

AGRARIAN LAND USE CHANGE AND CONSTRUCTIONS OF THE COMMONS: A CASE OF INDIGENOUS AGRICULTURE DEVELOPMENT IN TAIWAN'S MOUNTAIN AREAS

Chia-Nan Lin* Bor-Wen Tsai**

Abstract

This study aimed to identify different land-use types from indigenous people's agriculture development in Taiwan's mountain areas. We focused on the agrarian land use changes, in attempt to analyze these land use types caused by what political and economic processes under mountain agriculture development in Taiwan. Further, we studied on indigenous people's agrarian land use mechanism to figure out the regimes of resources management in different land use phases that they governed agrarian resources as common-pool resource. For these reasons, Tayah tribe, an indigenous community of Tayal people located in northern Taiwan, was selected for a case study to discuss for the tribe's complicated progress of mountain agriculture.

The result shows that the progress of mountain agrarian land use could be divided into three phases influenced by the political and economic situation. Each phase contains a specific regime about resource management that represents how land resources be interpreted and operated as the commons. These three phases were traditional swidden agriculture period, rice farming production, and diverse cash crops connected with market economy.

Based on the findings, land use types which represented management regimes were transformed not only by agricultural process, but also by indigenous people's cultural contexts. That illustrated land use issues of indigenous tribe especially located in mountain areas were complicated processes. Nowadays, the regime of resources management in local community was vulnerable and much weaker than before. That will be a critical and tough issue when we concerning about the robustness of management regimes especially in complex commons systems.

Keywords: Land use change, Mountain Agriculture, Tayal indigenous people, Common-pool resources, Taiwan

* PH.D. Student

Department of Geography, National Taiwan University, Taipei, Taiwan, R.O.C.

** Associate Professor

Department of Geography, National Taiwan University, Taipei, Taiwan, R.O.C.

INTRODUCTION

Agrarian land use usually reflects the ways human adapts to their environment with different space and time. Various land use types also indicate how land or natural resources be utilized in diverse social contexts and geographic conditions. In Taiwan's mountain areas, numerous agricultural activities were taken place from 100 years ago to present. The most one of these agriculture actors in mountain areas was indigenous people. They had lived in Taiwan's mountain areas for hundreds of year, and evolved several complicated regimes regarding natural resources management with their cultural means. So, in terms of indigenous agriculture, land use was definitely showing the relationship between indigenous people and their surroundings with their cultural beliefs. Consequently, indigenous people's land use could be considered as a type of self-governed resource by their specific mechanism composed of tradition institutions, social organizations, and religions.

Besides, governments' policy and modern economy made some dramatic changes to indigenous people's agrarian land use in past 100 years. These changes were eventually affect their resources management regimes in several ways, and probably made conventional regimes reconstruct in order to produce a suitable adaptation in new situations. In this case of land use change, what kinds of resource management regime and how indigenous people practice these regime in their land use were two main questions we concerning. For these reasons, this study retraced mountain areas' agrarian land use history in a Tayal¹ tribe case. We also analyzed what management institutions were practiced in each land use period and how these management regimes facilitated natural resources be regarded as a self-governed 'common-pool resources' in a complex circumstance.

INDIGENOUS PEOPLE'S REGIMES ABOUT COMMON-POOL RESOURCE

In recent 20 years, discourses about indigenous people's resources utilization or management were extensively concerned in several research fields, such as anthropology, geography, political science, applied ecology, and so on (Posey, 1985; Berkes, 1989; Colding and Folke, 2011). It illustrated that indigenous people's cultural contents indeed had some specific implications with resources utilization practices and management regimes. As Berkes and Farvar (1989); Gibbs and Bromley (1989) mentioned that indigenous people's communal property meant not only property regime but also their social institution which evolved with their culture together. In this perspective, rules, norms, or social institutions were culture-driven by self-organized

¹ Tayal people were totally the same with Atayal people. Because of more announcements on rectification of the name 'Atayal' from native perspectives, we substitute the term 'Atayal' with 'Tayal' to express our regards.

processes rather than were created additionally to regulate collective behavior (Sandström, 2009). In other words, these cultural means made their environment become a self-governed resource. Eventually, it would be practiced as a common-pool resource that highly connected with their cultural beliefs. Indigenous people's everyday practice was managing their commons (Ostrom, 1990).

