

# SELF-GOVERNANCE ON INDIGENOUS COMMUNITY FOR SUSTAINABLE DEVELOPMENT: A CASE STUDY IN TAYAL COMMUNITY IN TAIWAN

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**Abstract:** Self-governance is an approach for preventing community resources overuse and degradation for a sustainable future. Ostrum (1990) proposes a concept of self-governing organisation for people whom collectively act on common pool resources (CPRs) governance. In this model, participants can make force and constraint contrasts that supplementary choices bring into new game theory framework which makes the primary control of outsiders transiting to negotiation between two participants. Hence, whilst negotiation is reached and participants cooperate with each other, the paying entire cost is far lower than the cost of central control (Ostrom, 1990).

Forestry, farming landscape are sort of CPRs in many Taiwan indigenous high mountain communities, and so does Cinsbu community. Self-governance is an urgent mean to adapt to such limited living space. For indigenous community's sustainable development and self-governance, this study takes Maqaw Industrial Group (Tayal indigenous people, belongs to Cinsbu Community in Hsinchu, Taiwan) for an instance. This group was organised in 2005, which maintained Tayal's culture (ex. Gaga, ancestor's words or advice, usually understood as "disciplines and taboos") and opposed outside corporation's control over local industries as their calling. Besides, this group emphasises community development is based on economy, which is also necessary to protect natural resources and preserve Tayal traditional culture. For this reason, Cinsbu community members and B & B operators cooperate with each other to promote community economy, ecology, and culture. In recent years, Maqaw Industrial Group has transformed from

conventional farming to natural farming for depending upon chemical fertilizers and pesticides.

In order to make agriculture matching up local mountain landscape, special agroforestry cultivation is a good case for explaining adaptation onto Cinsbu's high mountainous landscape. Indigenous farmers do not chop the trees next to farmland. Instead, ancient wisdom told them to preserve trees for preventing the loss of topsoil by rainfall. Meanwhile, Tayal people know that trees stabilise slope and water, and they keep grass as food or natural pesticides (ex. bitter or spicy plants keep insects away) for pests. The most interesting one is that "stone" is very useful in Tayal traditional cultivation. They do not eliminate stone but keep in field for faster drainage. Moreover, under solar power, stone's temperature raise to keep crops warm from chilling injury.

Also, group members develop the term "Cinsbuology" for outsiders (esp. tourists) to realise the function, beauty of the forestry, and environmental conservation in this community. The idea is that people can learn anything from forest, indigenous people's farm, and any place without school classroom in Cinsbu. Not only the environment, indigenous people, and their Tayal culture form community landscape, but also tourists' observation, learning, involvement to mold into "Cinsbu" and knowledge of "Cinsbuology".

This study applies literature review, in-depth interview, participatory observation, and workshops for data collection. We found three factors that composed indigenous collectively self-governing

action on CPR: 1. Tayal people establish their basic idea by traditional “Gaga”; 2. regarding indigenous people as a main constituent for resource governance; 3. legislating fair and transparent regulations. We conclude this study that Maqaw Industrial Group adequately use local natural resource for tourism without valuing the seriousness of resource degradation in the beginning. Later members retrospected their way of life, and try to cultivate organically in agroforestry. Besides, tourism is an important industry in Cinsbu. However, it is a pity that tourists come and go and never learned something relevant to indigenous culture. Group members therefore created “Cinsbuology” for tourist to actually experience indigenous people's life and their idea towards the nature in their community. Group members establish a fully self-governing organisation by their willingness and help Cinsbu community to build up self-governing ability towards conservation and economic development, which start a positive effect for a sound and harmonious community.

**Keywords:** Agroforestry, Commons, Maqaw Industrial Group, Self-governance, Sustainable Development,

## INTRODUCTION

According to a census in 2013, the population of indigenous people in Taiwan who live in high mountain areas is 160,655<sup>[1]</sup> (30.3% of whole Taiwan indigenous people). For those who live in the mountain areas, agriculture is one of the essential business. In prehistory periods of self-sufficient and harmonious farming, indigenous peoples cultivated the land by slash and burn methods with few impact toward the nature. Since few decades, many indigenes has converted forest into cultivated farmland, applied fertilizer, and sprayed pesticide (so called ‘conventional agriculture’) to increase the productivity. Although such operation does raise agricultural yield and income, it damages farmers’ health, soil barren and erodent, farmland fertility decline, and results in water quality and living environment degradation.

