

The role of *Phyllostachys heterocyclus* var. *pubescens* in the life of local residents in Guilin Township, Shaowu, P. R. China

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Abstract—The bamboo species of *Phyllostachys heterocyclus* var. *pubescens* grows so widely in Guilin Township, Shaowu, Fujian, China that it was chosen by the government as the key to alleviate the poverty of the local residents and enhance their revenue. The first step the government took is to assess the role of the bamboo in the life of the local residents. An investigation on the area of bamboo plantation owned by each household and a questionnaire survey were carried out in the summer of 1999 and 2002, respectively. The results showed that most households owned more or less bamboo plantations; bamboo was used as construction material, firewood, food, and was processed into dried bamboo shoot. The ratio of bamboo income to whole income of most households varied from 0 to 70 percent. The income of bamboo was mainly sourced from dried bamboo shoot and was used to buy daily life need items like oil, salt, and clothes to high-level life need items like televisions, motorcycles, and washing machines, etc. The income was also used to pay tuition for children and deposited in banks for big events such as marriage and house-building in the future. Most households did not want to give up bamboo plantations or change them into other plants. It is concluded from this that the bamboo species really plays an important role in the life of local residents in Guilin Township.

Key words: *Phyllostachys heterocyclus* var. *pubescens*; dried bamboo shoots; income.

INTRODUCTION

Guilin Township, of which about 90 percent is mountainous, is a remote township located in the north of Fujian Province. Due to its remote situation, the mountains

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and thus poor transportation, Guilin Township has poor industry and is undeveloped. Most people of Guilin Township are poor and live a hard life. Realizing the situation, the local government of Guilin Township tries to do its best to alleviate the poverty of its people and enhance its revenue. *Phyll. het. var. pub.*, a fast-growing, high-value, multi-purpose bamboo species, was chosen as the key to reach the objectives of the local government, because more than 6000 hectares, about 38 percent of the land of Guilin Township, are planted with *P. het. var. pub.* according to the Inventory of National Forest Resource. In the past, the tax a household paid was determined by the volume of dried bamboo shoot the household produced, i.e. the more the dried bamboo shoot a household produce, the more tax it should pay. Thus, most households did not pay much attention to the management of bamboo plantations and got similar income; consequently, the productivity of bamboo plantations was decreasing, which reduced the production of bamboo shoot. Then the local government decided that the tax a household paid should be determined by the area of bamboo plantations the household had, so the more attention a household put into the management of the bamboo plantations, the more income it would obtain. The first step the local government took was to assess the area of bamboo plantation each household had and the role of *P. het. var. pub.* in the life of its local residents, which is presented in this paper. The results can be compared with the same investigation in the future to assess the changes the actions the local government took have made on local community and because there are many townships around Guilin Township with a similar situation, the results in the paper is meaningful for them too.

MATERIALS AND METHODS

Description of Guilin Township

Guilin Township is located at the southwest of Shaowu district, surrounded by Shaowu, Lichuan, Taining and Jianning counties (Fig. 1). The mean elevation is 720 m, with the highest being 1416 m, the lowest being 486 m. There were 3156 families, with a total population of 11 836 when the investigation was carried out. (Table 2 gives the number of families as 3048; this little difference is caused by differences in criteria like land owners or not, etc.) The Local Government of Guilin Township provided the data on the number of people and the production of dried bamboo shoots of each household.

Measurement of area

During 8–28 July 1999, 18 senior students from Fujian Forestry College (now School of Forestry, Forestry and Agricultural University) carried out the investigation on the holding size of *P. het. var. pub.* for each household in Guilin Township, with a guide provided by the cadres of the village and township and the owners of

