Analysis of Farmers' Needs for Forestry Information and Technology in Yunnan's Hot Zone: Based on Empirical Survey in Menglian County

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Abstract Lack of public forestry information and techniques has restricted the development of forestry management and the income increase of rural farmers in hot region of Yunnan province. Therefore it is necessary to provide forestry information and techniques to rural areas so as to compensate for the information gap between urban and rural areas. Based on the survey about farmer demand for information and technique in Menglian County, the paper analyzed the supply methods and demand characteristics of forestry information and techniques. The results showed that the farmers had very strong demands for forestry information and techniques with diversified trend. But the farmers got the information with backward method and single service supply approach, and it lacked effective expression mechanism for their demands.

Key words Forestry information and technology, Forest farmers, Analysis of needs, Information services, Yunnan's hot zone

1 Introduction

The implementation of the reform of collective forest property rights system has made the forest farmers become the main subject of forestry management and forestry technology needs. The interests and losses of forestry management are related to farmers. The complete system of property rights causes forest farmers to have reasonable expectations of long-term gains, and then focus on the forestry production and management information and technology that forestry operation depends on[1]. The lack of information, in conjunction with forest farmers' economic strength, education level and bonds of mind, has resulted in the lack of demand for forestry information and technology, thereby becoming a "bottleneck" restricting the development of the forestry industry[2]. Through the relevant literature review at home and abroad, it is found that the current theories and research methods on technology need behavior have been relatively mature, but these methods are mainly concentrated in the use of several important cultivation technologies for crops. There are few in-depth studies on forest farmers' demand behavior[3-5], and they mainly focus on the single commercial forest research[6]. In this study, with Menglian County of Pu'er City in Yunnan's hot zone as the research object, we select 2 key towns, and make random questionnaire survey of 32 forest farmers to better understand the forest farmers' awareness and demand, in order to provide a reference for the government and scientific and technical personnel to promote forestry technology and information and build the grass-roots forestry technology extension system.

2 Overview of the study area

Menglian Dai, Lahu and Va Autonomous County is an autonomous county under the jurisdiction of Pu'er Prefecture, Yunnan Province, China. It borders Lancang County in the east, Ximeng County in the north, and Myanmar in the west and south, with the border line of 133.399 km^2. It is an important gateway to Myanmar, Thailand and other Southeast Asian countries. The county's land area is 1891.97 km^2, and the population is 130000. It administers 3 townships, 3 towns and 39 village committees. It is a typical frontier mountain county, with mountainous area accounting for 91.8 % of the county's total area. The main rivers include Nanlei River, Nanka River and Nanma River. It has a low-latitude humid subtropical monsoon climate. There are neither hot summers nor cold winters, with the annual average temperature of 19.6℃. The annual average rainfall is 1 373.2 mm, and the annual relative humidity is 80%. There are also rich light, heat and water resources, providing favorable natural and geographical conditions for the sustainable development of tropical forestry.

3 Survey program

With Menglian County as the research object, we select two key forestry towns (Jingxin and Mangxin), and use questionnaires and interviews to understand forest farmers' awareness and demand will of forestry technology and information. The questionnaire respondents are all householders, and the survey personnel are trained in advance to adeptly collect data. The information reflected in the questionnaire is true. The survey content includes the basic situation of farmers (identity, family situation, educational level), economic conditions, forest operation, man-made forest operation technology and information needs.

4 Results and analysis

4.1 Farmers' family situation

4.1.1 Nationalities and educational level. We survey 32 rural households in 3 villages of Jingxin Township and Mangxin Town in

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Menglian County, involving a total number of 155, and an average of 5 people per household. There are 101 labor forces, accounting for 65% of the population surveyed, an average of 3 persons per household. The rural households surveyed include 7 Dai Nationality households, 10 Lahu Nationality households, 4 Aini Nationality households, 5 Lisu Nationality households, and 6 Hani Nationality households. The educational level of labor in this survey is divided into 6 levels (illiteracy; primary school; junior high school; senior high school; vocational or technical school; junior college and above), and the results show that the educational level of the labor force is generally low (illiterates and semi-illiterates, 38.6%; primary school, 42.7%; senior high school, 16.8%; technical school, only one person; junior college, also only one person).

4.1.2 Farmers' family economic conditions. As can be seen from Table 1, 2, the average annual total income per household is 32200 yuan. The income from the cultivation of food crops accounts for 45.7% of the total annual income, and the planting varieties are rice and corn. The income from the cultivation of cash crops accounts for 28% of total annual income, and the main planting varieties include sugarcane, tea, coffee, amomum villosum and vegetables. In addition to traditional farming, some farmers are also engaged in breeding, transportation, small businesses and migrant working in slack season, so the income obtained has a small share in the annual income, indicating that all of the farmers are mainly engaged in traditional farming (Table 1). The average annual expenditure per household is 14200 yuan. The largest expenditure is for means of production and daily living, accounting for 30.5% and 42.1%, respectively. The expenditure on means of production is mainly used for the purchase of seeds, pesticides, fertilizers and farm machinery, while the cost of living is for the daily food, clothing and so on (Table 2).

