INDIGENOUS KNOWLEDGE AND ITS FUTURE: ANALYSIS OF PRACTICES AND COMMUNICATION NETWORKS IN XISHUANGBANNA, CHINA

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ABSTRACT

The unlimited expansion of rubber plantation in Xishuangbanna is not merely causing the loss of biodiversity in the region but loss of indigenous knowledge which cannot be ignored. Indigenous knowledge plays an important role in the lives of ethnic minorities living in Xishuangbanna especially in higher elevation above 500 meters above sea level. The aim of this research is get an overview on the remaining indigenous knowledge in Xishuangbanna, its traditional role and functions, and its potential as supplement or alternative in solution to monoculture rubber cultivation in the region. This study research is part of the research project of the SURUMER consortium, particularly within sub-project 8 "Knowledge transfer and interaction management". This research uses Participatory Rural Appraisal/ Rapid Rural Appraisal instrument such as open and semi-structured interviews, group discussions, transects, mapping, etc. to derive the data needed for analysis of research results. Various aspects of indigenous knowledge such as learning systems and communication, beliefs, health and medicine, agricultural techniques and practices, local classification and quantification, community organization and human resources, tools, materials and handicrafts were revealed in the study area. Impacts brought by new technologies especially rubber has caused the traditional agricultural crop rotation is no longer practiced by the farmers, declining in the availability of wild food and medicinal plants which directly or indirectly affect indigenous knowledge in the study region. Without any active involvement and co-operation from government and respective parties, indigenous knowledge could not be preserved.

Keywords: Indigenous knowledge; monoculture rubber; participatory rural appraisal; rapid rural appraisal; traditional knowledge.

INTRODUCTION

"We are reminded of the global and historical tendency of complex technologies associated with economic powers to squash smaller, local technologies…We are urged to identify the valuable elements of smaller technologies and to create a place for them in the new century." [9].

The unlimited expansion of rubber plantation in Xishuangbanna is not merely causing the loss of biodiversity in the region but loss of indigenous knowledge which cannot be ignored. Indigenous knowledge is in the verge of extinction due to and current globalization trends worldwide such as rapid population growth, the introduction of market-oriented agricultural and forestry which basically focus on monoculture cash crops, westernized educational systems in schools, mass media and environmental degradation due to deforestation [1-5], [13-15]. Deforestation contributes to the disappearance of wild edible and medicinal plants and had depressing effects on the knowledge related with those plants [7]. Communication gap between the elders and young generation is also one of the factors that cause the deterioration of indigenous knowledge as the young generations do not spend much time in their communities or have different lifestyles from their ancestors [8].

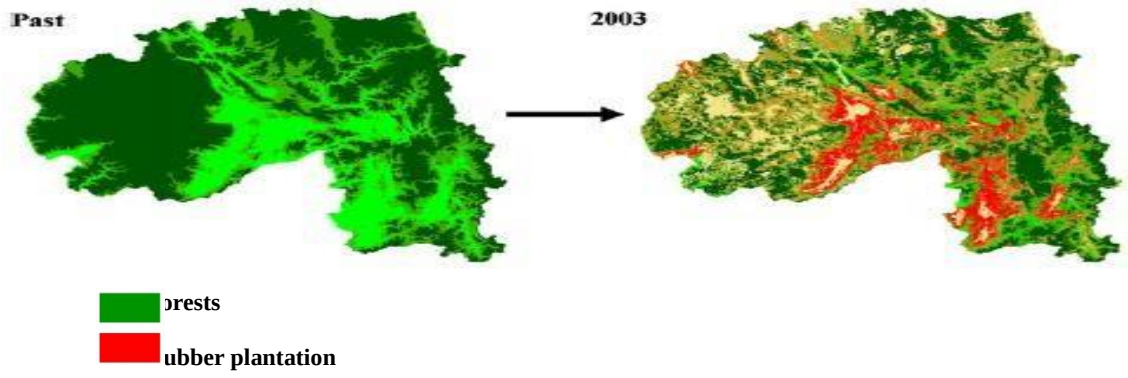

Figure 1. The expansion of rubber forest in Xishuangbanna from the past and in 2003 [10]

Objectives of the study

The objective to promote the role and functions of indigenous knowledge in agricultural such as the shifting cultivation, intercropping and agro-forestry in fostering more sustainable and ecologically rubber plantation in the region. Encouraging the use of underutilized indigenous knowledge on indigenous food resources such as animal, food crops and wild edible plants collection and plantation.

