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Tea-walnut Intercropping in Xishuangbanna, China: A Coevolutionary Analysis

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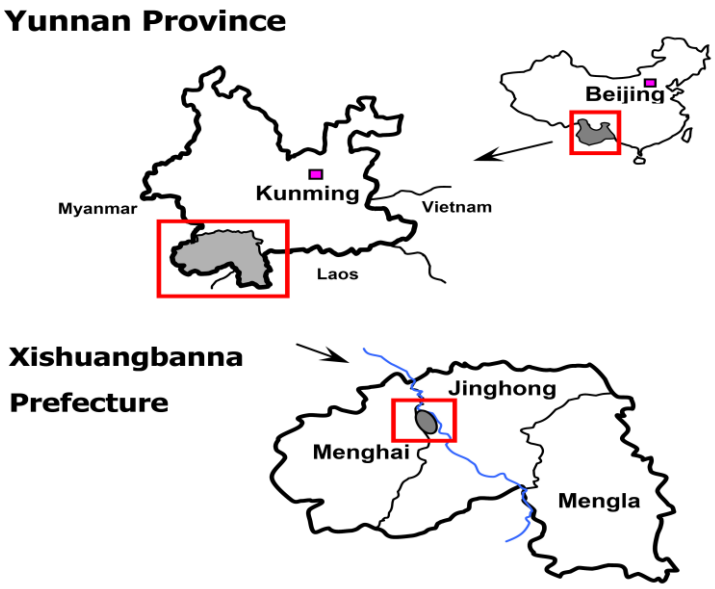
Introduction

In recent years the farmers in the higher altitudes of Xishuangbanna prefecture of Yunnan province, China (see Figure 1) have seen their lowland neighbours enjoying rapid economic growth arising from the prosperous intensification of rubber crops. As rubber tree can only be grown up to an altitude of 1,000 m a.s.l., farmers of the higher altitudes are looking for alternative livelihood strategies. For many, these livelihood strategies are adopting agriculture innovations (such as tea-walnut intercropping) that will enable them to make the best use of their existing socio-economic and environmental conditions.

Figure 1: Research Location



Source: LILAC, 2008

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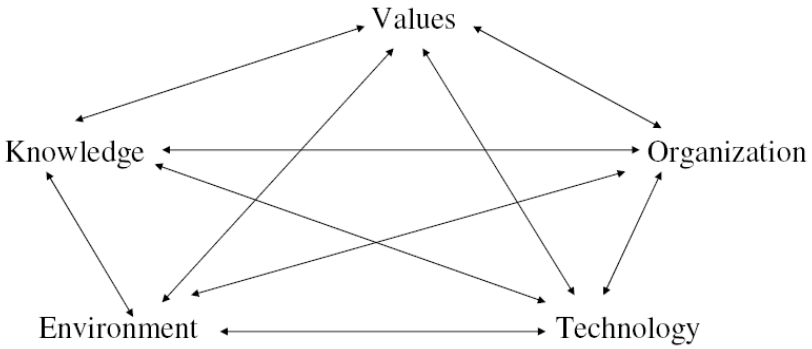
According to Richard NORGAARD'S theory of coevolution environmental features, socio-cultural characteristics and land use innovations are all components of rural development, the evolution of which is strongly interlinked and mutually influenced (see Figure 2). Thus, Norgaard states that social and environmental systems coevolve such that the environmental system reflects the characteristics of the social system, and the social system reflects the characteristics of the environmental system (NORGAARD, 1994).

Figure 2: Coevolution Scheme



Source: NORGAARD, 1994

This study was done in the frame of Living Landscape China (LILAC), a consortium of German and Chinese universities researching sustainable land options and biodiversity conservation in the Nabanhe National Nature Reserve (NNNR). The aim of the study was to look into the circumstance this socio-environmental coevolutionary process, and to examine to where this process can lead.

Research Methods

The research methods in this study were selected in order to be suitable for both the theoretical framework and the geography of the research location (see Box 1). Thus, in addition to examination of secondary literature on the topics of socio-environmental coevolution and diffusion of agriculture innovation, a qualitative research approach was applied. Approximately 25 semi-structured interviews were conducted with the farmers in the village itself (see Box 1). The interviews were done in various social situations, using participatory techniques such as eating together or even talking in the fields, the topics were covered without using ordered survey questions read from a paper in order to avoid stress to the interviewees or be identified with government officials. Moreover, the advantage of such methods also manifested itself by gaining the trust of the interviewees; to get them to open up and speak freely.