Table 1 Farmers' income in 2009

Sources of income	Cultivation of food crops	Cultivation of cash crops	Breeding	Transportation	Others	Total
Sum (10^4 yuan)	1.47	0.90	0.35	0.41	0.10	3.22
Proportion (%)	45.7	28.0	10.9	12.7	3.1	100

Table 2 Farmers' expenditure in 2009

The main expenditure	Means of production	Living expenses	Children's education	Medical care	Others	Total
Sum (10^4 yuan)	0.43	0.60	0.11	0.08	0.20	1.42
Proportion (%)	30.5	42.1%	7.6	5.9	13.9	100.0

4.2 Farmers' forestry production and operation Among the 32 rural households surveyed, each household has 21.35 mu of woodland after forest reform. All farmers believe that after the hills are allocated on the household basis, it can avoid deforestation and facilitate management, thereby obtaining higher economic efficiency. In the survey, 12.5% of farmers have not yet planted man-made forest, 32% of farmers have planted man-made forest, and 20% of farmers have received benefits from the cultivation of man-made forest. Other farmers think the operation of man-made forest can increase income. The poor management, lack of technique and less input of human and material resources are responsible for the operational difficulties of man-made forest.

4.3 Analysis of forest farmers' needs for forestry information and technology

4.3.1 Forest farmers' willingness to acquire forestry information and technology. In the survey of farmers' needs for forestry information and technology, it is found that the farmers have strong willingness to obtain new information and technology. 74.2% of farmers think if necessary, they will actively learn new forestry information and technology, and 17.5% of farmers think although it is necessary, they will not spend more energy on finding information and technology. 35.4% of farmers think there is an urgent need for constantly enriching the forestry production technology in order to meet the production practice, and 56.4% of farmers just think there is a need.

4.3.2 The types of information and technology needed most by forest farmers. Statistics show that the primary information for forest farmers is about seedlings (40%), followed by market information (29.6%), forestry policy (26.9%), and practical forestry production technology (20%) (Table 3). Thus, it can be found that farmers are more concerned about the seedling, market and policy information. This also requires the forestry technology extension and service agencies to provide targeted forestry technology and information services at different stages of forestry production, in order to obtain better promotion and service effectiveness.

Table 3 The types of information needed most by farmers

The types of information	Seedlings	Market	Policy	Technology
Proportion(%)	40.0	29.6	26.9	20.0

4.3.3 The channels for farmers to obtain forestry technology and information. Survey results show that the channels for farmers to obtain forestry technology and information are as follows: local forestry technicians (92.9%); finding on one's own (50%); radio and television (35.7%); other villagers (25%); newspapers and magazines (7.1%); others (7.1%) (Table 4). Thus, forestry technicians play an important role in the process of farmers obtaining information and technology. Farmers' knowledge on forestry production is mostly from the forestry science and technology promotion long carried out by the forestry departments. The local forestry technical personnel implemented the forestry technician village responsibility system after the forest reform, making farmers have more opportunities to obtain information and technology. Meanwhile, 35.7% of farmers obtain a lot of forestry information

and technologies from radio and television as popular media. 25% of farmers obtain forestry information and technology by talking with other villagers or imitating other villagers to carry out forestry production. Newspaper and magazine are subscribed by only a handful of villagers, due to the low level of education. There are some other channels for farmers to get information and technology, including mobile phone information, research institutes and conversation with forest product buyers. As for the Internet queries involved in the survey, it is found that there is no farmer using the Internet to obtain information and technology due to local conditions.

Table 4 The channels for farmers to obtain forestry information and technology

The channels for obtaining technology and information	Forestry technicians	Finding on one's own	Radio and television	Other villagers	Newspapers and magazines	Others
Proportion (%)	92.9	50.0	35.7	25.0	7.1	7.1

4.3.4 Farmers' awareness of the township forestry station. The township forestry station, as the most basic level of forestry institutions in the forestry system, plays an important role in forestry technology promotion and service. However, 62.5% of farmers have never been to the forestry station, and some farmers even do not know where the forest station is. Among the farmers who have been to forestry station, 41.7% of farmers make inquiry about the forestry production and management knowledge and information, and other farmers only apply for the forest harvesting permits or warrants. 75% of farmers think the forestry station staff going to the village, are to promote forestry-related policies, while 34.5% of farmers think the forestry station staff are to provide forestry technical guidance and services.

