

THE SUSTAINABLE DEVELOPMENT OF THE CULTURAL LANDSCAPE OF JIANAN IRRIGATION SYSTEM IN TAIWAN

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Abstract. Jianan Irrigation System, built in 1920 by the Japanese Colonial Government, had become the most important irrigation system in southern Taiwan since its completion. More than 150,000 hectares dry farmland which could only depend on rain falls in the past had been transformed into productive paddy fields. The operation systems and the management organization still function today. It would be considered as an organically evolved cultural landscape because of the ensemble of facilities, organization, operation systems, and the agricultural landscape created and transformed due to the irrigation system. Jianan Irrigation System had been registered as a legal cultural landscape of Taiwan in 2009. This paper will discuss the possible sustainable development in the irrigation system, and its related field.

1. Introduction

The cultural landscapes represent the "combined works of nature and of man". An irrigation system could be seen as a cultural landscape, an organically evolved cultural landscape especially - the water stored with the limit of the natural landform, flowed through the waterways with the gravity, and used for agriculture, which reflected the limitation of the natural environment, and the interventions from man. The irrigation system would be also one of the important components for rural landscape and development, due to the operation of the system would benefit the agricultural production. Thus, not only the irrigation system facilities, the fields, even the village, could be considered as an integral landscape, which would represent the agricultural production process and scenery.

The conservation of the historical irrigation system would not only to protect the physical infrastructure, the related issues in the environment should be also considered. Sustainable management would be a recommended approach for the conservation.

2. Jianan Irrigation System

2.1. THE BRIEF HISTORY OF JIANAN IRRIGATION SYSTEM

The southern part of Taiwan is a flat plain area. However, before Jianan Irrigation System was built, there were only local irrigation systems in the rural area, which could only depend on the occasional rain water. In 1920, Japanese Colonial Government decided

to build an irrigation system, to improve the agricultural productivity of the plain. The construction work started from 1920, and finished in 1930. More than 150,000 hectares dry farmland which could only depend on rain falls in the past had been transformed into productive paddy fields. The system, stretching over 160,000 km, is consisted of not only reservoir, waterways, water gates, tunnels, aqueducts, inverted siphons and other facilities, but also the irrigation operation systems and the management organization which still function today.

To operate the system, Jianan Irrigation Association was also founded in 1920. This association is still functioning today, which control, operate, and manage the system, according to the necessary of water. The maintenance of the system is also the responsibility of the Association, which include the renovation of related facilities and the repair of the waterways. However, the main structure and the important elements of the systems, such as reservoir, main waterways, and aqueducts, were still preserved as its original status.

From the historical point of view, this system was an important mile stone for Taiwan agricultural development. From the technological point of view, the construction and operation of the system represent the knowledge of human beings. From the landscape point of view, the system had created a harmonious rural landscape, and the elements



Figure 1. The operation map of Jianan Irrigation System.

of the system had been also integrated in it. From the heritage point of view, it could be seen as an organically evolved cultural landscape, for the important elements of the system represent the evolution of human under the influence of the physical constraints and/or opportunities presented by the natural environment.

After the amendment of the Cultural Heritage Preservation Act in 2005, the category of the Cultural Landscape had been added to the Act. In 2009, the System had been registered as a legal cultural landscape of Taiwan.

2.2. THE RURAL AREA AND JIANAN IRRIGATION

SYSTEM

Since the foundation of Jianan Irrigation System, the agricultural production had been increased, and the living level in the rural village had been also improved. In fact, the plain covered by the system had become the major agricultural production base in Taiwan. For the past few decades, the agriculture policy was an important part for government. Thus, the management and operation of the irrigation system would be fine. However, if the agricultural process declines, the function of the irrigation system would also be threatened, and would also cause the issues of protection or conservation.

Therefore, the irrigation system would not only be the



Figure 2. The construction work of the reservoir of Jianan Irrigation System. (Wu, 1998)



Figure 3. The facilities related to Jianan Irrigation System.

engineering works, the future conservation would be connected closely with the development of the rural village and the usage management of the rural lands. The sustainable development and management of the rural landscape would be benefit to the protection of the irrigation system and its elements.

3. Sustainable Developments and the Conservation of the Cultural Landscape

3.1 THE SUSTAINABLE DEVELOPMENTS IN THE RURAL AREA

The researches interests of sustainable development are divided into 3 major aspects: economic, environmental (or ecological), and social/cultural aspects. As for the agricultural sustainability, there are four major goals could be seen as a good indicator for assessment:

- Satisfy human food, feed, and fiber needs, and contribute to biofuel needs;



Figure 4. The farms and the waterway of Jianan Irrigation System.