However, with the trend of modernization, indigenous people's lifestyle might probably not as traditional as before. A well governance regime in the past might not as workable in today. As a result, conventional practices were supposed to provide an adaptation to fix the requirements in different situations. It led to the diversity of resource management regimes which mostly reflected in its attributes (Ostrom, 2005; Janssen et al., 2007; Tang and Tang, 2010). Therefore, studied in the evolution of resource management regimes would gave us a great lesson to realize the changes about how indigenous people define a common-pool resource in different phrases and social contexts, and provided an example to consider how collective regime could be reconstructed in the diverse and complicated situations.

CASE STUDY AND METHOD

Tayah tribe – A indigenous community of Tayal people

Tayah tribe was located in Yufeng Village, Jianshin Township, Hsinchu County, in northern Taiwan, where the elevation is about 1,200 to 1,300 meters (Figure 1). The inhabitants of Tayah tribe are all Tayal people, one of Taiwan's aboriginals, distributed from Taipei County (northern Taiwan) to Nantou County (central Taiwan), and had the most extensive geographic distribution among Taiwan's indigenous peoples. For hundreds of year, most of Taiwan's north mountain areas were Tayal people's traditional territory. Tayah tribe was a Tayal's settlement with more than 200 years history. Nowadays, the majority of local residents' occupations are farming. Their main agricultural productions are vegetables and fruits (Liao, 1984).

This case study has some specific characteristics. First, it is a mountain agriculture place. And in fact, there are still some differentiations compared to Taiwan's common mountain agriculture development that we were attempting to figure out. Besides, it's an indigenous tribe. Land use in an indigenous tribe might follow some cultural context. In other words, this kind of land use issue not only regarded local agricultural process, but also refers to indigenous people's cultural contents about land resources, especially in communal property and commons. In short, it is a complicated situation about 'the commons' issue. For these reasons, Tayah tribe was selected for this research.