Forestry, river, and farming landscape are sort of CPRs in many Taiwan indigenous high mountain communities, and so does Cinsbu community. Cinsbu

Community is a Tayal indigenous community located in Hbun Tunan Village, Jienshih Township, Hsinchu County, Taiwan. It is a geographically remote community within the range of Mknazi Watershed, where is also the range of Shihmen Reservoir and its catchment area. Hbun Tunan Villagers belong to Mknazi Group, Sqlyk, Tayal. As the CPRs degraded rapidly and traditional culture faded away gradually, the indigenes in Cinsbu rethink to revitalize the whole environment. Some Tayal people attempted to use environmental friendly organic farming, alleviating the damage to body and land by using chemical fertilizer and pesticide spraying. They set up an organization to develop agroforestry, ecotourism and cultural revitalization by self-governance.

Nowadays, most of the farm households in this community adopted organic farming, which combined with crops and trees growing and showed as a model for other indigenous communities. However, during the transformation of agricultural operation, Hbun Tunan Community was not necessarily operated without obstruction or frustration. Thus, this study explores how self-governance helps forward organic farming progress, CPRs protection, and its challenge by in-depth interview, participatory observation and literature review.

## THEORETICAL REVIEW

Common pool resources (CPRs)<sup>[2]</sup> are natural or human-made resources used simultaneously or sequentially by members of a community or a group of communities, which share two important characteristics: excludability and subtractability (Ostrom, 1990: 30). Because of these characteristics, CPRs are potentially subject to over-exploitation, depletion or degradation. In the management of CPRs, a challenge is how to co-ordinate use by individuals as population grows in order to prevent over-exploitation (Williams, 1998:2).

In the discussion of forestry, pasture, and other CPR problems in traditional policy science, the three models of Hardin’s (1968) the tragedy of commons, Dawes’ (1973; 1975) prisoners’ dilemma, and Olson’s (1965) the logic of collective action are often quoted. These models point out the same conclusion: “individual rational strategy can lead to collective

<sup>1</sup>About the detailed census data, please see: <http://www.apc.gov.tw/portal/docDetail.html?CID=940F9579765AC6A0&DID=0C3331F0EBD318C2345A69447FC6B5DA> (retrieved date: July 5, 2013). The total population in Taiwan, R. O. C. is 23,340,136 in the census of 2013. Please see: <http://sowf.moi.gov.tw/stat/month/list.htm> (retrieved date: July 12, 2013).

<sup>2</sup> Common-pool resources (CPR) is a natural or artificial resource system. The coverage range is huge and individual increasingly appropriation of resource unit will decrease the storage of resource system so that it is costly to exclude potential beneficiary who gains resource (but it is not impossible to exclude) (Ostrom, 1990:30).

irrational consequence". It is the coordination problem in the framework of non-cooperative game theory. Policy scholars who accept this model give solutions either 'national centralized control' or 'non-interference market mechanism'.

This sort of strategy, however, has its prerequisite conditions. The consequences of all privatizations or national controls are not as ideal as expectation, sometimes even causing or accelerate resources degradation. Therefore, western scholars start reviewing resources institution theory. Among of them, Ostrom (1990) begins with CPR self-governance to discuss the choice beyond private market manipulation and state control, attempting to seek the answer of maintaining resources sustainability from local knowledge and then address a new game theory model. In this model, in regard to CPR use, participants can make force and constraint contrasts that supplementary choices bring into new game theory framework which makes the primary control of outsiders transiting to negotiation between two participants. Hence, whilst negotiation is reached and participants cooperate with each other, the paying entire cost is far lower than the cost of central control (Ostrom, 1990).

In this case the Tayal indigenous community called Cinsbu, due to latest discovery of cypress forestry; they traditionally cultivate for their livelihood, but also develop tourism nowadays. Because of the number of tourists getting raised, Cinsbu's Bed and Breakfast (B & B) business develops very soon. Tourism becomes the economic development base of the community. It is simultaneously, nevertheless, whilst tourism brings streams of customers, tourism also alters the environment, community's life style, and traditional culture. In order to avoid the community business trapped into the tragedy of commons, community members shall completely get local information and implement their traditional knowledge for seeking an appropriate self-governance method to both develop local business and communal CPR's sustainable development.

#### THE ACTION OF CPR'S SELF-GOVERNANCE IN CINSBU COMMUNITY

##### **Gaga, the starting point**

If people would like to understand Tayal people's governance view of CPRs, Gaga is the basic starting point to understand them.

In a Tayal traditional community, usually has three different organisations, they are *qutux gaga* (group of co-worshipping ancestors), *qutux mlata* or *qutux phaban* (group of co-hunting, co-working, and sharing), and Gaga relative group (group of following same *gaga* and regulation). Tayal language "*alang*" or "*qalang*" represents community, settlement, and

village, which is the basis of whole Tayal socail structure. In the past, community structure was based on consanguinity, to constitute a political unit where had its sovereignty and vague territory. Such community has above three organisations (*qutux gaga*, *qutux mlata*, and *gaga* relative group) to run its social function. Gaga has multiple meanings, and the most common interpretation is "ancestors' words", or "the words, regulations, or taboo told by the elderly". Tayal people may have different *gaga*. Whilst a group of people respect the same *gaga*, they always follow the same regulation in a group to jointly work, hunt, share, and burden the sin and responsibility (Kojima, 1915; Huang and Yu trans. 1984).