The specific outputs of the study are as follows:

1. An overview on the indigenous knowledge still practiced by ethnic groups living in Xishuangbanna including differences among the ethnic minorities in the region
2. Insight in how far indigenous knowledge embedded in community practices and role of indigenous knowledge in traditional systems
3. Evaluation of the importance of indigenous knowledge in natural resource management within the wider context of local people livelihoods
4. Evaluation of the impacts brought by new land use technique especially rubber cultivation on indigenous knowledge practiced by the local ethnic minorities
5. Future of indigenous knowledge in Xishuangbanna

In order to achieve the *overview on the indigenous knowledge still practiced by ethnic groups living in Xishuangbanna including differences among the ethnic minorities in the region*, it is significant to define and to categorize indigenous knowledge and its role in people's livelihoods and conduct on-set observations and interviews. In addition to get *an insight in how far indigenous knowledge embedded in community practices and role of indigenous knowledge in traditional systems*, it is necessary to examine the identity of the remaining indigenous knowledge in the study area. To achieve third output, *evaluation of the importance of indigenous knowledge in natural resource management within the wider context of local people livelihoods*, it is important to understand the potential of integration of indigenous knowledge into development process for sustainable livelihood. To reach the *evaluation of the impacts brought by new land use technique especially rubber cultivation on indigenous knowledge practiced by the local ethnic minorities*, it is important to understand the impacts brought by the new land use technique and to determine an overview on the transfer and dissemination of indigenous knowledge among local communities in study area.

Description of study area

The present study was carried out in Xishuangbanna Dai Autonomous Prefecture. It is a tropical region located at the southwestern of China, bordering Laos and Myanmar and with Langchan (Mekong) River passes through its middle (Figure 2). In the past, Xishuangbanna was known for its farming by elephants and practice of tattooing.

Although it covers only 0.2 % of the China's land area, it holds about 16 % of China's higher plant species [17]. The total area of the region is 19220 km^2, with about 94% is covered by mountains and hilly terrain. Xishuangbanna is located within 21°10' - 22°40' N, and 99°55' -101°50' E. It is rich in cultural and biodiversity and represented by 13 ethnic minorities, but there is only 6 ethnic minorities living in NNNR: Hani or Akha (23.37%), Lahu (50.34%), Kemu or Yi (3.34%), Dai (11.37%), Han (10.22%) and Bulang (1.35 %). Owing to its richness of biodiversity, it is often referred as "Kingdom of plants and animal" of China. Xishuangbanna is a place where ethnic diversity and biological diversity meet together [12]. Xishuangbanna consists of 4669 higher plant species belonging to 1697 genera from 282 families. [11] The study was carried out in Nabanhe National Nature Reserve (NNNR) which is located in the central north of Xishuangbanna. The reserve was established in 1991 and protects the 211 km^2 watershed area which is surrounded by hills and mountains. The range of altitude is this reserve varies from 539m to 2304 m. The reserve is divided into 3 zones: core zone, buffer zone and experimental zones.