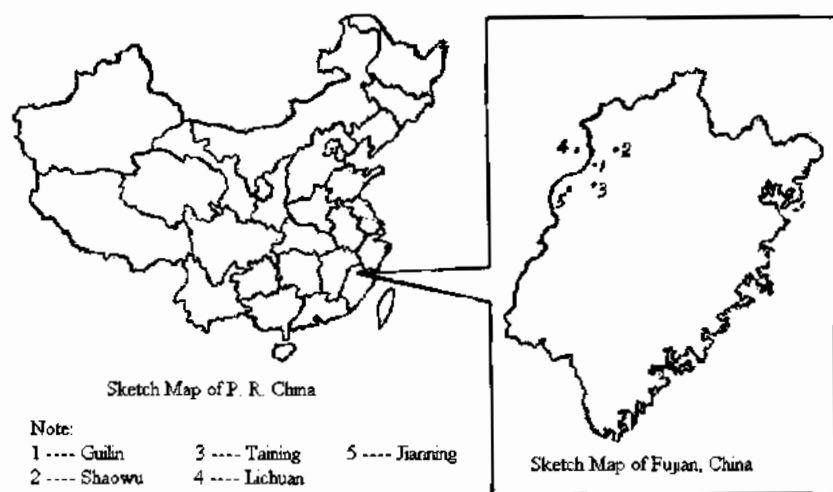


Figure 1. The location of Guilin Township.

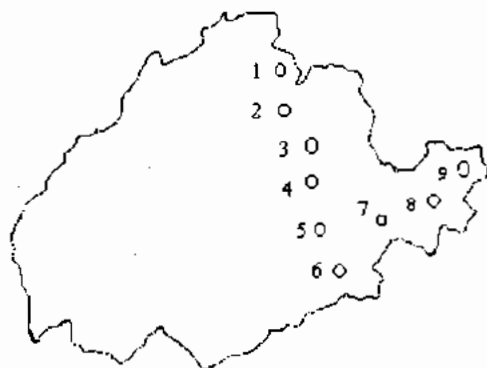
the land. The area is calculated by the formula of 'Area = area of slope \times cos(slope gradient)'. The area of slope was obtained by measuring two vertical crossed middle lines depending on the shape of the land. The length is measured by tape and slope by Blume-Leiss altimeter.

Movement of dried bamboo shoot from plantation to market

Information on the movement of dried bamboo shoot from plantation to market was collected by talking with different people from farmers and middlemen to cadres of village and township.

Questionnaire survey

In July, 2002, five senior students from the School of Forestry, Fujian Agricultural and Forestry University went to Guilin to do a face-to-face questionnaire survey. A structured questionnaire, explaining the purpose of the survey and guaranteeing the respondents full anonymity to the interviewer was compiled before the questionnaire survey was carried out. Nine villages with 375 households were involved in the questionnaire survey, the location of surveyed villages is dotted out in the Fig. 2. The villages are on a diagonal of Guilin Township; however, no village was chosen in western Guilin because the road for vehicles was destroyed when the questionnaire survey was being carried out. It was requested that no household in the nine villages should be missed. However, village Jiaoxi was an exception for some 19 households were absent. The number of households in each village is listed in Table 1. To be sure to make an interview smoothly, the students explained the purpose of the survey and guaranteed the respondents full anonymity to the interviewer at the beginning of every interview. The results are presented in the next paragraph.



Sketch map of Guilin Township

Note: Number 1 to 9 are the villages chosen.

Figure 2. The villages being investigated.

Table 1.

The villages and their households investigated (in 2002)

Village no.	Village name	Household	Note
1	Dayang	48	
2	Xikou	44	
3	Chakou	52	
4	Tutan	30	
5	Faji	48	
6	Shangguilin	45	
7	Shanggan	39	
8	Huilin	45	
9	Jiaoxi	24	The other 19 households being absent
	Total	375	

RESULTS

Number of people in household

The data on the number of people in household were sorted as shown in Table 2. The number of people per household varied from 1 to 9, with most households having 3 to 5 people. In addition, the questionnaire showed the population of all nine villages surveyed was 1595, including 1191 adults and 403 children, i.e. more than 25 percent of the whole population are children who cannot be considered as labourers. That is to say, most households did not have enough labourers and would consequently have to hire outside labour to assist in harvesting bamboo shoots during peak production period.