- Enhance environmental quality and quality of resource base;
 - Sustain the economic viability of agriculture;
 - Enhance the quality of life for farmers, farm workers, and society as a whole.
- (Committee on Twenty-First Century Systems Agriculture, 2010)

3.1.1. The Economy

Due to the limit scale of the farms and land parcels in Taiwan, lots of individual farmers faced the economic problems; furthermore, the prices and cost of the farm products would be difficult to compete with the import ones. (Council of Agriculture, 2000) In this moment, the sustainable agriculture in Taiwan would be more emphasis on the problem of the economic viability, and the quality of life for farmers. Besides, since the change of the economic features, the agriculture is also declining. This also results in the population outflow in the rural village, sometimes only the elder farmers and their grand-children still live in the village. For the economic development of the agricultural system, some strategies try to help promote the farm products and diversify farm income, such as direct marketing, agritourism, etc., many farms would rely on non-farm source of income (Committee on Twenty-First Century Systems Agriculture, 2010). Some more direct strategies would also help, such as direct purchase from government and financial subsidies. Furthermore, the encouragement of farming for young generations, and the maintenance of a healthy and fair market, would be also necessary for the development of the economy in rural area.

3.1.2. Land Management

Inefficient land management also causes the abandon of the land, and the illegal and/or improper usage of the farmland. All these matters finally influence the conservation of the rural area. Once the land changed for different uses, such as the new real estates, even the industrial factories, it will be almost an irreversible change to the rural land. If it could be probably not easy to maintain a sustainable farming, it would be another choice to keep the rural lands as its original status from buildings.

3.2. THE NEW MANAGEMENT OF JIANAN IRRIGATION SYSTEM

Besides the direct benefit, tourism would be another possibility for the conservation of the irrigation system. The tourism facilities were built in the reservoir of Jianan Irrigation System. However it was only the

tourism oriented plan without the consideration of the historical or cultural landscape conservation. On the rural lands, the agritourism was just beginning.



Figure 5. The unsuitable buildings and land use in the farms in Taiwan.

The agritourism, under the umbrella of “ecotourism”, will provide the opportunity for local people to develop new levels of self- and place-awareness – a renewed sense of self-worth, community identity, positive realignment with local landscape and history (Jaworski and Lawson, 2005). The agritourism in the irrigated farms would be benefit not only to the economy of the farmers, but also to the conservation of an irrigation heritage. Not only the scientific features within the engineering of the irrigation system were presented, the agricultural production along the system would be combined with the tourism processes and the additional economic benefit would be introduced.

3.3. THE PROTECTION OF THE SIGNIFICANT ELEMENTS

A cultural landscape could be seen as the complex of the people, operation, site, and elements. Mostly we will see directly the elements, such as the ordinary structures, significant buildings, and other material elements or immaterial elements. On the other hand, the significant features of the cultural landscape were usually represented through the collective and numerous identical elements. Thus, the significant elements in the cultural landscape should be preserved and conserved with necessary legislative and technical instruments, to prevent or minimize the deterioration and change. The protection of the landscape does not remove the need for traditional monument-based designation and conservation methods, which are still required for protecting the fabric of special

features within the landscape, while the limits of the monument-based protection would be not suitable for the protection of the landscape as a whole concept (Fairclough, 2006).

For Jianan Irrigation System, the significant elements would be firstly the reservoir, water gates, tunnels, aqueducts, inverted siphons and other structures. These elements should be not only included in the cultural landscape, but also further preserved and conserved with other monument-based instruments.

4. The Opportunities with the Registering and the Conservation of Cultural Landscapes

While a cultural landscape is registered as a cultural heritage under the preservation law, some values will also appear.

4.1. THE IDENTIFICATION OF THE LOCAL PEOPLE



Figure 6. One of the aqueducts of Jianan Irrigation System.

A cultural landscape is a space directly contacted with local people. Moreover, people are the power of the creation and conservation of a cultural landscape. Cultural landscapes are cultural properties and represent the "combined works of nature and of man" (World Heritage Centre, 2008), it would be also the collective work of people. A cultural landscape registered as an official cultural heritage would be a encouragement for the identification of the local people who use, create, involves in the landscape environment.

The identification of the space of the local people would also provide the base for future public participations. The protection, management, and planning are the major works for landscape, and the public participation (no matter what kind of the participation is) is the necessary procedure (ELC, 2000). However, if the local people are lack of the identity

and the necessary knowledge of the cultural landscape and cultural heritage, sometimes an irreversible damage to the cultural landscape would occur through the process of the public participation. The cooperation between local awareness and the academic researches would be important to avoid the degradation of the landscape. In the case of Jianan Irrigation System, the managers of the system and the government authorities should be also included in the scheme.