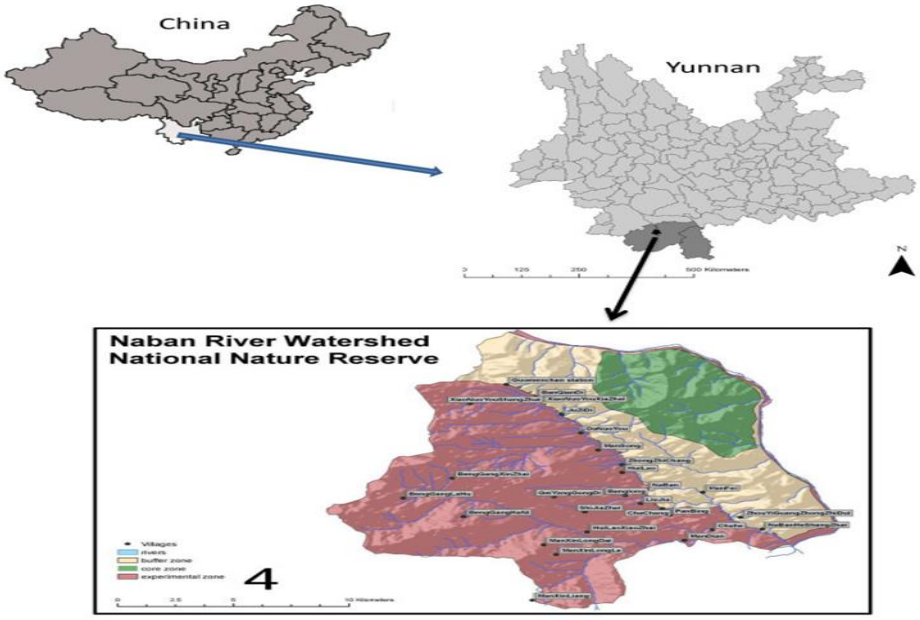

Figure 2. Maps of China, Yunnan, Xishuangbanna, NNNR (adapted from [7])

METHODOLOGY

Field trips were carried out in 6 ethnic villages namely Naban, ZhongZhiChang, BanQianDi, XiaoNouYouShangZhai, Manmo and Ban Po Zhai as shown in table 1. These villages were selected based on set of criteria such as ethnicity, elevation and socio-economic condition in the village. This research uses empirical and analytical instruments of

Participatory Rural Appraisal/ Rapid Rural Appraisal such as open and semi-structured interviews, group discussions, transects, and mapping. My interview guidelines that have been developed mainly focused on elders and rubber farmers.

Table 1. Selected villages in study area

Study area	Village	Ethnic	Altitude (m)
Within NNNR	Naban	Dai	690
	ZhongZhiChang	Han	700
	BanQianDi	Lahu	-
	XiaoNouYouShangZhai	Mountain Han	1550
Outside NNNR	Manmo	Aini	623
	BanPoZhai	Aini	1800

Interviewee was appointed by village leader or research team (research assistant and I) walked from door to door in the village or invitation by villagers. Interviews were conducted in Chinese and local dialects such as Dai, Lahu or Akha language by interpreter and then transcribed and translated into English. A total of 40 local people participated in the interviews.

Table 2. Distribution of interviewee in the study area

Village ofmtarget groups	Sex of respondents		Total
	Male	female	
Naban	2	3	5
ZhongZhiChang	3	3	6
BanQianDi	11	0	11
XiaoNouYouShangZhai	4	3	7
BanPoZhai	1	2	3
Manmo	5	3	8
Total	26	16	40

Source Author, 2013

RESULTS

Since then, a lot of the villagers give up their rice cultivation and mainly focussed on rubber plantation and converted almost all of their agriculture to rubber plantation. Besides that, successful rubber production in state farm also leads the villagers to plants rubber in their land. Increased source of income from their rubber production enabled them to buy rice and any other goods from market (Farmer 3 & Farmer-4). Some Manmo villagers said:

"Rubber cultivation is not that labor intensive as the paddy rice I have cultivated before. I can use more the money I received from selling of latex to buy rice and other products from market"

Since then, the rubber production in Manmo has expanding from small scale cultivation to big scale cultivation which opened a new road for the economic development and improve the living standards of the villagers. Up to year 2012, total lands cultivated with rubber are 7255 Mu with 217650 rubber trees whereas for rubber-tapped areas covered about 5118 Mu with 153540 rubber trees and the dried rubber output per year produced by Manmo is 644 tons. The main economic pillar is rubber cultivation.

