

RECONSTRUCTION CASE STUDIES IN JAPAN AND NEPAL—PERSPECTIVES FROM ENDOGENOUS DEVELOPMENT AND THE ‘ICICLE MODEL’

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Abstract

This study argues about the theory of endogenous development, a theory of social change proposed by Japanese sociologist Kazuko Tsurumi, and its ‘icicle model’ described by Kunio Yanagita, which complements one of the perspectives on the concept of development that Tsurumi refers to, for the purpose to analyze examples of how adjustment efforts are made between traditional and modern way of life. While traditional life is forced to change due to modern social changes in each society, the differences between the two coexist despite their conflicts. In contrast to the idea of ‘exogenous development’ that imitates the Western European development model, endogenous development refers to the renewal of traditions through endogenous process in each society in response to changing needs based on the conditions of each society and its natural environment. Among them, the ‘icicle model’ provides a structural view point of development in which new things created in response to the needs of the new era are layered on top of the icicle, leaving the old inside, so that the new and the earlier values coexist at the same icicle. This study firstly analyzes examples of the ‘icicle model’ of Japan. Focusing a case of Otsuchi town in Iwate Prefecture, a town that was devastated by the tsunami in the Great East Japan Earthquake (2011), and where the spring water and its wells that were characteristic of the region were incorporated into the reconstruction plan and rebuilt as the town’s distinctive, traditional and natural features. This thesis will then look at Nepal’s case, a country in same Asian region, focusing on cases of Dhungedhara and Pokhari, both famous traditional water facilities, the existence of which is endangered due to rapid population growth and modern infrastructure needs. An appropriate way to resolve such an issue could be a concept that might be Nepal’s ‘icicle model’. By examining the cases of these two countries, this study tries to convey the view of endogenous development theory proposed by a Japanese scholar who witnessed rapid changes since the 19th century, and share it in Nepali context which is also witnessing rapid change in the past decades.

Keywords: Endogenous development, Icicle-model, Kathmandu, Otsuchi, Traditional water facility

1. Introduction

1.1. Endogenous Development and Icicle Model

Endogenous development theory is a field of study that examines cases of social change in local communities with endogenous manner. It was developed by Japanese sociologist Kazuko Tsurumi (1918-2006) as a discipline that explores the process of social change in which, as local traditions become unable to adapt to new social conditions

over time, old traditions are remodelled to adapt to the new circumstances. This theory does not analyze cases by fitting them to a specific development model, but rather examines each cases individually, examining how the region’s unique characteristics have been remodelled to bring about adaptive change in new situation. When analysing a case, this theory focuses on several key points. For example, it focuses on the activities of local people and key-person facing social change, and considers the motivations behind their activities, including any religious belief or animistic ideas of coexistence with nature. It does not reject the need to incorporate information and new technologies from outside the region as needed, but focuses on connections

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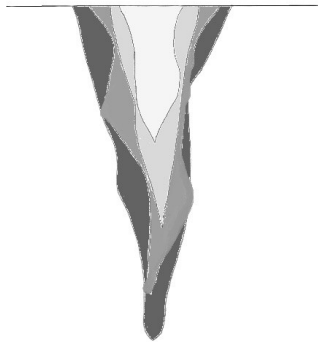


Figure 1. Image of icicle. The layers of the icicle are transparent showing earlier layers at the interior core.

with external conditions and examines how traditions have been remodelled through the endogenous motivation of local people.

1.2. Icicle Model

As far as Modernization theory is concerned, it only views the state of social development in terms of the degree of industrialization and its economic scale. Thereby the theory ignores regional characteristics such as culture, environment, and lifestyles. In contrast, the icicle model applied in this paper's analysis can take all aspects of life into account. The word 'Icicle model' is Tsurumi's interpretation of the words of Japanese folklorist Kunio Yanagita, which comes from the idea of viewing social change and its state to an icicle. Yanagita was born in 1875 (1963) and had collected a lot of folklores in Japan. He believed that ethnic culture must be explored and considered first by its people who share same sense of culture (Tsurumi, 1996).