4.2. THE NEW MANAGEMENT COMBINED WITH THE CULTURAL LANDSCAPE

The concept of the “agriculture development” had been changed as the concept of the “rural



Figure 7. The workshop for introducing Jianan Irrigation System and related farms.

development”. If the agriculture would imply a “productivist” and farm business development model, the rural development would be a multifunctional, environmentally sustainable and integrated paradigm in which the primary sector opens up to become rural, acquiring a systemic, diversified, alternative, and locally sustainable productive perspective; it also implied from a model of an intensive and sectoral agriculture to a model of territorial development which is endogenous, multifunctional and locally sustainable (Bianchi, 2011). Thus, the rural development would also meet the concept of the cultural landscape.

The agritourism is a suitable model for the rural development, which offers the experience of traditional rural life, the main attractions being home cooking, country walks, mushroom picking, fishing, horse-riding, and so on, as well as engaging in ‘typical’ farming activities (Jaworski and Lawson, 2005). Besides the farms, the related setting in the rural area, such as the important facilities in an irrigation system, will become the elements in the agritourism planning.

Furthermore, the irrigation system would be an important part of farming process, and the recognition of the cultural landscape with the registration of the cultural heritage would further enhance the importance of the irrigation system to the rural landscape. At the same time, the values and the features of the irrigation system would be imprinted on the people through the agritourism process.

4.3. PLANNING AT REGIONAL AND TOWN LEVEL

In European Landscape Convention, it is argued to



Figure 8 Different cultivation in the irrigated farms provided the opportunity for the agritourism.

integrate landscape in to each Party’s regional and town planning policies, and in the cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape (Council of Europe, 2000a). For the cultural landscapes in Taiwan, it will provide the opportunity to integrate the concept with other planning systems after its register, as stated in the Cultural Heritage Preservation Act, Article 56: “In order to maintain Cultural Landscapes and preserve their environments and landscapes, the competent authorities of such sites shall be empowered, together with other relevant authorities, to draft plans for preservation of Cultural Landscapes. The said authorities may in accordance with the Regional Planning Law, the Urban Planning Law, or the National Park Law, classify, designate, or re-classify the Cultural Landscapes preservation lands or areas and other functional lands or sub-areas, and preserve and maintain such Cultural Landscapes in accordance with this Act”.

Although this would be more emphasis on the land management within the area with the value of the cultural landscape, it is no doubt that the land uses

would highly affect the results of the conservation of the cultural landscape. However, other aspects of the conservation should be further considered.

4.4. MANAGING CHANGE

Due to the change is one of the most important characteristic of landscape, the conservation of the landscape should use different approach. Since the concept of the cultural landscape in the scope of the cultural heritage was much latter than the other buildings and structure monuments, there were many different concepts which were followed in the conservation of buildings and monuments, but were not suitable for the conservation of the cultural landscapes. Firstly, the instrument of management should be further considered. While the protection and planning of the landscape are also promoted in European Landscape Convention, landscape management is concerned with the regular and sustainable 'upkeep' of landscape, to guide and harmonise changes which are brought about by social, economic and environmental processes, which is the most relevant way of managing landscapes (Fairclough, 2006). Secondly, the concept of management should be further altered from the preservation of the buildings to the conservation of the landscapes. Traditional methods of protecting fabric are appropriate and necessary for monuments or buildings, but landscape is philosophically different to those things and a more dynamic form of sustainable management is called for. This can be characterised as being concerned with managing change rather than managing things (Fairclough, 2006).

In the system and the history of the cultural heritage preservation of Taiwan, it had not been familiar to the management of the cultural landscape, especially with the concept of "managing changes". For Jianan Irrigation System, the management should firstly focus on the normal operation of the system, and then would be the other compatible economic activities in which the meanings and the importance of the system in the scope of the cultural heritage could be also revealed, to ensure the intrinsic part of the System would be kept. These concepts are not only

important to the irrigation system, but also true for the irrigated farms.

Besides, the concepts of the cultural landscape should not be only analyzed, prepared, and/or managed in the scope of the cultural heritage. It will be necessary and important to carry out through different way and different scheme. Landscape can be affected for good or ill by action in many sectors. Hence the need for governments to ensure that landscape objectives are taken into account in all relevant sectors of public life (Council of Europe, 2000b).

5. Conclusion

"Sustainable development" had been considered as an important issue in the landscape discipline. For the cultural landscape with the cultural heritage value, a "sustainable management" would be a more applicable manner with the conservation of the cultural landscape.

Jianan Irrigation System had been one of the important irrigation systems in Taiwan since its founding, especially the scale, the irrigated area, and the historical and economic influences. Before the registration of the cultural landscape, the system had been functioning continuously. Since the registration under the Act, it would be necessary to plan the management strategy with the concept of the cultural landscape and cultural heritage conservation. For an irrigation system, the conservation works would be closely connected to the normally operation of the irrigated farms and rural landscape. The conservation/preservation of the structures of the irrigation system, and the continuing process of the farms are both important to the management of the irrigation cultural landscape.