Table 2.

The composition of household in 1999

Number of persons per family	1	2	3	4	5	6	7	8	9
Number of families	153	287	816	924	581	220	58	7	2

Table 3.The area of the plantation of *P. het.* var. *pub.* per household (1999)

Area (ha)	Number of families	Area (ha)	Number of families	Area (ha)	Number of families	Area (ha)	Number of families
0–1.0	1150	6.0–7.0	33	12.0–13.0	3	18.0–19.0	1
1.0–2.0	751	7.0–8.0	18	13.0–14.0	3	19.0–20.0	0
2.0–3.0	388	8.0–9.0	17	14.0–15.0	5	21.0–22.0	1
3.0–4.0	220	9.0–10.0	14	15.0–16.0	3	22.0–23.0	0
4.0–5.0	111	10.0–11.0	16	16.0–17.0	3	27.0–28.0	1
5.0–6.0	59	11.0–12.0	5	17.0–18.0	0	31.0–32.0	1

Note to Tables 3, 4: the boundaries 0–1.0, 1.0–2.0, etc. mean 0 to less than 1.0, 1.0 to less than 2.0, etc.

Area of the bamboo plantation per household

The investigation in 1999 showed that among 3156 families, only 2803 households owned bamboo plantations. The area of this bamboo plantation varied from 0 to 32 hectares per household. A total of 1901 families or 68% of the plantation owners had only less than 2 hectares. The number of households owning 6–7 hectares decreased drastically to only 33. Three to five households had 12–18 hectares of plantation each. Only one household owned 18–32 hectares of bamboo plantation (Table 3). In other words, the larger the area of plantation is, the lower the number of households owning them.

Production of dried bamboo shoots of each household

The data of the production of dried bamboo shoots of each household provided by the Department of Revenue of the local government of Guilin Township were sorted into Table 4, including those for the year 1998 and 1999. According to the questionnaire survey, among 375 households surveyed, 355 households produced dried bamboo shoots. Bamboo shoots were stored in a wooden warehouse built at the border of the plantations after being boiled. (In the old days, every year, tax collectors determined the amount of tax each household should pay by measuring the volume of bamboo shoots when they were still in the warehouse.) The volume of dried bamboo shoots each household produced ranged from 0 to 9.5 m³ in 1998, and 0 to 8.0 m³ in 1999. Table 4 shows that the number of the households which had less than 1.0 m³ of dried bamboo shoots in 1998 was less than that in 1999 (1090 and 1138 respectively). More households had more than 1.0 m³ of dried bamboo shoots in 1998 than in 1999 (586 and 548 respectively). The largest volume of

Table 4.
Production of dried bamboo shoots of household

Volume of dried bamboo shoot (m ³)	1998	1999
0–0.5	627	671
0.5–1.0	463	467
1.0–1.5	272	263
1.5–2.0	160	137
2.0–2.5	70	70
2.5–3.0	36	41
3.0–3.5	15	16
3.5–4.0	11	8
4.0–4.5	4	4
4.5–5.0	5	3
5.0–5.5	4	3
5.5–6.0	3	2
6.0–6.5	1	0
6.5–7.0	2	0
7.0–7.5	1	0
7.5–8.0	1	1
8.0–8.5	0	0
8.5–9.0	0	0
9.0–9.5	1	0
Totals 0–1.0 m ³	1090	1138
Totals 1.0–9.5 m ³	586	548
Overall totals	1676	1686

Note: the volume is given in m³ because this is the easiest way to measure the quantity in stock.

9.0–9.5 m³ was produced in 1998. It means that the year 1998 was the 'on' year; while the year 1999 was the 'off' year for shoot production. In the 'on' year, most households had more production of dried bamboo shoots, resulting in decrease of the number of households having small volume of dried bamboo shoots and increase of the number of households having large volume of dried bamboo shoots.