Icicles are pillars of ice that grow over a long period of time. Old water droplets remain inside the icicle, while new water droplets flow around the surface of old ice layer, creating new layers on it. Modernization theory sees old social structures are replaced by new ways in a total manner. In contrast, the icicle model sees the old and the new as building up together, and therefore the new does not reject the old, but rather sees them as coexisting meaningfully together. As such, its distinctive feature is its attempt to view ways of life as icicles.

A concrete image of the icicle model can be understood as shown in Figure 1. It is important to note that icicles can take various shapes depending on various conditions, such as changes of the outside temperature, humidity, wind conditions and so on. For example, some icicles grow straightly, while others appear uneven with large

protrusions. If we take these differences to view societies, we can imagine shapes of icicles differ depending on how each society reacts and adapts to new social conditions that they have been forced to adapt to. For example, when the shape of icicle is uneven or the layers are thin, both new and old layer may be visible from the surface. In this case, it could be possible to express the clear coexistence of old and new eras at the same time.

Today, rapid and abrupt social changes are caused by globalization, industrialization, information technology, and sometimes devastating natural disasters are forcing to change the historical and traditional ways of life. Despite this global trend, however, we remain conscious of the need to preserve the traditions and culture that are so important to our lives, and strive to balance in the new situation. In this study, with applying the icicle model to illustrate how people in Japan and Nepal, experiencing and responding to rapid modernization and abrupt natural disasters— such as earthquakes, adjust their society. By examining the cases, this paper demonstrates not just the society being renewed under the strong influence of modernization, but also a quest to preserve values inherited from the past in their way of life.

Firstly, the paper studies an example of Otsuchi town in Iwate Prefecture of northeast region of Japan, which was devastatingly swept away by the tsunami following the Great East Japan Earthquake of 2011 and required the entire town to be rebuilt. The study focuses on attempts of reconstruction of water springs, like artesian springs and wells, which Otsuchi valued as a distinctive feature of the town. Secondly, this paper examines the case of Kathmandu Valley in Nepal. In Kathmandu Valley, this study focuses on stone conduits (Dhungedhara) and reservoirs (Pokhari), to consider the movement to preserve public water system in a situation of groundwater depletion due to rapid population growth and the impact of urban development including underground construction. Both of these cases have the theme of tradition related to water resource management and both are the examples of attempts to preserve traditional way of water usage while adjusting it in the modern system.

2. Case Study of Japan and Nepal

2.1. Case of Otsuchi Town

Otsuchi town of Iwate Prefecture in Japan, which is located at the eastern coast of the northeast region, experienced extensive damage in the 2011 Great East Japan Earthquake as in Figure 2. The town's coastal areas were devastatingly swept away by the tsunami, resulting in the loss of nearly 8% of the town's population that stood at 15,994 at the time of earthquake. The town faced the need to rebuild large portion of the town's residential area. Geographically, central area of the town is at the confluence of two rivers that run from the mountains of the town region.



Figure 2. Location of Otsuchi

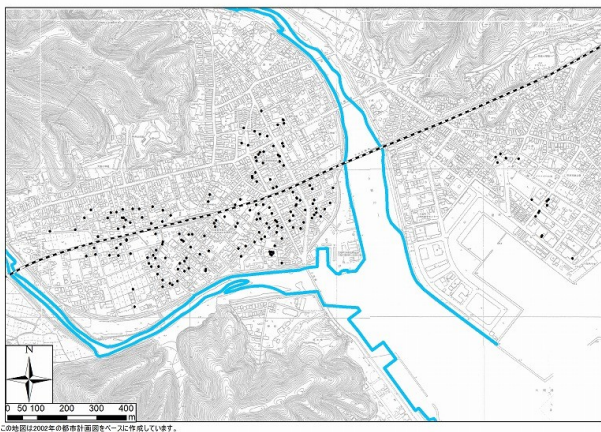


Figure 3. Map of central area of Otsuchi town and location of investigated wells and springs (Washimi, 2013a)

And that coastal area is town's central area called Machikata as shown in Figure 3. The rivers flowing from mountain area produce abundant underground water to the town's coastal area, and especially Machikata has high density of the springs and wells.