The sustainable management of the irrigation cultural landscape would require many works from different disciplines. The cultural heritage protection may effect on the significant elements which would ensure the most obvious feature in a cultural landscape could be represented. The sustainable economic planning would provide necessary base for the people living



Figure 9. The main water gate of Jianan Irrigation System (left: 2006; right: 1920s) (right photo: Wu, 1998)

in, even create the new possibility for the future. The land use management, necessary and valid, would be an important issue which directly influences the results of the conservation of the cultural landscape.

Although the change is an intrinsic feature in the landscape, an irreversible change on the land use would damage the meanings and values of the cultural landscape, especially its heritage value. Managing change would become a new challenge in the conservation in Taiwan, and it would be an inevitable approach for the conservation of the cultural heritage.

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RAPPORT

LE PATRIMOINE CONTRE LE DÉCLIN ?

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Dans le cadre de cette session “Le patrimoine contre le déclin ?” le point de départ des interventions menées sur le patrimoine a été le « déclin », qu’il s’agisse du déclin du patrimoine lui-même, du bâtiment abandonné ou dégradé ou des paysages non entretenus ou menacés par un développement urbain exponentiel, des sociétés de manière plus large, comprenant une récession économique, une perte de population qui menace de déclin un patrimoine parfois déjà négligé (exemple du Pérou ou des Shrinking Cities). Le tout a été présenté dans une perspective d’espace : urbain ou paysager et dans lequel l’homme joue un rôle prépondérant.

Face à ce déclin c’est l’action qui a pu être menée sur le patrimoine au travers des divers exemples exposés qui constitue le fil directeur de cette conception émergente, celle de vouloir faire du patrimoine un moteur du développement. Plusieurs leçons ou observations se dégagent à l’issue de cette session.

- La protection patrimoniale est apparue comme un levier du développement, notamment le classement au patrimoine mondial de l’UNESCO (exemple : Sénégal, le Pérou ou Justus van Effen Housing Complex) ; elle est donc nécessaire quoique le débat reste ouvert sur l’impact du classement sur l’évolution de la ville (« ville musée », à l’identique ou une adaptation de la gestion du patrimoine urbain aux réalités socio-économiques et culturelles ; exemple Saint-Louis du Sénégal.).
- L’anticipation des possibles effets de la protection mise en œuvre pour prévenir des impacts négatifs (spéculation, réduction de l’activité, appauvrissement et exode) et la mise en place d’évaluations régulières et d’un contrôle de la mise en œuvre et de l’évolution des protections (exemple : Pennsylvania Wilds). Pour cela, la relation de l’homme au milieu doit rester au cœur du processus de protection et de gestion du patrimoine.
- La nécessité de renforcer la collaboration entre les différents acteurs du patrimoine et du développement territorial de manière générale :
 - D’échelle différente = UNESCO, Etat, collectivités, habitants
 - De secteurs différents = public, privé, ONG
 - De disciplines différentes = social, économique, politique

Aller vers un nouveau mode de gouvernance partagé efficace (exemple : Pennsylvania Wilds, le Pérou) et stimuler les coopérations et la coordination régulières entre les différents acteurs et niveaux. Eviter enfin les possibles effets négatifs d’une décentralisation qui ne prendrait pas en compte les nécessaires protections du patrimoine.

- La nécessité de prévoir et mettre en place les moyens financiers, réglementaires et humains pour que la

préservation et le développement n'échouent pas = renforcer les stratégies d'investissement, les partenariats publics-privés, l'engagement des populations locales (exemple : Shrinking Cities et Heritage & The Governance Agenda).

- La nécessaire connaissance et compréhension de ces patrimoines, de leur système de fonctionnement ainsi que de la valeur qu'ils représentent pour les populations locales, tant en amont de la détermination du mode de protection qu'en aval, afin d'informer les populations et les touristes pour qu'ils respectent ces équilibres patrimoniaux (Exemple : Space is Not Nothing, Pérou, Sénégal, La Mojana, Justus van Effen Housing Complex). La communication sur ces valeurs s'est avérée être un instrument utile dans le processus de développement.
- Appuyer toutes ces stratégies patrimoniales de développement sur le patrimoine immatériel, c'est-à-dire une identité partagée et reconnue, un sentiment d'appartenance fédérateur, une fierté pour mobiliser la population dans la préservation et le développement de l'ensemble de leur territoire.
- Toutes ces actions sont à mener et à penser dans une interdépendance équilibrée à maintenir et développer entre ville et campagne, entre paysages culturels et paysages agricoles (exemple : Taiwan, Country Residences, et "Understanding the conservation of historical settlements and cultural industries from an urban and regional development perspective").