Movement of dried bamboo shoot from plantation to market

Through interview and discussion with local farmers, middlemen and cadres of village and township, information on the production and marketing of dried bamboo shoots was obtained (Fig. 3). The bamboo plantation provides three kinds of raw materials: culms, bamboo shoots, leaf and branch. The growers in Guilin Township harvested bamboo shoots from winter to the next spring. After being dug out, the shoots are boiled with water until they become edible. They are then stored in wooden drums. On top of the shoots stored in the drums, high pressure was exerted by using a large piece of stone or by a wood leverage. In former days, after several months, the tax collectors or cadres of village and township came to measure the volume of bamboo shoots in every warehouse for tax assessment. The owners paid

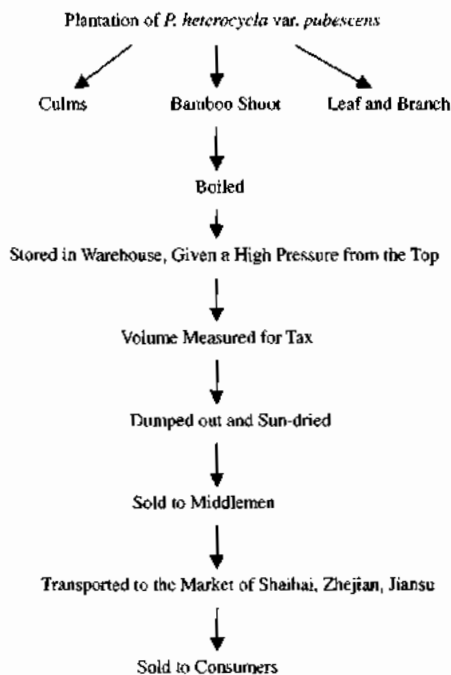


Figure 3. The movement of dried bamboo shoot from plantation to market.

tax according to the assessment. The tax per cubic meter was around 600 Yuan. From summer to autumn, the bamboo shoots in the warehouse would be taken out and dried under sunlight. Finally, the dried bamboo shoots were sold to middlemen and transported to Shanghai, Zhejiang and Jiansu for sale. Prices of dried bamboo shoots per cubic meter range from 4000 to 8000 Yuan, depending on the quality of the dried bamboo shoot.

Use of bamboo

According to the questionnaire survey, among 375 households interviewed, there are 355 households producing dried bamboo shoot, 199 households eating fresh and dried bamboo shoot, 72 households using bamboo as weaving material, 24 households using bamboo as construction material, and only 20 households using bamboo as firewood. Therefore, being processed into dried bamboo shoot is the most important use of bamboo in Guilin, followed by food, and weaving. However, it is surprising that there are not many households in Guilin using bamboo as firewood. This may be due to too many shoots processed into dried bamboo shoot. Compared with the documented 1500 uses for bamboo [1], the use of *P. heterocycla* var. *pubescens* in Guilin is limited; however, it is similar to the other bamboo species such as *Schizostachyum brachycladum* [2] in the local community. The use of bamboo is extended with developing science and technology; therefore, the

limited use of bamboo in Guilin Township is partly due to the underdevelopment of science and technology.

Income generated from bamboo

In the questionnaire survey, the income a household obtained in a year was divided into the incomes of bamboos, fruit trees, other forest products, crops, culturing, business, works and others. In the case of bamboo income, it was divided into the incomes of fresh bamboo shoot, dried bamboo shoot, and culms. Then the percentage of the income of bamboo in the total income of a household was calculated and sorted into Table 5, the percentage of fresh bamboo shoot, dried bamboo shoot and culms in the total income of bamboo were calculated by dividing the sum of those bamboo products by the sum of the total income of bamboo. It can be learned from Table 5 that the percentage of bamboo income in the total income of a household could reach as high as 90% and as low as 0. The percentage of bamboo income in the total income of most households is below 70%. According to the survey, the income generated from bamboo is divided as follows:

the most important source of the income is the dried bamboo shoot: 40.9 percent;

the income of culms is the next: 33.5 percent;

followed by fresh bamboo shoot, 25.6 percent.