Before the Great East Japan Earthquake, many homes beside the tap water supply had wells and artesian springs that were used for daily life. Focusing on these cultural and traditional values of the water facility, this case study examines the preservation attempts of the wells and artesian springs in the town. Survey results revealed that Machikata area in Otsuchi town previously had nearly 200 artesian springs or even more, a significant number for the size of the area as in Figure 3 (Fujiyosi et al., 2018, Washimi, 2013a).

The spring water was used for drinking, washing and cooling foods and some homes even had water for bathing purpose also. Public wells and artesian springs also served



Figure 4. Shinto ritual before filling spring (J-cast news, 2014)



Figure 5. Retention park with spring water pond

as gathering places, and so, water was a rich cultural feature of Otsuchi. However, after the tsunami disaster, most of the affected area decided to raise the ground level during reconstruction to protect the place from future tsunamis. The average raised height was 2.2 metres (Otsuchi town, 2014a); this meant that many springs there had to be filled in (J-cast news, 2014). As a result, many springs were filled, and new homes built fitted with piped tap water, making spring water less necessary than it has been before.

While this has led to a decline in the importance of water springs in daily life, conservation efforts have been made to preserve the natural springs due to their cultural significance. One of the ways decided for preservation is the development of coastal area that was deemed as a disaster risk zone, and where buildings was no longer feasible. The area was developed into natural parks that made use of spring water and wells there as in Figure 5. Efforts have also been made to preserve the wells in reconstructed parks in other areas of the town by maintaining the low ground level that existed before the land level was raised (Figure



Figure 6. Traditional water boat with spring water



Figure 7. Signboard about water facility

6). Signs explaining the traditional relationship between the town and water have also been erected in the parks as an effort to bridge the history of Otsuchi and its springs to future generations (Figure 7). In other words, efforts have been made to preserve the springs though in a reduced number. The rebuilt water springs and wells within the town is now preserving important memories of the community while contributing to maintain the historic character of the town.

In the above case of Otsuchi town, the aspect of social change emphasized in endogenous development theory is that many houses and town infrastructure were washed away by the earthquake and subsequent tsunami. Consequently, the necessity of landfilling to raise the land level created a conflict between the demands of new social conditions and to keep the traditional water facility as it was before. Furthermore, as tap water systems were installed in each house rebuilt, and with predicted population decline of the town, the need to rebuild wells as a daily usage is diminishing. This conflict led Otsuchi town to decide to preserve the traditional water facilities in parks, even if it meant reducing the number of springs (Otsuchi town, 2014b).

Furthermore, in an area determined as a disaster risk zone

where buildings could no longer be constructed, a natural park was built with a large spring pond functioning as a place where underground water flows out, thus maintaining the image of a water-rich town. When considering this development in terms of the icicle model, one point to note is that the traditional water facilities could not be preserved as they were prior to tsunami. In such circumstance, the history of past life forms (built forms) could be illustrated as an older layer of icicle, while the changes of modern times can be illustrated as outer surface layer. Though the older layer of past life is no longer easily visible from the surface, the new layer still includes spots of older layer with it. This shows not only the houses with tap water lifestyle but also spring water parks and artesian springs remaining in town parks evoking memories of people's past lives in a selective way. This could be illustrated with a shape of an icicle, such as in (c) in Figure 8 which indicates that the new outer layer, representing a lifestyle with tap water facilities are the mainstay, is thicker, revealing that the lower layer representing the past life is hidden by the surface layer and is difficult to observe. However, efforts to preserve traditional water facilities in the town, have allowed the past layer come to surface slightly, revealing memories of the past. Using an idea of icicle to consider the change in a society in this