BanQianDi village participated in the indigenous cropping project introduced by NNNR with collaboration with Xishuangbanna Tropical Botanical Garden (XTBG) and the China Academy of Sciences. About 60 mu lands in BanQianDi is used for the intercropping project. In this project, rubber is intercropped with medicinal herbs such as Flemingiaphilippinensis (Qianjinba 千斤拔), Cortex cinnamoni (Rougui 肉桂), Rauvolfiaverticillata (Luofumu 萝芙木). The research was a collaboration between Xishuangbanna Tropical Botanical Garden (XTBG) and China Academy of Sciences. The aim of this research is to diversify rubber agroforestry systems that have potential to improve the productivity and economic profitability as compared to monoculture of rubber. Besides that, the systems of rubber intercropping with economic and medicinal plants can help maintain biodiversity. There is a compensation of 40 RMB/mu/year for farmers whose lands are selected for this intercropping project. Based on the research done by XTBG and China Academy of Sciences, QianJinBa is able maintain soil moisture and improve soil nutrients in rubber plantations and extend the lifespan of rubber trees and rubber trees that are intercropped with QianJinBa mature 1-2 years earlier, and rubber trees could be tapped at the 6th year instead of at 8th year. Normal lifespan of rubber trees without intercropping with QianJinBa is 24 years whereas lifespan of rubber intercropped with QianJinBa is extended to 32 years. The leaves from QianJinBa can be used as fodder and also for human consumption.

Different dimensions of indigenous knowledge affected by these changes, such as learning systems and communication, beliefs, health and medicine, agricultural techniques and practices, local classification and quantification, community organization and human resources, tools, materials and handicrafts were identified.

DISCUSSION

Learning systems and communication

Learning systems and communication aspects are found in Naban, ZhongZhiChang, XiaoNouYouShangZhai, BanQianDi, Manmo and BanPoZhai.

Han ethnic minorities living in ZhongZhiChang and XiaoNouYouShangZhai passed the knowledge of wild food and medicinal plants from one generation to generation orally. In the past, the children started to follow their parents to mountain or forests at age of 6 years old to learn and identify the edible and non-edible wild food and medicinal plants. But in recent years, the tradition was no longer practiced by the younger generation as they prefer to choose modern medicine and consume produced food and other goods as they are more appealing and attractive to them, especially in the Han ethnic in ZhongZhiChang.

Photo 1. Transfer of knowledge through observation and practice. A researcher helping the farmer in the collection of herbs in forest near ZhongZhiChang village (Source Author, 2013)

The indigenous knowledge among Aini ethnic minority are transferred orally from one generation to another, starting from their ancestor through process of socialization and it usually disseminate internally among the communities as part of their lifestyle and daily activities. However, the indigenous knowledge is barely documented or written down in texts or manuscripts their descendants or outsiders. Indigenous knowledge is by its very nature gender sensitive [16]. Gender roles based on their experiences, knowledge and skills as they carry out the productive and reproductive duties allotted to them [6]. For example, in Aini ethnic minority, the women have much more knowledge on weaving and livestock management than men, whereas the men have much more knowledge about soil classification measures than women.

Agricultural techniques and practices

Agricultural techniques and practices aspects are identified in Manmo and BanPoZhai. This aspect is not able to identify in Naban, XiaoNouYouShangZhai, ZhongZhiChang and BanQianDi due to time constraints.

Rice is important food staple for the local people. Aini minority groups had traditionally cultivated rice before 1980s. When rubber is introduced in Manmo in 1984 following the government policy, they intercropped rice on swidden agriculture land. However, intercropping rubber trees in their paddy field had caused significant decrease in their rice harvest, which resulted food shortage in Manmo in the late of 1990s. In order to solve the food shortage, they decided to clear their community forests which are collectively-owned by the Aini community of Manmo after received approval and permission from local government. Though, the action of clearing the community forests does not solve the food shortage in the village because the rice were cultivated without much input and care as they put more of the input and effort in their rubber plantation. In 18th October 2001, big flood caused by heavy rain had destroyed around 20 Mu of paddy field and 30 Mu of corn field which brought a great economic loss to the villagers.