There is no obvious class concept in Tayal traditional social organisation. The leader of the community is not hereditary but according to personal ability. The internal constraint among group members is from the belief of *utux* (ancestors' souls or ghost). People once violate common value and ancestors' regulation, disasters would come to not only the violator, but other *gaga* members. Traditional Tayal productive activity highly relies upon natural resources. If each person do not constraint their own behaviour, it would definitely impacts other community members' harvest. Therefore, Tayal people establish cooperative regulation to decrease possible conflict of resources use. Moreover, Tayal people's productive activity relies on primary labour force, thus they have to take action collectively to create higher benefit more than individual benefit (Yen and Kuan, 2004: 31).

##### **History of Business Development in Cinsbu**

Cinsbu is at Hbun-Tunan Village, Jianshih Township, Hsinchu County (See Fig. 1). Original called "Cinsbu Community" includes territory of Cinsbu community and Smangus Community<sup>3</sup>. Cinsbu, in Tayal language, refers to "the place where sunshine first comes at dawn", which implies it is located in a relatively high mountain area. Local people call their community "the most close to the God community." Cinsbu is also the most early community in Hbun-Tunan. Tayal ancestors migrated from Ren-ai Township, Nantou County northward. They went through Sihyuan Wind Gap, ridge of Dabajian Mountain, Sinaji Mountain, Hbun-Tunan, and finally arrived in Cinsbu.

<sup>3</sup> These two communities were originally from Cinsbu. Due to increase of population, some people moved out and found a place named "Smangus". Nowadays, people usually call two communities "Smangus-Cinsbu Community". In this study, we use "Cinsbu Community" to represent these two communities as a huge community range.



**Figure 1:** The geographic location of Cinsbu, Jianshih Township, Hsinchu County  
Retrieved from [http://hccst.pomost.com.tw/chinese/travel\\_04\\_01.php](http://hccst.pomost.com.tw/chinese/travel_04_01.php)



**Figure 2:** The students attended the workshop of natural farming and learned the skill of making ferment.



**Figure 3:** The students paid attention to the lecturer and took notes diligently.



**Figure 4:** The agroforestry in Cinsbu Community is growing with the multiple crops rotation and Taiwan fir growing on lower end of the farmland.



**Figure 5:** Formosan Alder is growing on upper end of the farmland

Cinsbu Community's traditional production is agriculture, including cereal and root tubers. Millet is the most important crop for Tayal people because of its multiple function for eating, brewing wine, ritual use. Other crops are beans (ex. pigeon pea), squash, vegetables, ramie etc. Economic crops are Japanese pear, peach, high mountain vegetable, bell pepper, mushroom, and tomato etc. Japanese pear and peach have the most quantity in seasonal fruit sale. Due to climate influence, community farmers' income is unstable, so that most of farmers (most of them are male ) take temporary jobs for increasing family income outside or inside the community (Yen, Chen, and Liu, 2007: 74).

### **Development of Ecotourism**

Cinsbu's tourism development originates from the discovery of primary cypress forestry. In addition, two days off of the working week makes people asking for outdoor activities to relax. Cinsbu is where the place has natural and cultural resources, also has chance to alter its business. Along with the increase of tourist number, number of local B & B increases as well. However, most tourists go to Cinsbu on Saturday and Sunday and not many tourists go there on working days. That makes B & B's revenue high but averagely unstable. Therefore, B & B owners still cultivate for stable income. Community, organisations, and town office hold activities in different months for promoting peach and Japanese pear sale, for instance, peach festival in March, peach festival in June and July, and Japanese pear festival in September. During these time, thousands of tourists come for tasting great fruits, food, and beautiful natural environment. The raising occupancy rate of each B & B indeed helps local economy a lot (ibid. 2007: 45).

### **The Establishment of Self-Governing Organisations**

#### ***Tayal Community Sustainable Development Association and Mknazi Tourism Association***

Before the establishment of Maqaw Business Group, due to efficient tourism development and good achievement, many outside planning groups started to contact with Cinsbu Community, and helped community to submit proposals to the government for subsidies. At the same time, community members are aware of that the development and construction of Cinsbu Community is just at the beginning, they still need governmental resource for supplementing the part of lack. By community meeting and discussing, they agree to establish an association for nurturing communal talents and create more employment opportunity (Huang, 2001: 3). Therefore, Tayal Community Sustainable Development Association established in 1999. The association not only did

communal works, but also progressed spatial planning, communal arts, cultural business development, and tour guide nurturing. It is the base for agriculture transformation, and also for conserving natural resources, developing ecotourism, and B & B (Hsiao, 2004: 83-84).