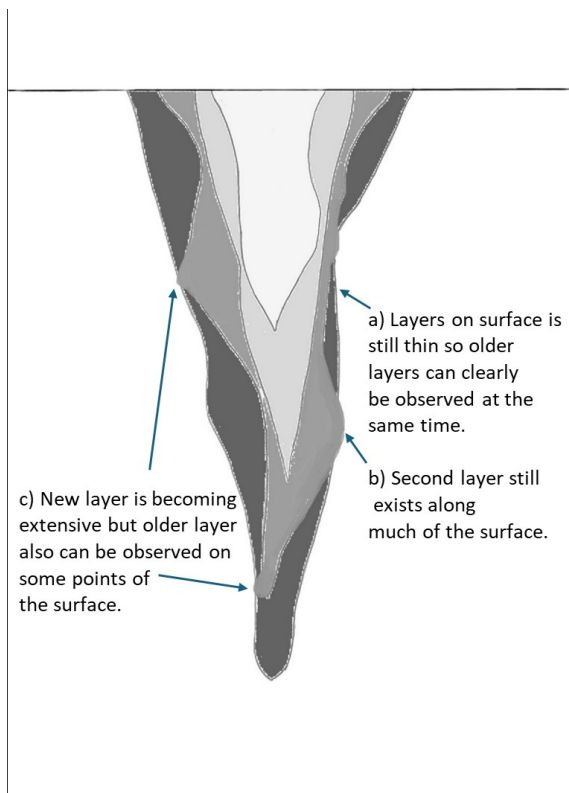


Figure 8. Icicle model study pattern

way may help explain the connection between Otsuchi's present and past. The deeper layer in icicle may explain even older memories that are no longer visible at present state, Yanagita explains invisible memories also exist within peoples' lifestyle or in their way of belief.

In this way as seen in the layers of icicle, Otsuchi's challenge should be whether and how to keep connection with new and old lifestyle together in the future. It will depend on residents of Otsuchi whether they want to actively incorporate traditional water facilities into their daily lives, and on their thoughts which will determine how future layers will be formed. If the voices calling for spring water to be utilized grow louder, it could be said that a new, thick layer representing the spring water culture will be created on top of the icicle's surface.

2.2. Case of Kathmandu Valley

Drawing the findings from Otsuchi town, this study secondly examines the case of traditional water facilities like Dhungedhara (stone conduits) and Pokhari (reservoirs) in the Kathmandu Valley, Nepal, which also feature water as a theme. Dhungedhara and Pokhari are found throughout the historic Newar towns of the Kathmandu Valley, and where the water continue to flow they are still actively used in daily life. The water supply to these facilities was designed with a system of underground water channel from

the upstreams and higher level lands into the city, supplying water throughout the year including the dry season (Joshi, 2014). Stone inscription records show that these water systems have a history of more than a millenium and which are functioning until late in modern times. Beyond their historical significance, these systems continue to be used in daily life even today at a time when Kathmandu Valley is experiencing drastic changes due to rapid population growth driven by modernization.

Many people still actively use dhungedhara, for drinking water, bathing, and as a place of relaxation as show in Figure 9. However, in recent years, it is becoming a problem due to increasing pressure of population growth and urban construction that led to many dhungedhara and pokhari to dry up due to the closure of irrigation channels and decline in groundwater levels. As in the case of Otsuchi, the spread of modern tap water facility in Kathmandu has led to the construction of underground water pipes, bringing water to many homes. But, the construction of pipes and cement-concrete foundations underground in the city has disrupted the traditional groundwater flow, causing water facility that have played an important historical and traditional role to begin drying up. However, because they are recognized as components of the city's practical element of daily life and aesthetic space, the neglect of dried-up dhungedhara and pokhari is seen as a problem, and efforts are being made to preserve them (Figure 12). Some other dhungedharas are maintaining their water flow during the rainy season only as in Figure 11. Some of pokharis are being restored to protect its water flow systems from destruction of the groundwater pathways. For example, Ranipokhari, which was destroyed by the earthquake of 2015, was rebuilt in a way that preserved the pond employing the traditional technology to maintain groundwater storage and its supply as much as possible. This was achieved after residents opposed a government plan to use concrete to the base of pond and store tap water in it (Figure 10).

To consider this case as an icicle model, the social changes in the Kathmandu Valley can be attributed to groundwater depletion and blockage of underground water channels due to changes in underground infrastructure caused by rapid urbanization. In a manner similar to Otsuchi town, the decline of traditional water facilities has also been attributed to the fact that, as water pipes become more widely available to every household, the need for these facility has been diminishing. In Kathmandu Valley, in response to the conflict between modern trends and historical values, as already mentioned above, some dharas continue their water flow temporarily during the rainy season. And there are some dried out dharas which have been filled up.