Since then, a lot of the villagers give up their rice cultivation and mainly focussed on rubber plantation and converted almost all of their agriculture to rubber plantation. Besides that, successful rubber production in state farm also leads the villagers to plants rubber in their land. Increased source of income from their rubber production enabled them to buy rice and any other goods from market (M-3 & M-4). Some Manmo villagers said:

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Since then, the rubber production in Manmo has expanding from small scale cultivation to big scale cultivation which opened a new road for the economic development and improve the living standards of the villagers. Up to year 2012, total lands cultivated with rubber are 7255 Mu with 217650 rubber trees whereas for rubber-tapped areas covered about 5118 Mu with 153540 rubber trees and the dried rubber output per year produced by Manmo is 644 tons. The main economic pillar is rubber cultivation.

Although, there are a lot of villagers especially the elders were complaining about the taste of hyrid rice, tasty paddy rice and upland rice as well as other traditional crops were gradually vanished from Manmo village.

Rubber plantation in Manmo village also liberated the women from many heavy traditional duties such as fetching water, collect and carrying firewood due to improved living standards.

In Ban Po Zhai, paddy rice and upland rice are still the major cultivated crops besides other food crops because in the early 1980s, the villagers experienced food shortage where they simply did not have enough food to eat. Besides due to high altitude, rubber plantation is not possible to introduce in their village. The knowledge on the rice cultivation is still hand down from one generation to the next. They believe that the rice had soul and the paddy field had a spirit-owner who must be keep calm and placated. The children will follow their parents to paddy field to learn the cultivation techniques through observation. Besides that, they will carry a basket equipped with agriculture tools such as knife, hoe, etc. with them when they were going to field. In the past, they practiced shifting cultivation, slash and burn agriculture. This traditional agriculture practices were banned by the local government in 1998 to prevent uncontrolled fire in the forests and deterioration of natural resources.

CONCLUSION

Indigenous knowledge still plays a significant role for sustainable development in Xishuangbanna. Xishuangbanna is a region in China which is rich with different minorities groups. The ethnic minorities were found to be rich in their indigenous knowledge, skills and practices especially in wild food and medicinal plants and livelihood purposes. But current land use trends, economic development, lack of proper identification, deforestation and cultural influence from dominant Han Chinese culture had cause indigenous knowledge of some minorities in vanished and many other indigenous knowledge in verge of extinction. Villages at the lower elevations and surrounded by rubber plantation such as Manmo and ZhongZhiChang are poor in their indigenous knowledge compared to Ban Po Zhai and XiaoNouYouShangZhai which are located at higher elevation. Under the impact of modernization and ongoing globalization processes in Xishuangbanna, importance of indigenous knowledge is being lost as most of the indigenous knowledge are transmitted orally and barely documented or written down in texts or manuscripts for the reference of their descendants or outsiders.

Current land use system in ZhongZhiChang had caused a lot wild vegetables disappearing such as Chinese yam and wild ginger (father of village head).

It is important to recognize that the attributes of indigenous knowledge that include intercropping techniques, diversification of crops, intercropping techniques, control of pest and disease in plant breeding, seed varieties, fish breeding; traditional medicine, animal health care; management of natural resources and oral traditions and local languages in education as it provide an important source of local subsistence and also alternative to rubber cultivation in Xishuangbanna. It could play a significant role for economic benefits of indigenous people especially the wild food and medicinal plants living in the rural region. Besides that, it is vital to establish new systems which could link and incorporate indigenous knowledge and modern knowledge and technology for more sustainable resources development in the region. Without any active involvement and co-operation from government and respective parties, indigenous knowledge could not be preserved.

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