After one year running the association; however, association members had different opinion on association operation. Therefore, some community members left and established Mknazi Tourism Association in 2002 for farm product marketing at first. They increased community cultural characteristics for customers to experience Tayal culture and food. They also changed B & B operation method from operation individually into "co-management and operate individually". Besides, the association actively instituted communal farm product marketing mechanism, integrating communal farm product for common marketing as achieving economy of scale and its channels and patterns (Hsiao, 2004: 86).

### ***Maqaw Business Group***

In 2005, members of Tayal Community Sustainable Development Association under the help and assistant from Taiwan Indigenous Community Empowerment Association, established Maqaw<sup>4</sup> Business Group. Its development theme differed from developing ecotourism idea, instead, their purpose was based on Tayal culture to maintain community environment for sustainable development. Therefore, they strongly opposed to give their community and territory to corporations for avoiding Tayal culture displaced by outside culture. Informant A1 and A2 said their mission:

"The government claims that conservation is a precondition for development, but it is the perspective of outsider, which does not meet the local needs to promote development, and often result in many unforeseen problems. For Tayal People, forestry is fountain of life; if forestry is destroyed, the growth of various crops will get worse. We operate business with local experience and ecological wisdom, we will not destroy the surrounding natural environment, and ecological conservation can be achieved not only by Tayal traditional masonry methods, but also through the reconstruction of traditional ecological value... In addition, Tayal People know the nature of forest deeply; the external

<sup>4</sup>Maqaw' is a kind of mountain pepper, which is suited to growing in low to middle altitudes (500~1800 metres). For Tayal ethnic group, it is an important spice which is a special seasoning and can be used to relieve one's thirst. It has a very specific meaning of shared harmonizing with others.

government does not know the indigenous culture, often frames the policy by imagination.”

As to cultural inheritance, Maqaw Business Group often hold traditional ritual for uniting community members' identity. Informant A1 said: “The preservation of Tayal culture is passed down through dictation and ceremony...In recent years we hold the *go'tas* ceremony... we believe that Tayal culture is gifted to Cinsbu Community by the God.”

Although Maqaw Business Group is not registered by law, it integrates B & B operators and other community members to co-operate with each other, constituting mechanism for fund financial support in order to encourage community economy and cultural inheritance. For instance, they establish internet marketing for farm product and enlarge its selling channels, hold camping activities; lead eco-tourism; and attract tourists to know Tayal culture (ibid. , 2004: 86-88). Peach marketing in Cinsbu mainly relies on Maqaw Business Group to promote community self-production and self-marketing. By community internal co-operation, they can decrease the disturbance of wholesalers' price and decline marketing cost, guaranteeing farmers' income being stable. Informant A2, who is the member of this group, states works which the group assists to farmers:

“In order to gain reasonable income, Maqaw Business Group gathers the fruit farmers in several nearby communities by selling self-growing products to help eight disadvantaged single parent families, and prevent the exploitation by brokers or even by farmers association.”

#### **Maqaw Business Group's Business Self-Governance**

As above statement, the mission of Maqaw Business Group is different from Tayal Community Sustainable Development Association and Mknazi Tourism Association. Their mission is to develop community economy by tourism. But before that, the group emphasises that economic development must establish on the basis of community's natural resources and Tayal traditional culture. That is to say, they have to achieve sustainability of environment, culture, and then the economy. Therefore, every business should operate under such consensus. Informant A3 said:

“Due to the limited land area, the community should develop various businesses and make strategic alliance...to develop leisure agriculture together with tourism, B & B, cultural businesses etc. It is necessary, and it is the future direction for indigenous communities.”

According to above purposes of association

establishment, Maqaw Business Group's members devote themselves to protect communal natural recourses.

#### **Learning Organic Agriculture**

Traditional cultivation technique of Tayal people was slash and burn, which is also called swidden cultivation. It burns forestland and cultivate without animal force and fertilizer. People cultivate by using digging stick. Also, whilst they cultivate for short-run, the land needs long-run fallow (Yen and Yang, 2004: 398). Nowadays, because of the change of social status, and also governmental control of slopeland, community's farmland area declines greatly and even insufficient for cultivation. In order to satisfy basic life demand, farmers try to increase yield of per unit area of farmland. Although Cinsbu started to cultivate 20 years ago, they still cultivate as conventional agriculture by spraying fertilizers. Some of the community members gained organic certification in 1998 but such organic farming did not promote.

