. Secondly, the concept of the cultural landscapes and the possibility for the conservation of the sugar factories will be addressed. Thirdly, the conservation and research status of the sugar factories of Taiwan will be analyzed, while the difficulties of conservation under the conventional process will also be reviewed. Finally, the possible protection process and conservation methods based on the idea of cultural landscape will be addressed, while potential problems will also be raised.

3. Sugar Factories and the Idea of Cultural Landscape
3.1 The Typical Components of a Sugar Factory
Sugar production is affected greatly by the location of sugar cane farms. In order to raise the benefit and reduce cost, sugar cane farms should not be far from the factory, and the method of transportation of the sugar cane needs to be highly efficient. Traditionally, the sugar was only made in local workshops, however, after colonization by the Japanese, it was produced by an industrial process in new factories.
In fact, a sugar factory complex could be considered as an example of a cultural landscape of the sugar industry. In the case of the sugar factories of Taiwan, the sugar cane was planted on the sugar factories’ own or contracted farms under a plan made by the factories. To grow sugar cane, there were immense sugar cane farms in the central and southern parts of Taiwan, and numerous villages were mainly composed of farm workers and others who worked in jobs related to the factories.

To ensure that the sugar could be made quickly from the sugarcane, a network of dense railways for each factory were built in order that the raw sugar cane could be transported efficiently. Such sugar industry railway networks thus became one of the most important transportation systems for people and other goods.

3.2 Organically Evolved Cultural Landscapes

From the point of view of the UNESCO World Heritage Centre, the industrial heritage and its related natural environment would be considered as the “organically evolved landscape”, which results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment (UNESCO World Heritage Centre, 2008). Although there are still no sugar factories that have been nominated as cultural landscapes on the list of World Heritage sites, some similar nominated cases share the same concept of an organically evolved landscape.

Most of these cases are landscapes related to agriculture. The evolutionary process of land and environment has also caused long term changes in the history, the local or regional economy, and urban and/or regional planning. Such cases of cultural landscapes; the Alto Douro Wine Region in Portugal, Rice Terraces of the Philippine Cordilleras, and Agave Landscape and Ancient Industrial Facilities of Tequila in Mexico, for example, meet the criteria of organically evolved landscapes (the sub-category of a continuing landscape to be specific), were the majority of all cultural landscape cases of the World Heritage sites. The research of Fowler argued that almost 60% of the 30 nominations of cultural landscapes for World Heritage status were in the category of organically evolved landscapes - continuing landscapes (Fowler, 2003). Although this rate has decreased slightly to 50% of the 70 nominations in 2009, the concept of organically evolved landscapes is still the most important.

In the case of sugar factories and their surroundings, all of the components could combined to form a sugar industry cultural landscape. The landscapes of farms full of sugar cane resulted from the interaction of people and nature, and the factory itself represented the final stage of sugar making, in which the scientific process of production was seen. The village around the factory, with the special features and atmosphere affected by its location and planning, represented the life of the past, and the remains of railway systems were the major transportation method for the sugar cane, other goods, and people in the past. Thus, many factories could be found in the landscapes.

3.3 Threats to Sugar Factories and the Cultural Landscapes in Taiwan

Concerning the economic aspects, although Taiwan earned a lot of foreign exchange income from the sugar industry in the past, sugar cane farming and sugar manufacturing has withered because of the increased costs and changes in agricultural policies. Since increasing amounts of cheap sugar began to be imported, sugar factories were forced to close and were abandoned one by one; only two factories remain functioning. Consequently, the landscapes of sugar cane farms have been disappearing; and only very few farmers still raise sugar cane.

Because of the heavy cost of maintenance and the improvement of highway and local road systems, the transportation of people and goods using the sugar industry railway systems has declined since 1982, and all of the railway lines stopped running. Even though two factories are still functioning, the transport of raw sugar cane from fragmentary farms, scattered all over the southern part of Taiwan, is now dominated by highway and local road traffic.
Concerning the social aspects, in the beginning, most sugar factories were established near the sugar cane farms. Some factories were originally built beside the residential areas of villages. Due to the growth of the villages (population growth, economic growth, and land area growth), the factories were surrounded by suburbs of the original village, or became part of the city as the villages developed into cities. The pressure of development for other uses had been increasing, and the factories have been facing the threat of demolition. At the same time, the sugar cane farms have been released for residential, commercial, or other industrial uses.

Consequently, the overall complex of sugar factories and their cultural landscapes have been rapidly disappearing. This is not only a serious crisis for sugar industry cultural landscapes, but also the major problem of most industrial cultural landscapes in Taiwan.