Considering the cases of Kathmandu Valley, the icicle



Figure 9. Kumbeshwor hiti (Lalitpur)



Figure 10. Ranipokhari after reconstruction (Kathmandu)

image could explain the changes as shown in Figure 8(a) and (b). For example, the dhungedhara and pokhari themselves have been preserved in their original state because they were not completely destroyed by earthquakes or other disasters unlike Otsuchi town. This means that old layers reflected in traditional lifestyle remain prominently on the surface together with new layer (b). Therefore, they are not hidden beneath the surface like ancient layers of icicles inside. Because they are used for practical purposes in daily life, and are therefore not ancient layers but rather prominent layers on the surface. Therefore, along with new ways of life such as tap water, it also represents the traditional lifestyle of the past on the surface of the icicle. As in the above cases, people of the Kathmandu Valley will likely continue to recognize the value of old water facility and its system, and prefer its preservation rather than destruction. Therefore, the layers of ice that represent the lifestyles utilizing traditional water facilities will likely remain on the surface and may even thicken with the growing maintenance and their use. Furthermore, as shown in the Figure 8a, the latest layers in



Figure 11. Sundhara (Lalitpur)



Figure 12. Restoration work of Salanpukhu (Bhaktapur)

the Kathmandu Valley are relatively thin, allowing the past layers to be seen through.

3. Comparison of the Two Case Studies

3.1. Similarities and Differences between the Two Cases

As summarized in Table.1, the two cases share a commonality: both involve the daily use of underground

water from the higher land and mountains. Both have a history of practical use of traditional water facility in daily life, and the spaces they use have cultural and traditional value connecting community. Most importantly, they share the underlying causes of social change. Both cases share the common theme of a decline in traditional water supply facilities, due to the impact of modernization, such as the global spread of modern tap water system. Meanwhile, there are differing factors between the two cases. The driving factor of change in Otsuchi was the need to rebuild their town after the tsunami. Furthermore, town planning was premised on a declining population, making wells and artesian springs less necessary as before. In contrast, in the Kathmandu Valley, new social conditions emerged, including a decline in groundwater due to rapid population growth and changes to underground infrastructure due to urban development opposite to Otsuchi's condition. However, these factors led to the similar result such as replacement of earlier water supply facilities with modern tap water, leading to the decline in use of traditional water supplies. As such, it is possible to see that traditional water systems in Otsuchi and Kathmandu are facing decline due to some common and some different reasons. However, both cases share a common thread: both are recognizing the town's distinctive features in traditional water facilities and striving to preserve their value, thereby preventing past memories from fading away. However, in Otsuchi, because the ground level of the land was raised to prevent tsunami damage, many of the old wells and springs were filled, making it difficult to say that past lifestyles remain intact. Kathmandu, on the other hand, differs in that its dhungedhara and Pokhari, a part of the water system, remains intact. When considering the case with drawing icicle models, it is possible to analyse how to represent the past and the present of the case, thereby determine the extent of how the influence of the new era has repainted past lifestyles, or how they coexist without repainting them, as distinctive features of each case.

3.2. Discussion of the Cases as an Endogenous Development Theory

This paper focuses on how the icicle model can illustrate considering specific cases of differing regions, which endogenous development theory is concerned of enabling the unique characteristics of each case to be utilized in facing rapid social change. However, it is necessary to clarify whether the case can be considered as endogenous development. The paper begins by stating that endogenous development theory requires a focus on the activities of local people and key-persons facing social change, and that the motivations supporting these activities, such as religious beliefs or animistic ideas of coexistence with nature, should be taken into consideration. The paper also explains it does not reject the need to incorporate new technologies

or informations communicating with outside the region as needed, but also focuses on connections with external factors. In this regard, the cases in this paper highlights the fact that it was the local people who sought to preserve the traditional forms of water facilities in these regions. For example, in Otsuchi, town planning meeting was held for local people to discuss how they want their town to be rebuilt. Local residents expressed a desire for a town with traditional spring facility (Otsuchi design meeting, 2013). In Otsuchi, when land was raised and wells and artesian springs were filled in, local residents requested to have Shinto ritual ceremony for the springs going to be filled (Figure 4). This explains spring has religious value to the residents.