Box 1: Research Location
XiaoNouYouShangZhai village in the Nabanhe National Nature Reserve

- A mixed Lahu and Mountain Han village at an altitude of 1550 m a.s.l.;
- There are 33 households and 150 villagers. Farmers mostly plant paddy rice, corn, tea, and hemp.
- Farmers in the village have 325 mu* arable land, of which 284 mu sloping land for tea.
- Farmers also have pigs, chickens, buffalos and wild bees.

(LILAC, 2008)

In addition to conducting interviews in the village, the researchers did a lot of systematic walks in and around the village. This served the purpose of viewing and photographing the surrounding ecosystems and the plantations where tea-walnut intercropping was adopted. The surrounding ecosystems were defined as village socio-system, agri-ecosystem, and community forest around the village.

To supplement the data collected in the village an additional 15 expert interviews were conducted in the regional capital of Jinghong and also in Beijing. Experts were defined as people who are familiar with the nature reserve, have significant knowledge of tea or tea intercropping systems, and/or are familiar with the local ethnic groups comprising the prefecture of Xishuangbanna.

Findings and Discussion

There are numerous examples in the world where highland and lowland people are separated on issues of culture, society and economy. In Xishuangbanna this separation is relatively new and only started making a difference in recent decades when rubber became an economic accelerator. In this regards it is clear that the people of XiaoNouYouShangZhai would have chosen to grow rubber if they could. However, as the village is located above 1,000 m a.s.l. it is not possible for them to grow rubber; a situation that leads to several evident outcomes. One such outcome is the strong connection the people in the village still have to their surrounding forest. Not being able to grow rubber (a relatively quick income that promoted deforestation in the lower altitudes) like their lowland neighbours, the farmers not only avoid further deforestation, but are also in a constant lookout for unique agriculture innovations, such as intercropping tea with walnut, corn with walnut, and tea with camphor.

Altitude is indeed the first example of socio-environmental coevolution where environmental conditions affect members of the society in the village. However, more such examples were observed. The older people in the village reported how bad the situation was when about 50 years ago the forest around the village was almost completely deforested; an example where a collective memory of a social group affects the environment surrounding the village.

The memory of economic bad times in the village is another drive to look for agriculture innovations that can bring more income without damaging the environment. This is also done with consideration of space, slopes, remoteness of the village from the nearest market, and market demand.

*1 mu = 1/15th of a hectare, 1 mu = 0.164 736 920 98 acre e.g. 30 mu = 2 hectare, 30 mu = 4.942 107 629 4 acre

Box 2 shows opinions of interviewees telling in their own words views on tea-walnut intercropping in relation to their society and their environment.

Box 2: Farmers' arguments for and against intercropping tea with walnut

Arguments in favour

"Helps to avoid run-offs"
"The soil is very fertile, so it is a shame to waste space"
"The price of walnut is very high at the moment"
"There is no where else to plant walnut"
"The distance between the tea and the walnut is big enough to reduce damage to the tea from future toxicity of the walnut"

Arguments against

"Harvesting is possible only once a year, instead of twice, because of the walnut toxicity"
"There is no need to mix"
"Intercropping with other crops changes the taste of the tea"
"If tea prices will go up again, there will be less tea to harvest"

Conclusions

Two major conclusions can be drawn from a coevolutionary analysis of tea-walnut intercropping and its surrounding environment. First, farmers' arguments showed that most of them are not aware of the Juglone (a toxic substance of the walnut tree) and do not posses the knowledge of whether tea and walnut can be planted together. Second, the adoption of innovations in agriculture is strongly influenced by the altitude of the village and its remoteness, the result of which is the villagers' openness to new agriculture knowledge. And third, although tea is usually considered a mono-culture, it was observed that in comparison with rubber it does not cause great damage to soil and water. Furthermore, it allows growing it near forest ecosystem and crops in adjacent fields, two elements which lead to higher biodiversity and better environmental performance.

Further research and suggestions

It is suggested here to increase collaboration of local authorities with farmers and development agencies to develop more alternative livelihoods. Those may include:

- Small scale responsible forms of tourism.
- Involvement in long term agriculture research. Such research will enable farmers to improve their own crops, as well as contribute to the global scientific knowledge.
- Enhancing farmers' involvement in nature reserve management and learning from other high altitude nature reserves in China.

References

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