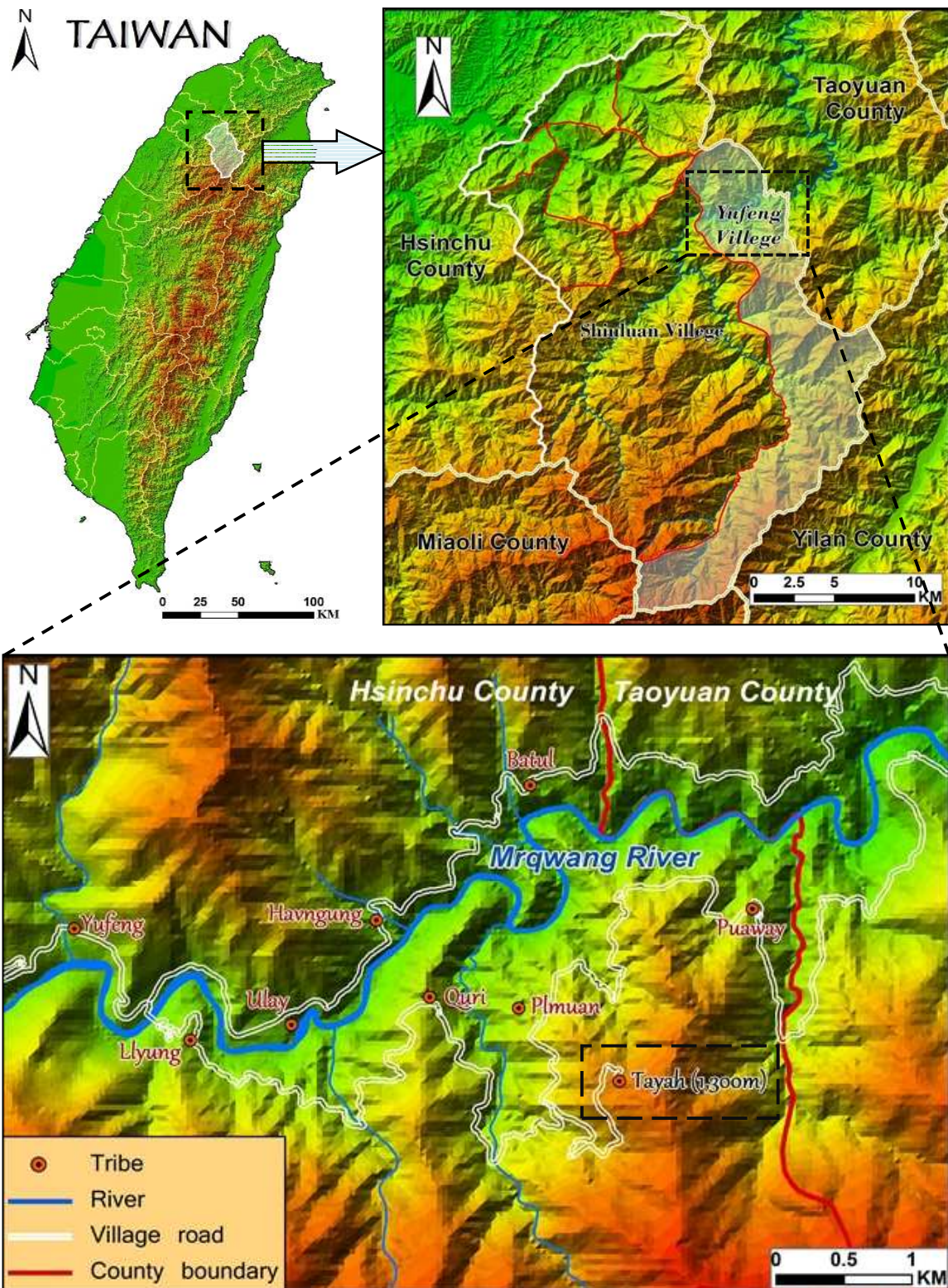
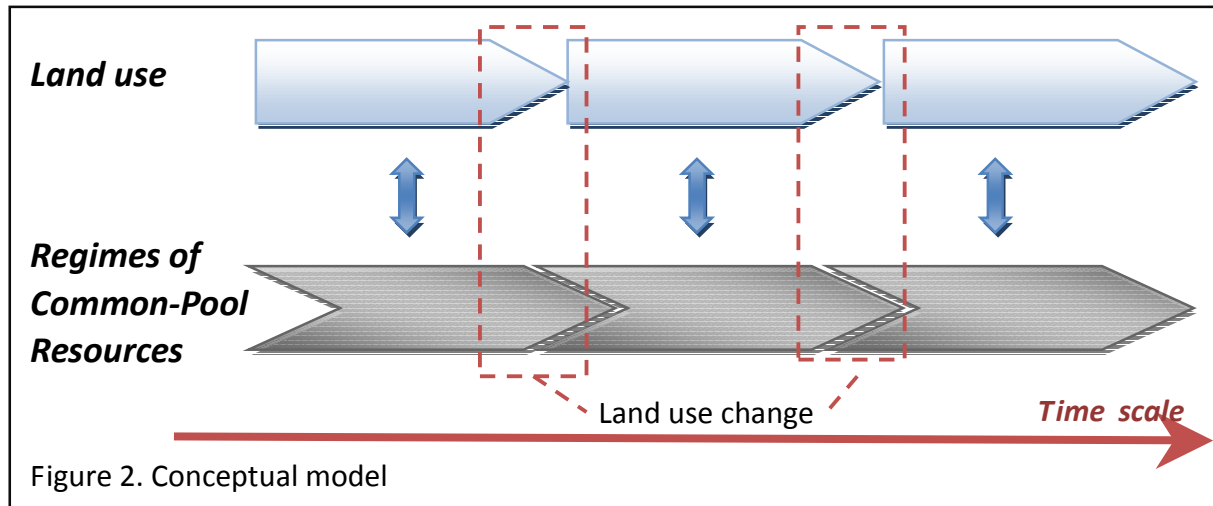


Figure 1. Study area - Tayah tribe

Conceptual models

In this research, we considered that each land use type could be regarded as a

representative of self-governed resource. Each type might simultaneously consist of some regimes of common-pool resources (CPR) which constructed land or natural resources as a commons in each period. In the other words, land use types were probably corresponding to the specific regimes of CPR in each period. Accordingly, in this study we attempted to identify what kind of CPRs were constructed, and how these CPRs were reconstructed during land use change process (Figure 2).