3.4 Importance of the Conservation of Sugar Industry Cultural Landscapes

Since the 1880s, sugar had been one of the important export commodities for Taiwan. In 1950, sugar was the major export, up to 73.6% of total exports, and contributed significantly to the development of the Taiwan economy (Taiwan Sugar Corporation, 2006). The sugar industry cultural landscapes are the evidence of this history of the economy, and their conservation would help people realize this fact. Besides, the factories, villages, railways and sugar cane farms together had become the memory and experience of living and progress of life for many people. The memory and experience would be connected through conservation of the cultural landscapes, and be transferred to the next generation.

Sugar was a basic need of human life, and from the educational and interpretive points of view, conservation of the sugar industry cultural landscapes would be a chance for people to understand the complete process of sugar making. From the spatial point of view, the complex of the cultural landscapes, including the planning and the setting, would be an important source of research of industrial heritage.

Therefore, for the sugar industry cultural landscapes, there have been numerous contributions to the history of science and technology, and a profound influence on the development of areas around the farms. Therefore the total settings of sugar factories should be worthy of conservation as cultural landscapes.

The industrial heritage is the evidence of activities which had and continue to have profound historical consequences; it is also of social, technological and scientific value (TICCIH, 2003). Similarly, the importance of the conservation of sugar industry cultural landscapes would derive from memory, the history, the technology of industry, and the planning of the space. Furthermore, the process of interaction between people and nature would be specifically emphasized.

4. Conservation Status of the Sugar Industry Cultural Landscapes in Taiwan

4.1 Legislation and Registration

In Taiwan, some of the buildings of the sugar factories were designated as "monuments" under the Cultural Heritage Preservation Act before its amendment in 2005. Due to the restrictions of this Act and the typical concept of preservation, the policy of "no changes to building appearance" led to a fossil conservation, and the owners of these buildings have refused the registration or have been against the designation.

After the amendment of the Cultural Heritage Preservation Act, the category of Cultural Landscapes was added to the Act, which includes the spaces and related environment of myths, legends, circumstances, historical events, community life, and/or ceremonies. The Operational Guidelines of the Act further indicate detailed categories, which include the location of myths and legends, the routes of historical or cultural facts, religious landscapes, historical gardens, the locations of events, agricultural landscapes, industrial landscapes, transportation landscapes, irrigation facilities, military facilities, and the landscapes interaction between humankind and the natural environment.
In this sense, the sugar factories could be seen as industrial landscapes, one of the sub-categories of cultural landscapes. Up to 2010, only two sugar factories, Qiaotou and Hualien, had been registered as cultural landscapes under the Act. However, because most of the cultural heritages in the built environment had been designated or registered as monuments in the past, even the concept of cultural landscapes had been introduced in the Act, while only the buildings and the territory of the factories (and timber-dormitories around the factory in the case of Hualien) were included in the registration of cultural landscapes of the sugar industry. However, the farms and railway systems related to the production of sugar were both excluded.

Besides, the two remaining sugar factories that are still functioning are also not registered under the Act. Conservation of the industrial heritage depends on preserving functional integrity, and interventions to an industrial site should therefore aim to maintain this as far as possible (TICCIH, 2003). It would be appropriate that the factories still functioning be registered under the category of cultural landscapes. The continuing and sustainable use of the factories is respected within the concept of cultural landscapes, therefore the necessary maintenance, restoration, and even limited replacement due to the production would be considered as a process of organic evolution. This would not lead to a fossil preservation but the registration and restoration of sugar factories and landscape in the manner of cultural landscapes.

### 4.2 Research

The research of sugar factories in Taiwan began during the 1990s. Most of the results since then were related to the history of factories, the potential for sustainable use of factories, and possible methods of reuse of these buildings. Research into the cultural landscapes associated with the industrial heritage has also started recently. The thesis of Wang (2008) discusses research into the case of gold and copper mines in northern Taiwan, and analyzed the relationship between mining industry heritage and cultural landscape. The raw material of the mining industry heritage came from the natural environment, so that the interaction between people and the land occurred during the production process, and this relationship demonstrated the key concept of a cultural landscape.

Investigation work concerning cultural landscapes started in 2005 in every county in Taiwan and some sugar factories were included in the tentative list. The components in the factories with the features of the cultural landscape were listed in the inventories. The more specific directions of conservation and management were also outlined in the reports (NCKU Research and Development Foundation, 2008).

### 4.3 Resistance to Conservation

Although the conservation of sugar industry cultural landscapes would contribute to many aspects, of the history of the place and the memory of the people, there are some difficulties within the actual conservation process.

Firstly, the owner of the factories – the Taiwan Sugar Corporation, lacks the desire and passion for conservation. Few of the factory buildings and related facilities have been registered or designated as listed buildings while the others have not been conserved due to excuses by the company, such as lack of money, or the difficulties of preservation technique. Many facilities and the farmland were abandoned and have deteriorated. In recent years, tourism has become one of the major purposes of development of sugar factories. However, the concepts of cultural landscapes and industrial heritage were not revealed with the commercialization of the sites.