The survey among 375 households showed next the use of the income from bamboo sales

375 households buying daily life items such as salt, oil, rice and so on;

355 households paying tax especially agricultural tax;

352 households paying tuition for children;

296 households buying alcohol and cigars;

112 households paying travel costs;

79 households buying expensive items like televisions, washing machines, refrigerators, videos, and motors;

49 households depositing the income of bamboo for marriage wedding and house-building in the future;

36 households using the income of bamboo as business-started capital.

Table 5.

The percentage of bamboo income in the total income a household obtained in a year (2002)

Percentage	100-90	90-80	80-70	70-60	60-50	50-40	40-30	30-20	20-10	10-0
Number of households	3	14	29	50	42	44	46	44	52	53

Note: the percentages 0-10, 10-20 mean 0 to less than 10, 10 to less than 20, etc.

Therefore, it is concluded that the income of bamboo is used in many ways.

According to the survey, the opinion about the bamboo income is as follows.

197 households considering bamboo income very important,

166 households considering bamboo income not very important,

12 households considering bamboo income not important.

On the question of what would you do with bamboo plantations, among 375 households surveyed, the answers were:

7 households would give up bamboo plantations,

304 households would continue to run bamboo plantations,

62 households would expand bamboo plantations,

not household would like to replace bamboo with other species or crops.

CONCLUSION AND DISCUSSION

It is concluded from the above that most households in Guilin Township had some plantations of *P. het. var. pub.*: the bamboo was processed into dried bamboo shoot, used as firewood, constructing and weaving materials, and fresh bamboo shoots were eaten. Bamboo income was part of the whole income of most households: it was sourced mainly from dried bamboo shoot and was used to pay for many items, from daily life needs to expensive products. Bamboo income was considered important or very important among most households. Most households would keep running bamboo plantations. Therefore, it can be learned that this bamboo played an important role in the life of the people of Guilin.

To date, however, the contribution of this bamboo species to the life of people of Guilin is being questioned. With more people leaving the hometown to work and bringing their income back, the percentage of bamboo income in the whole income of the household is decreasing. Because of the movement of bamboo shoot from plantation to market, the income of people in Guilin depends too much on the consumers in Shanghai, Zhejiang and Jiansu. If the consumption of dried bamboo shoot is reduced in Shanghai, Zhejiang and Jiansu, the income of people in Guilin is also reduced. Therefore, the system that supports local people in Guilin is vulnerable.

Although *P. het. var. pub.* provides culms, bamboo shoot, and leaf and branch, only bamboo shoots were utilized. Even processing of bamboo shoots is a monopoly. Therefore it is advisable to diversify the utilization of this bamboo, such as using culms to make furniture or pulp, and roots to make handicrafts, besides bamboo shoot utilization. Even the use of fresh bamboo shoots can be amplified: they can be canned.

The other problem is that there is a lack of knowledge of bamboo plantation management and capital in Guilin. The diameter of culms in most plantations is rather small. This is caused by intensive harvesting of bamboo shoot. Since Guilin

Township is a remote mountainous region, outsiders are not likely to work in Guilin, nor are those Guilin people who are educated. Lack of trained people inhibits the development of Guilin Township even if it has a large volume of bamboo resource. There is no manufacturing factory to process bamboo because of lack of capital.

Acknowledgements

The authors wish to thank Mr. Tan Ching Feaw, Malaysia for editing the article, the Local People's Government of Guilin Township for providing the local cadres to organize farmers to carry out the investigation and provide data on the population and production of dried bamboo shoots from individual families, and accommodation during the investigation. We are also indebted to Professor Yichi Liang and Jinyi Lin, Master student Heming Chen, the School of Forestry, Forestry and Agricultural University of Fujian for their coordination. The authors also wish to thank Xia Zhao, the Research Institute of Tropical Forestry of the Chinese Academy for helping to draw the sketch map of Fujian and China.

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