Methods

This study concerned in land use change through different periods of time, and how local people translated these changing into local resource management regime to construct the commons in each phase. With these objectives, we reviewed a lot of documents which could trace from early 19 century to present and most of them were published officially. Besides, interview and oral history were operated during fieldworks to rebuild and realize the process of land use change in Tayah.

TAYAH TRIBE'S THREE DIFFERENT LAND USE PHASES IN MOUNTAIN AGRICULTURE DEVELOPMENT

The process of land use change in Tayah was figured out from the analysis on pervious documents and oral history investigated in fieldworks. In general, Tayal's land use types could divided into three phases with temporal scale, there were: traditional swidden agriculture, paddy/rice farming production, and the stage of diverse cash crops.

Traditional swidden agriculture (before 1920s)

Like other indigenous people around the world, the agriculture of Taiwan's aboriginals Tayal also initiated from swidden agriculture. In the past, hunting and swidden

agriculture were the only two ways for food provisions. Tayal people did this work as their customs and evolved their specific culture in northern mountain areas of Taiwan.

Before 1920s, Tayah residents maintained traditional agriculture in mountain slopes. Traditional agriculture or 'swidden agriculture' that agrarian lands were cultivated regularly by some peculiar means was major pattern for indigenous people's food production in the past. This way of production comprised of several stages, such as burned up the field, planted the crops, and so on. Each stage was highly restricted by their traditional norms or taboos that land knowledge, agricultural pattern, social institution, and religion were all seriously complied with Tayal's traditions (TCIC, 1915).

In terms of Tayal people, household was the most fundamental social unit. Further, some households were integrated into traditional social organizations by specific means; they were 'gaga' group or 'utux nigan'. Gaga means rules, norms or principles for everyone who participated in that group to follow. Gaga group was a group who shared the same norm for their everyday life. The term Utux referred to traditional spiritual beliefs, 'utux nigan' was stand for a group they followed the same religious context in their general activity. These two traditional organizations played quite significant roles in swidden agriculture (Ruan, 1964; Wang, 1990). Traditional swidden agriculture usually needs more manpower involved in. In order to fill this requirement, gaga group and utux nigan became principal supports in this period. But due to Japan's colonization policy changed in 1920s, swidden agriculture became forbidden. This kind of land use was stopped and replaced in rice farming production.

Rice farming production (1920s-1980s)

From early 19th century to 1920s, Japan colonial government began to ask local community in mountain areas to change their land use type into rice farming. The objective was to make indigenous people become farmers. Government restricted their living sites to weaken their mobility, such as fighting between tribes, hunting, etc. Therefore Japan government could dominate indigenous people in an easier ways.

Tayah tribe was changed their land use type under this situation during 1920s. This kind of agriculture was totally different from Tayal people's tradition. They were supposed to farm in a restricted area and cultivate in more intensive working rather than adapt to nature conditions in a previous passive way. Increasingly, Tayah people's traditional customs were modified to merge into rice-oriented culture. This rice farming type still maintained to 1980s, even though Japan abandoned their domination and then R.O.C. government restored Taiwan in 1945, the policies about indigenous people between these two polities were essentially quite the same. The rice farming and strict management in indigenous mountain areas were sustained until

intervention from modern economy introduced by roads in 1980s (Chen, 1993).

Diverse cash crops (1980s to present)

Tayah tribe still maintained rice farming production before the road built up which connected to urban area during 1980s. In the other words, the period before 1980s, rice farming in Tayah was not connected to Taiwan's food supply system. Tayah people grew rice only for their own needs. It was a self-sufficient agriculture in a tribe scale, like traditional swidden agriculture in the past; they exercised rice farming production as a subsistence economy in tribe scale.

After 1980s, government built up village roads and improved their lifestyle become more modern. At this time, local residents' needs of food could be satisfied by commercial trade from outsides. As a result, Tayah residents didn't supposed to produce rice by themselves, and began to plant diverse cash crops to make money through reaching economic market trend. Nowadays, Tayah tribe still cultivate with diverse cash crops. This land use type showed that Tayah tribe no longer isolated from Taiwan's holistic economy, and became a passive role dominated by market.