In Kathmandu, on the other hand, there have been cases of Ranipokhari reconstruction where residents opposed to government plan that did not care for preserving pond and temple in the traditional manner. The community awareness expanded to preservation movement (Uprety & Shrestha, 2021). In Bhaktapur, for example, the city itself is actively and enthusiastically working to preserve the entire town with its own authority and budget (Nepali Times, 2018). These can be understood as spontaneous expressions of the desire of the people of Otsuchi and of Nepal to preserve their own history and traditions. Considering the influence of outsiders, for example, external experts have visited Otsuchi town several times to conduct spring surveys, with local residents participating (Washimi, 2013b), which may have contributed to bring the town's commitment stronger to preserve springs during reconstruction. On the other hand, while Kathmandu receives a lot of foreign aid and accepts foreign experts in its development projects, it seems the main interests of such foreign aids has been on historical monuments like temples, and not so much on traditional water facilities. This suggests that it is the people of Nepal and Kathmandu themselves who have a strong sense of the historical importance of traditional water facilities. Furthermore, considering about the religious sense or animistic sense, in Otsuchi town, water represents the town's connection to its abundant natural environment. In Nepal, water also represents the town's connection with the sacred mountains and rivers that support life in the Kathmandu Valley. Water also plays a sacred role in various festivals, demonstrating its connection to the unique natural environment of the region and its sacredness has a religious dimension. In this way, even from the perspective of the requirements of endogenous development theory, this is an example of preservation and restoration work based on the endogenous motivation of the local people.

4. Conclusion

Based on the considerations in this paper, what insights can be gained comparing the two cases using the icicle model for the future preservation of Kathmandu Valley?

Table 1. Similarities and differences between the two cases

| | Otsuchi town | Kathmandu Valley |
|---|--|---|
| Facility | Water wells, water springs | <i>Dhungedhara</i> (stone conduits), <i>Pokhari</i> (reservoirs) |
| Similarities | - A water supply system using underground water from the surrounding up streams and mountains - Practical value in daily life - Cultural and traditional value | |
| Similarities (effects of modernization) | Spread of modern tap water facilities | |
| Differences (local specifics) | - Destruction by earthquakes - Reconstruction in anticipation of population decline | - Changes in underground infrastructure - Rapid population growth - Groundwater depletion |
| Differences | Many of the old facilities filled and new facilities have been created and preserved in selective way. | The old facilities remain in their original form and are preserved as they are. |

Unlike Otsuchi, the Kathmandu Valley's traditional water facilities are not hidden beneath the new layers of icicles, but are rather prominent surface with new layers. Therefore, the challenge for preserving characteristics of historical cities of the Kathmandu Valley may be how to preserve them in their original form, and make it thicker on the surface of the icicle that means to keep the connection of traditional water system with modern life active attributes to the thickness of the layer.

In the case of Otsuchi, the depletion of underground water was not an issue. In contrast, in the Kathmandu Valley, water depletion is a problem. Therefore, in addition to preserving the visible *dhungedhara* and *pokhari*, it is also crucial to prevent underground infrastructure from destruction due to urban development and maintain the underground water flow pathways. However, this requires a decisive policy on urban development which could be a difficult challenge. Preservation of traditional urban structures will depend on the thoughts and hopes of the people regarding their lives, which will influence the direction of future urban planning and development. The strength of the people's wishes and hopes is likely to have a major influence in future development works. For this reason, it is important not only to know what outsiders can objectively know, but also to understand the thoughts and feelings of the local people, as Yanagita pointed out.

Therefore, it is necessary to investigate the thoughts and feelings of the local people living in the area regarding preservation, and to depict and its psychological aspects within the image of icicles. In this study, only two case studies have examined to introduce how icicle model can be utilized to understand the dialectics of tradition and development. However, more case studies would help to further the understanding of each characteristics. It can serve as a tool for designing Nepal's original way of future

development. A future challenge will be to utilize the icicle model to deepen social considerations through a variety of case situations that are facing rapid social change and making efforts of adjustments between new and the old.

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