4.3.5 Farmers' willingness to take part in technical training. All of the farmers surveyed are willing to participate in the man-made forest operation technical training. As for the technical training modes, 75% of farmers choose to visit and observe other demonstration bases; 72.1% of farmers choose the on-site guidance in the field; only a few farmers choose the mode of taking classes for training. As for the content of the technical training, 65.6% of farmers choose the forestry production practical techniques (nursery, afforestation and management and protection, etc.) while 25% of farmers choose the tree species knowledge. Only a few farmers are interested in the long-term forestry operation objectives and forestry ecological construction.

5 Conclusions and recommendations

5.1 The forest reform makes the forest farmers have a growing demand for information and technology and there is a diversified pattern First of all, the forest reform makes the farmers obtain independent woodland management right and they have a growing demand for information and technology in order to get more economic benefits. Secondly, farmers' needs become diversified. Currently, farmers need not only forestry production technology, but also the information on supply and demand, price, technology and policy. Thirdly, farmers need interaction and they want to communicate with experts about the forestry technical knowledge. Farmers want the customized information based on their own needs.

5.2 The channels for farmers to obtain forestry information and technology mainly include forestry technician, radio and television, finding on one's own and communicating with others The teaching of forestry technicians is the main channel for farmers to get information and technology, but it has the clear characteristics of government behavior due to the influence of forestry technician's knowledge and culture, and farmers can only passively receive the information. Television is the most principal way for the farmers to obtain information. Based on the consolidation of existing broadcast television network, increasing the broadcast time of rural information service programs can be the most convenient way to improve rural information service. With the increase of state investment in information technology in rural areas, coupled with the popularity of telephones, cell phones and computers, farmers' information access path has shifted from traditional media to modern media.

5.3 The supply mode of forestry information and technology for farmers is simple The township forestry station is currently the government agency which provides the most direct information and technology services to farmers, but the effective supply is insufficient, and the reasonable supply system is not arranged in accordance with the nature of public services in rural areas, resulting in low efficiency of the system. Meanwhile, the forestry station provides limited services. In addition, the civil service is basically not developed. The grass-roots forestry departments and various levels of information service organizations should choose the appropriate way of transmitting information according to the use characteristics of farmers' technical information.

5.4 Farmers lack the effective expression mechanism for information and technology service needs There is a shortage of software and hardware equipments for collecting information, processing information and transmitting information at the grassroots level, and the information network system is not perfect. There are no information service intermediary organizations, and it lacks the personnel who perform active and scientific information management, and the grass-roots government departments can not accurately understand farmers' needs for rural information services. Farmers can not effectively express their needs for technology and information services. The grass-roots government departments and information service organizations at all levels should increase the personalized information services, and establish information and technology service files based on farmers' needs.

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index of various county-level administrative units in Poyang Lake Ecological Economic Zone in 2010, and the ecological and economic index was highest in Wannian County (55.74), indicating that the ecological and economic system is best in Wannian County. The ecological and economic index is lowest in Ruichang City (28.65), indicating that the ecological and economic system is poor in Ruichang City. (iii) The developed regions with high scores of ecological and economic index should improve resource utilization efficiency, increase environmental protection efforts and strengthen ecological construction in ecological and economic development; the underdeveloped regions with high scores of ecological and economic index should ensure the economic growth rate and quality. (iv) The regions with low scores of ecological and economic index should vigorously develop economy, improve resource utilization efficiency and focus on ecological construction while paying attention to protecting the environment during ecological and economic development. (v) The overall score of ecological and economic index in Poyang Lake Ecological Economic Zone is not high, only 38.37, at a poor level. It is necessary to greatly enhance environmental protection and resource utilization while focusing on ecological construction and socio-economic development.

5.2 Discussions The ecological and economic index built in this paper has been expounded through peer review and acknowledged by some environmental economics experts, so it is scientific and practical. Some experts have proposed the inclusion of land resource utilization, biological resource utilization and renewable energy use and other indicators as well as erosion rate, human development index and Gini coefficient, but these indicators are not included for some reasons. This shows that the indicator system in this paper is flawed, and we will try to divide the evaluation unit into two levels (county and city) in future studies. It is necessary to further develop and improve the indicator system for ecological and economic index, and building an evaluation system with universal applicability will be the focus of future research directions. At the same time, the use of expert consultation to determine the index weight is still strongly subjective despite the integration of some indicators, and there is a need to combine the subjective weighting method with objective weighting method in follow-up studies, to enhance information processing and calculation accuracy. In this paper, this paper performs evaluation and analysis of the calculation results of ecological and economic index, and analyzes the comprehensive scores of five modules, with advantages of conciseness, but the disadvantages lie in the too general recommendations. It is necessary to explore the deeper reason in the future study, and propose more targeted recommendations.

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