REGIMES OF COMMON-POOL RESOURCES IN EACH LAND USE PHASE

Tayah's three land use phases were mostly resulted from political and economic concerns in each period, otherwise, there still some implications about resource management under these land use phases. In this case, we think each phase provided a case of common-pool resource management. In this point of view, how they use the land also indicated what kind of regime existed in the common-pool resource. Therefore, we analyzed three components of CPR regimes in each land use phase, they were key resource type, collective institution, and scale of CPR, to discuss how and if Tayah's indigenous people made land or natural resources become self-governed resources.

CPR regime in traditional swidden agriculture period

In Tayal people's tradition agriculture period, the land was always common property hold by a tribe. The reasons people used land resource in turns is to follow their ancestral norms, gaga and utux . In this situation, the land resources were belonging to a gaga group or 'utux nigan'. In Tayal's traditions, a gaga group or 'utux nigan' was comprised of several households and usually referred to a tribe. In summary of Tayah tribe's swidden agriculture, land resources were effectively managed through traditional norms and religion, gaga and utux, and institutions for lands management were gaga group and 'utux nigan'. So it could be considered as a tribe-based common-pool resource. Land resource was a self-governed resource by gaga group

and 'utux nigan' in tribe scale.

CPR regime in rice farming production period

In the period of rice farming, in order to fit the objective of rice production, Japan government additionally published reserved land policy in mountain areas, and altered mountain slopes to terraced fields. These policies did bring several huge influences to local residents. First, the concept of private property was embedded in their value systems and became more influential in their everyday practice. Second, mountain landscape was modified to reach a new farming type, and moreover, the skills and equipment for new farming type were established in Tayah tribe.

Therefore, people's need of slope lands was converted into terraced field. At the same time, they constructed an irrigation system collectively to ensure the water for rice production could be supplied stably. This irrigation system played an important role about resources management at that time. It is because this system connected all the resource appropriators in gaga group or smaller unit integrated by households, and still managed by their traditional norms, gaga and utux. Until the emergence of the Christian religion in 1950s, utux religion was replaced and began to lose its influence in Tayah people's life. At the same time, traditional gaga also began to transfer to Christian context.

In summarized, the key resources of rice production period were lands (terraced fields) and irrigation system. Both were utilized and maintained in collective, but Irrigation system might have more representatives in common-pool resources rather than terraced fields. That was due to the introduction of private property made terraced fields as a private good. As a result, although the gaga group could operate the commons regime effectively, but the scale of this CPR were getting smaller, from tribe to smaller set of households. It also reflected the change caused from private ownership.

CPR regime in diverse cash crops period

After 1980s, Tayah tribe had already connected with modern economy. With the invasion of modernization, gaga and its referenced meanings had no longer existed in Tayah today. But previous irrigation system was still functioning for water prevision in cash crop cultivation. Several small sets of households maintained the pattern of irrigation system, and then transformed into plastic pipe. Each pipeline was belonging to a small set of households. Households in the same set did not have specific rules or norms to regulate their utilization from resources. They only used kinship or family relationship as a network of households to hold their resources together.

To summarize, in cash crops period, Tayah's CPR regime was much subdivided than before. A small set of household's irrigation systems were key resources of this period under the scale in households. The institution to operate the CPR was a network under families. Eventually, the CPR was constructed in a smaller scale without shared norms and rule, it exactly represented the impacts resulted from market economy.

DISCUSSION AND CONCLUSION

In summary, Tayah's experience provided some results about the variations of CRP regimes about managing the complex commons in a dynamic way (Table 1).

Table 1. Tayah's CPR regimes in different land use phases

	Swidden agriculture	Rice farming	Cash crop
Key resources type	Land	Irrigation system Land	Irrigation system
Collective institution	Gaga group, Utux nigan	Gaga group	A network of several families
CPR scale	Tribe-based	Tribe-based, Small set of households	Small set of households

First, the key resources of CPR were quite probably related to land use pattern and show specific needs of land use requirement in each period. Moreover, both two latter land use periods were partly preserve the main resource system from former stage. It meant that local people could take advantage of the existed resources to produce an adaptation on land use change. In this point of view, the former resources could be regarded as an accumulative capacity for local people to reconstruct the CPR regimes to cope with the commons issue in coming generations.