In recent years, community residents gradually realise that tourism may bring to a risk of resources degradation. Thus, residents mainly composed by Maqaw Business Group, begin to practice organic farming one after the other. Moreover, other Tayal communities in the same Jianshih Township also start to promote nonpoisonous natural farming [<sup>5</sup>] and achieve great results. Residents successively alter cultivation method to organic farming. The pioneer informant A4 talked about the limitation of tourism toward community and his experience of promotion to organic farming:

“During the New Year Holiday, the B & Bs in Cinsbu are all booked out, the income is around 500 thousand dollars (US \$ 16,700), but the income will decrease to 50% in rainy seasons, and visitors shall

<sup>5</sup>To broadly define, in this study, 'natural farming' is introduced from Korea which uses Han-fang for cultivation without pesticides spray. It is a low-cost, environmental friendly, and the way of producing safe food, which its intension is no difference with 'organic farming'. However, natural farming, in this study, is not only representing cultivated technique, but refers to communities where are progressing traditional ecological knowledge, communal interpersonal relationship rebuilding, and beyond the current concept of organic farming. Furthermore, in terms of reality, due to current organic farming recognition is very strict and also recognition cost is very high so that general indigenous communal farmers cannot afford the fees. Thus, in order to distinguish cultivation ways, this study adopts 'natural farming' to specify them.

come once awhile in weekend...Therefore, we have to make living by farming. In decade ago I promoted organic farming in village and church, but villagers did not believe me, and even teased me. In recent years, the villagers come to me to learn organic farming after realizing the merit and future of it."

When the group knew Quri Community assisted and subsidised by the government to run workshops for natural farming instruction, they vigorously participated this activities. Due to most of Cinsbu farmers were having agricultural transformation period, so that they expected to learn natural farming. Informant A5 said:

"The aged people in the community welcome and expect to have workshops in the community to learn the skill of organic farming and exchange relevant information in order to increase the sensitive of place."

In order to understand farmers' real demand and teach new agricultural technique, there were two Tayal instructors invited to workshops. Tayal instructors are farmers who successfully run natural farming or gain organic certification in other indigenous communities. Because of the same culture background, language (Tayal), and production environment, instructors were easy to know local situation and teach in an appropriate way. Such "farmers learn from farmers" workshops deeply strengthen farmers' confidence to cultivate organically. Because all the people were relatives, friends, seniors, and same ethnic group, in workshops, they did not feel hesitant or shy but asked instructors lots of natural farming knowledge, and also practiced in person. Therefore, more and more people start to cultivate organically after learning in workshops. Informant A6 said:

"If there is no certain income source, the young men will leave the community; so we spend a lot of time to learn how to do organic farming. About 15 years ago, there was only one farm doing it, nowadays the organic farms has been increased to 50% of the community; some of them lived in the village for a long time, the others were just back to hometown."

Certainly, transformation is not without obstacles. Informant A 6 and A7 told about difficulties they encountered:

"Before we joined the operation of organic farming, we have difficulties to afford the production cost, pay organic certification fee, and find selling channels. In the beginning, we have to invest around 300 thousand (\$10,000 USD) dollars to build the facilities of simplified greenhouse and plant factory, then to pay the certification fee to verify the (high) quality of farm products (for customers)...if farmers do not know the verification procedure, they will get panic."

"In the beginning (at least five years) we have to invest large amount of money, and gain a little bit of profit only after receiving the organic certification. During the transition, we have to shore up the unprofitable business at first; we have to find other ways such as (agricultural) learning camp to gain the income."

During agricultural transformation, as a result of unstable income, it is a huge economic burden for community residents. But for the purpose of protecting natural resources, they consider that it is worthy to insist on such important issue. Informant A6 said:

"Conventional farming destroys land and human health because of the chemical fertilizer and pesticide. Even the seed is good in quality, unhealthy land still cannot grow good crops and gain profits in the long term. People do not look for the future! The land has to use in sustainable way to develop our own ethnic group for the next generation. If the land is damaged, people will go away finally. So we have to tell our children that the land is the traditional territory given by the elderly. We should maintain its integrity."

#### ***Cultivation in Agroforestry: Harmonising Production and Environmental Protection***

Agroforestry is a business mould to combine agriculture and forestry. Spurgeon (1980:58-61) indicates that the origin of agroforestry was in a result of forestry destruction and degradation of soil fertility by slash-and-burn, so that through scientific technique, the destructive forestry gradually recovers and residents' needs could be satisfied. Therefore, it is necessary to promote agroforestry for conserving biomass and avoiding deforestation. In 1992, 21<sup>st</sup> agenda which is made in Earth Summit that conducted by the United Nation, depicting that agroforestry is a sustainable way for land use and management.<sup>[6]</sup>

King (1987:664) indicates that agroforestry is a sustainable land management system. Such system is simultaneously or intermediately compatible with local culture and customs. An adoption of agroforestry can appropriately protect water and soil on slopeland, decrease flooding and landslide, increase humus, and maintain soil moisture.