Secondly, the policy of the government concerned with the factories and the land is not specified. The farms of the factories had become a source of land to meet various demands and intentions. The farmland was released from agricultural use, and instead used for housing, science parks, exhibition centers, shopping malls, and amusement parks, etc. As a result the interaction process between human beings and the natural environment was disrupted.

![Fig.5. Tainan Science Park, which was Developed on Former Agricultural Land Around the Shanhua Sugar Factory](image)

### 5. Conservation Concepts Concerning Industrial Cultural Landscapes

The conservation concepts concerning industrial cultural landscapes will take into consideration more than just the physical buildings and physical environment. For example, to preserve the cultural landscapes of the sugar industry will mean to conserve buildings of the sugar factories, the surrounding agricultural environment, and the technologies of production. In addition, the adaptation to new marketing challenges will also be considered.

#### 5.1 Factory Buildings and Industrial Villages

Factory buildings and industrial villages are still the important core of an industrial cultural landscape.
Generally the factories would be preserved as they are as far as possible, but under the concept of organically evolved cultural landscapes, it would be acceptable if the necessary renovation and restoration of the buildings and facilities of a factory which is still functioning was performed. However, the cultural, historical and production aspects should be considered at the same time. The industrial villages around the factories should share the same ideas.

Public participation is also an important part of the conservation of the industrial cultural landscapes. Especially in this industry, which connects deeply with people's lives, the participation of people would contribute to the understanding of the industry. However, in the case of sugar factories in Taiwan, visits to view the process of sugar making are not permitted for safety reasons. Consequently, the public will lose the chance to understand an industry through observing the procedure of sugar making. Public interest and affection for the industrial heritage and appreciation of its values are the surest ways to conserve it (TICCIH, 2003). Thus, it is another method for the conservation of the technologies of production that enable the process of production to be understood and appreciated through the participation of people.

5.2 Land Use

The land that the raw material comes from should be kept for the original use as much as possible. In the case of the sugar industry, the land of the sugar cane farms belonging to the factories, was transformed to various different uses in recent years. Although these changes make a profit for the factories, the changes will harm the integrity of the sugar industry cultural landscape due to inappropriate development and land division. The result will reduce the boundary of the cultural landscape to a very limited area in which only the factory itself is preserved.

From the cultural landscape point of view, the sugar cane farms are very important to the integrity of sugar making. Only when the farms are conserved, can the living process of sugar making be kept. If it is impossible to preserve the growing of sugar cane on the farms, the second-best choice would be the continuing agricultural use of the land with various other crops. In this way, the bio-diversity of the area could possibly be sustained. Other uses of land should be avoided, because the change and damage to the land would be irreversible.

From the cultural landscape point of view, the sugar cane farms are very important to the integrity of sugar making. Only when the farms are conserved, Fig.6. Manufacturing Facilities at Shanhua Sugar Factory Through Observation of the Sugar Making Procedure, People will Develop a Greater Understanding of the Industry.

Fig.7. Former Sugar Cane Farm Farms that Changed to Raise Other Crops Preserved the Land from Other Irreversible Uses.

5.3 Other Transformations

While the industrial heritage would change with time the original production process would also change and need some transformations. Generally, the educational, interpretational functions would be introduced to an industrial cultural landscape, and the people would experience, learn, and understand the development, history, and influence of the industry through these new functions. Usually, a more active conservation method, such as the introduction of tourism, is also considered. In this case, the adaptive reuse of the factory buildings would be implemented.

From the industrial cultural landscape point of view, the development of tourism would be a necessary choice. Alternative income would be provided through tourism, and this income would also contribute to the management and conservation of the cultural landscape. No matter whether through tourism or the reuse of the buildings, the direction of the intervention should not diverge from the "main theme" of the original cultural landscapes. Moreover, the connection between the intervention and the main theme of cultural landscapes can also be seen as one of the processes of organic evolvement.

6. Conclusion

The conservation of industrial heritage no longer involves the preservation of buildings and facilities alone, the related environment and the function of the industry should be considered as a whole. The industrial cultural landscape represents this idea. Not only are the buildings in the core area important, but
the land and the environment around the core, and the continuing functioning are also relevant and important.

The integrity of the conservation of the industrial heritage would be enhanced with the integration of the concepts of cultural landscapes. The conservation of the sugar industry in Taiwan began gradually with the concept of cultural landscape. The preservation of buildings alone in the past has been changed, and the new conservation, which integrates architecture, the environment and its usage has been introduced. With total conservation measures the sugar industry cultural landscapes would provide a new direction for sustainable development between the conservation of cultural heritage and the development of the area.

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