Second, collective institution of each period was initiated from local inherent mechanism and then evolved with social development process to fix land use requirements in each period. Actually, the fundamental unit of three phase institutions was the households. As we mentioned before, gaga group, utux nigan, and cross-families network were all made from household, but there were still some differences resulted from each land use needs connected to local context. With the increasing modernization from land use type, indigenous cultural contents were gradually decreasing in local institution. That would be a critical issue about cultural perseverance and robustness of management institution.

Third, the CRP scale was getting smaller, from a tribe-based to households-based. It would not be a good outcome from resource management even if it was suitable to

land use type. The smaller scale of CPR usually meant to the more divided of governances. It would probably become another ‘the tragedy of the commons’ (Hardin, 1968), and be a big threat for environmental governance.

In conclusion, Tayah’s land use case showed the diversity of resource management regimes. These diverse regimes were principally affected by political and economic drivers and deeply influenced local resources management practice. Nowadays, the regime to regulate resource usage is not as strong as in the past. In regards of resource sustainability, it obviously will be a serious issue to reconstruct institutional robustness in managing complex commons.

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REFERENCE

- Berkes, F. and Farvar, M. T. (1989) Introduction and overview. In: Berkes, F. (eds.) *Common property resources: Ecology and community-based sustainable development*, New York: Belhaven Press, 1-17.
- Chen, S.-C. (1993) *riju shiqi Taiwan shandi shuitianzuo de zhankai [The emergence of paddy field on Tawian’s mountain areas during Japan colonized period]*, Taipei: Master thesis, Department of History, National Taiwan University (in Chinese).
- Colding, J. and Folke, C. (2001) Social taboos: ‘Invisible’ system of local resource management and biological conservation, *Ecological Applications*, 11(2): 584-600.
- Gibbs, C. J. N. and Bromley, D. W. (1989) Institutional arrangement for management of rural resources: Common-property regimes. In: Berkes, F. (eds.) *Common property resources: Ecology and community-based sustainable development*, New York: Belhaven Press, 22-32.
- Hardin, G. (1968) The tragedy of the commons, *Science*, 162:1243–1248.
- Janssen, M. A., Anderies, J. M., and Ostrom, E. (2007) Robustness of social-ecological systems to spatial and temporal variability, *Society and Natural Resources*, 20(4): 307-322.
- Liao, S.-C. (1984) Taiyazu de wenhua: bulaoqianxi yu tuozhan [Tayal’s culture: Tribal

- migration and development], Taipei: World College of Journalism (in Chinese).
- Ostrom, E. (1990) *Governing the commons: The evolution of institutions for collective action*, New York: Cambridge University Press.
- Ostrom, E. (2005) *Understanding institutional diversity*, Princeton, NJ: Princeton University Press.
- Posey, D. A. (1985) Indigenous management of tropical forest ecosystems: The case of the Kayapó Indians of the Brazilian Amazon, *Agroforestry Systems*, 3(2): 139-158.
- Ruan, C.-R. (1964) nanao taiyazu de nongye [Agriculture of Tayal people, Nanao group], *Bulletin of the Institute of Ethnology Academia Sinica*, 17:123-200 (in Chinese).
- Sandström, C. (2009) Institutional dimensions of comanagement: Participation, power, and process, *Society and Natural Resources*, 22(3): 230-244.
- Taiwan's custom investigation council (TCIC), Taiwan colonized government (1915) *Fanzu guanxi diaocha baogaoshu: diyijuan- taiyazu [Indigenous people's custom report: Volume one – Tayal]*, Institute of ethnology, Academia Sinica (trans.) (1996), Taipei: Institute of ethnology, Academia Sinica (in Chinese).
- Tang, C.-P. and Tang, S.-Y. (2010) Institutional Adaptation and community-based conservation of natural resources: The cases of Tao and Atayal in Taiwan, *Human Ecology*, 38(1): 101-111.
- Wang, M.-H.(1990) guifan xinyang yu shijian yige taiyazu juluo de yanjiu [Norm, belief, and practice: A research on a Tayal tribe], Hshinchu: Master thesis, Institute of Anthropology, National Tsing Hua University (in Chinese).
- Yu, G.-H. (1984) taiwan gaoshanzu nongye jishu de bianqian ji diaoshi [Taiwan indigenous people's change and adaptation of agricultural skills], *The NCCU Journal of Sociology*, 18, 19, 20(bound volume): 181-197 (in Chinese).