As mentioned earlier, traditional Tayal cultivation technique was slash and burn. Their cultivation was to open ground within a great old-growth forest. However, such traditional cultivation nowadays

<sup>6</sup> Statement of Principles on Forests, Retrieved from <http://www.iisd.org/rio+5/agenda/principles.htm>; <http://habitat.igc.org/agenda21/forest.html>.



disappeared due to great loss of old-growth forest. Informant A8 told us the Tayal ecological knowledge to cultivate as agroforestry:

“We do not cut the trees on farmland, so tree roots can seize the soil to slow the erosion of topsoil, and the branches of the trees can be cut to provide sunlight for crops growing... We grow mountain fig up the farmland because it grows quickly to maintain topsoil. If the land is cultivated for a long time, we shall grow Formosan Alder to restore soil fertility. Long time ago our ancestors grow crops with at least five plots for shifting cultivation. For example, the first plot has been cultivated for four years, then indigenous farmers moved to another plot for farming, and so can be analogised...; they learned that each abandoned patch normally had to left fallow at least for 20 years before the soil became fertile enough to grow again. If there were Formosan Alder on the farmland, farmers would not grow crops owing to its land fertility is not enough.”

Cinsbu Community is at high mountain slopeland, where farmland is easy eroded. In behalf of preventing above problem, farmers of Maqaw Business Group practice agroforestry. Besides the width of each farmland has wider ridge, farmers grow plenty of trees such as alder [7] and cedar. Shade of trees can shelter crops, consolidate slope, maintain water and soil, and fertilise soil by defoliation.

Interestingly, farmers do not clean all the weeds for the purpose of decreasing loss. Besides, they control pests and diseases by biological methods such as pheromone trap, or plant celery, green onion, bitter-tasting plants, peppers etc. Informant A1 told how they prevent pests:

“If the weeds were cut off, the insects will eat the vegetables all...if the weeds were left without pesticides for the insects, the loss of the vegetables would decrease to 50%...We grow cabbage, celery and green onion, celery and green onion are bitter-tasting plants, the insects would not come.”

Besides, farmers attempt to circularly use materials as farm equipment. For example, farmers covered plastic sheet on each plot of the farmland for avoiding weeds. However, it led soil to salinization

<sup>7</sup> According to Smith (2010:13), relatively few of the 650 woody species that are able to fix atmospheric nitrogen occur in temperate regions; of these black locust (*Robinia*), mesquites (*Prosopis*), alder (*Alnus*) and oleaster (*Eleagnus*) have been investigated for their nitrogen-fixing potential [16]. Significant transfer of fixed nitrogen to crops has been observed in a study which showed that 32 to 58% of the total nitrogen in alley-cropped maize came from nitrogen fixed by the adjacent red alder (*Alnus rubra*).

and hardening that obstruct nutrition absorption. Besides, broken plastic sheet cannot be degraded so that pollutes the land. Moreover, plastic sheet have to change year by year, which is not environmental friendly. Now, farmers apply plug seedling instead of plastic sheet. Plug seedling can also obstruct weeds, and it is very convenient to plant seedling putting plug seedling into the soil. Plug seedling belongs to durable goods, which can be used for many years. Informant A1 told the aim of switching to use plug seedling:

“The original function of plastic sheet is to suppress weeds, but once it is covered the soil respiration cannot continue, it will accumulate salt..., if we use plug seedling the concentration of soil salinity would be reduced by rainfall due to the soil exposing in the air, ... and if we use plastic sheet people more likely to enter and step on the field and the soil gets harder and harder...it could be avoided with a plug seedling. A set of plug seedlings contain around 30 holes so that we could nurse seeds directly in the plant pot and could place the plug seedling into the soil directly. Bottom of the plate hole touches the soil, so roots can grow deep into the soil. We pull up the entire plug seedling while harvesting. It is a labour saving instrument. The cost of plug seedling might be higher in short term, but it can be reused for more than 10 years, and plastic sheet has to be replaced every year, so that in the long-term the cost of plug seedling will lower than the plastic sheet.”

Apart from this, informant A6 said something about the knowledge of “stone” that the elderly told him:

“Stone is fertilizer! The field without stones will accumulate water during rainy days, and the plant roots will go wrong as long as staying for more than four hours in the water. So we will keep them as long as they do not affect the field cultivation. Stones have drainage functions, and leave room for the soil to breathe. While millet is growing, the sun shines on the stone which heats stone for accelerating the growth of crops.”

Agroforestry is totally the wisdom of local farmers' experience. Through agroforestry, people can harmonise production and environment protection, and also maintain local biodiversity. It establishes basis of sustainable operation on agriculture and tourism.

#### ***Teaching Tourists the Tayal Indigenous Culture: the “Cinsbu Learning”***

Cinsbu Community is residents' living space, where confronts impacts of great number of tourists and derivatively pollution as well as destruction of ecosystem. It is also part of self-governance to decline negative externality by tourists.



**Figure 6:** The crops cover with plastic sheet to avoid the weeds growing, but it gets damage quickly and its small pieces may pollute farmland.



**Figure 7:** The sets of plug seedling could suppress weeds and reuse for several years to avoid farmland pollution.



**Figure 8:** The indigenous traditional territory is shown by community mapping



**Figure 9:** The forest classroom is surrounded by phytoncide



**Figure 10:** The indigenous women is demonstrating how to weave by ramie

Furthermore, community seniors deeply retrospect that they follow their gaga to eat together, share traditional life experience together, and have co-existent relationship with mountains and forestry. It is a pity, however, that as western positivism and contemporary pragmatism propagating, traditional Tayal culture flows away. For this reason, Maqaw Business Group put lots of effort to maintain Tayal culture, and promotes their particular culture to outsiders.

For achieving above goal, Maqaw Business Group develops “Cinsbu learning”<sup>8</sup>. It contains a great

<sup>8</sup> “Cinsbu learning” includes the following courses: “mother tongue,” “eating, living and folk song,” “traditional territory mapping” and “weaving.” The raw material of Tayal traditional weaving is ramie fiber, but now also mixed with other materials. In Tayal tradition, only the women who are good at weaving are qualified to gain facial tattoo.

amount of Tayal knowledge. Group members construct natural community classrooms, where are place to instruct humanity, education, business, and ecology. They instruct tourists to learn about forestry, experience the beauty of mountain, and realise community traditional culture. “Doing by learning; learning by doing” is the way to instruct “Cinsbu learning” to various tourists and customers. Informant A1 explains the aim of Cinsbu learning:

“The 30 members of the Maqaw Business Group develop ‘Cinsbu learning.’ This learning park was established for three years, we think the classroom is a concept of non-spacial limitation. For example, while we are working on the farm, the farm is the classroom; while we are working in the forest, the forest is the classroom. We cooperate with elementary, junior high and high schools to develop outdoor learning. Because many tourists just come to tribal community to take a look, eat, sleep, and learning nothing, so we create ‘Cinsbu learning’ to

share the elderly wisdom, and have experiences regarding local agriculture, living and culture. "

"Cinsbu learning" is part of tourism. They arrange tours for school pupils or organisations. Division of works are distributed by group members' profession that divided into activity, contact, traffic, lecturers, cooking, and other squads. Every group member participate each tours to provide good service for customers and tourists, and also practice ancient "work together" and "share together" gaga regulation.

#### **FACTORS THAT INFLUENCING COLLECTIVE ACTION ON CPRS' SELF-GOVERNANCE**

Tayal people's life and livelihood depend on natural environment very much. Natural environment, as CPRs, is inclusive to other people's use or encounters externality problems. That is to say, if community members neglect the degradation of resource base, it eventually becomes "the tragedy of commons". Ostrom's (1990: 18-21) several research cases show that traditional farming people or nomadic people already have the concept and institution to distribute CPRs. CPRs are limited by certain group members (such as a community's residents), through internal regulation to restrain every members' natural resource use rights. According to our observation, Maqaw Business Group members' CPR use and distribution, indeed fitting in with Ostrom's research. This study finds several factors that influence group members' behaviour as follow:

##### **The Traditional Gaga-based Value**

Tayal's traditional belief specifically reflects on gaga the ancient regulation and taboo. Once people disobey the co-value and regulation, disasters come to not only the violator, but other members who belongs to the same Gaga.

In our observation, the constraint of traditional internal regulation, due to its religious and moral implication, is still work to community residents even nowadays capitalism is still the mainstream of whole Taiwan society. The nature is community residents' daily life provider. Under traditional regulation, "share together" should be the same value to share resources together.

"Share together" is not only for this generation, but for offspring; a cross-generation "share together" is the basis of sustainable development. Maqaw Business Group's theme is to build the base of Tayal culture and sustain the community and environment, and emphasise that the use of CPR should be on the base of Tayal culture and protection of natural resources. We consider that such theme to establish an association (Maqaw Business Group), is completely fitting in with Tayal gaga and share together value. Therefore, such value that follows

tradition is the power for group members to gather together.

##### **Indigenous-People-Based Resource Governance**

It is denounced that governmental governance towards CPRs often adopts elitist policy dominance to emphasise the government-based management mode. Obviously, without considering multi-values and viewpoints, the government can hardly resolve problems, or even make problems.

The percentage of Taiwan indigenous peoples who live in mountainous area is 30.82%. Indigenous peoples' livelihood depend upon natural resources very much. Once the government control resources, indigenous peoples' livelihood is bound to be affected. Besides, scientific governance from the government is different from communities' traditional resources governance. As Tayal seniors said, there is no "management" in Tayal language, but "care" represent their consideration to the land. Community residents cannot agree with governmental single-way policy that no community residents can join governmental decision.

In contrary, Maqaw Business Group's governance is to inherit ancient wisdom to constrain group members to work and share together. Under such governance basis of Tayal culture, it greatly represents indigenous-people-based characteristics so that community residents can recognise such kind of governance.

##### **Legislating Fair and Transparent Regulation**

In some public affair cases that relevant to collective actions towards CPRs, Ostrom indicates that in some self-governing organisations, CPR users often create institution and management system for fair distribution of long-term benefit and have positive incentives towards sustainable use.

Abundant natural resources in Cinsbu bring opportunity for community business. However, as tourists entering into community life territory, negative externality starts to impact local ecology and community people's life. In order to solve the problems, self-governance organisation appears and regulates community security convention (See Appendix 1). Maqaw Business Group members are mostly from Tayal Community Sustainable Development Association so that by the past experience, they find that conflicts among members usually are benefit or free rider problems. Therefore, this group establish a fair institute to integrate community business to co-operation. In behalf of preventing undisclosed cost and benefit that cause community residents' distrust, they unveil every revenue and expenditure so that it every member share each dollar they earned, and avoid possible

conflicts.

#### THE INSPIRATION OF SELF-GOVERNANCE FROM MAQAW BUSINESS GROUP

CPRs in ecosystem have multiple characters that human society have to constitute the best management institution. People who realise characteristics of CPRs are undoubtedly local residents. Therefore, Ostrom argues that the

governance of CPRs should adopt residential self-governing mode (Ostrom, 1990: 15-21).

Maqaw Business Group was aware that the community only pay attention to tourism and its abundant revenue without maintaining local resources. If people continue with this way, community development will dismiss because of the degradation of resources.

**Appendix1:** Table of Interviewees

Code	Community	Gender	Date of Interview	Location of Interview
A1	Cinsibu	M	2006.3.6 2012.5.10 2013.3.9	Cinsibu Church Own B&B
A2	Cinsibu	F	2006.3.6	Cinsibu Church
A3	Cinsibu	M	2007.5.17 2010.3.22 2013.3.10	<i>Own House</i>
A4	Smangus	M	2011.5.3 2012.5.19	<i>Own House</i>
A5	Smangus	F	2011.5.3	<i>Own Farm</i>
A6	<i>Smangus</i>	M	2012.5.19 2013.3.9	<i>Own Farm</i>
A7	<i>Smangus</i>	F	2011.9.8 2013.3.9	<i>Megalan Common Organic Farm</i>
A8	Cinsibu	M	2012.5.19	Own House

Sorted by author

For sustainable development, Maqaw Business Group plays an important role as a leader to conserve local resource and Tayal culture. Both Maqaw Business Group and other community residents realise that whether succeeds in agriculture and tourism development, the balance of natural environment is essential the base for all the business that community residents would like to develop. Their unique "Cinsbu learning" is truly based on local resources. They bring customers and tourists to their community to tell them the true Tayal culture; bring them into the forestry to tell them how forestry preserves, protects, and provides Tayal people the land, settlement, and food. Such "Cinsbu learning" implies traditional gaga regulation, which not only transparent institution established for members to avoid conflicts, but also self-governance mode instead of governmental elitist policy is the best way for CPRs governance.

Nowadays, in Taiwan, many indigenous areas confront CPR governance problems. The government must rethink whether elitist policy is suitable for

indigenous communities or not? In this study, Maqaw Business Group's action is echoed to Ostrom's argument that if natural resources are in a specific space, community-based CPR governance can be practiced by community members who live in such space. As governmental policy cannot efficient solve community problems, local organisations such as Maqaw Business Group can easily realise local information and problems and promptly respond to. However, it is really not to say the government's role is not important in community development, but materials, financial support, human resources, and talent empowerment still need the help from the government. It needs the power of "button-up" for community to tell the government what they need for self-governing. Thus, through cooperation between the community and the government, CPR self-governance can lead to a susustainable future.

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