The impact of collective forest right system reform on farmer's management of under-forestry economis

——Based on the monitor of collective forest right system reform in LiaoNing Province, China

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Abstract: The development of non-timber forest products plays an important role in solving the food problems, using land reasonably and increasing the income of farmers meanwhile protecting forest. It is also an important component of sustainable development. Based on the data from household survey of “monitor of collective forest right system reform” in LiaoNing Province which hold by State Forestry Administration of the People’s Republic of China, the paper uses Probit regression and Tobit regression models to analysis which factors can significantly impact whether farmers manage non-timber forest products and the income of managing non-timber forest products. The conclusions show that the cooperatives, technology services, proportion of public welfare forest, non-agricultural work, etc. have the significant impact on whether farmers manage non-timber forest products; the cooperatives, satisfaction, the proportion of circulation timberland, area and age of headed ect. have the significant impact on the income of non-timber forest products. This article also focus on women’s participation in the management of non-timber forest products. Finally, based on the analysis results, suggestions on how to promote the development of managing non-timber forest products are given.

Key words: Management of non-timber forest products; Income of non-timber forest products; Impact factors
1 Introduction

1.1 Background

From ancient times, the forest resources has played a crucial role in development of economic and environmental protection. Founding of new China, forest resources as an important building material and fuel sources, has played an important role in the new Chinese economic recovery. With the rapid development of China's economics and the transformation of economic development mode, pre extensive development caused environmental pollution and excessive consumption of resources has become a hinder to economic development in the future. Eighth session of the General Assembly on behalf of the Communist Party of China should be made to focus on promoting the construction of ecological civilization. Forests as a renewable resource, the resource security, improve environmental quality and soil and water conservation effect of more and more attention. Faced with an increasingly grim situation of environmental resources, forestry also faces mainly from the provision of forest-based functions to the ecological environment changes. Forest as a renewable resource, which will help resource security, environmental quality improvement and the role of soil and water conservation, has caused more and more attention. Faced with an increasingly grim situation of environment and resources, forestry also faces changes from the provision of forest productions to the protection of ecology and environment.

Current community increases demands to forestry, the level of absolute number of forest resources has increased, but the level of relative number has a wide gap to the developed countries. And the afforestation is in poor quality. From the perspective of the number of forest resources, according to the seventh, eighth national forest inventory data and the World Bank data, from 2004 to 2013, China's forest area increased from 174.91 million hectares to 207.69 million hectares. Forest coverage rate increased from 18.2% to 21.6%, compared to forest resource-rich countries such as Sweden (69.24%) and Japan (68.38%), there still exists a large gap. In addition, from the perspective of forest quality, before the reform of collective forest right system, a large number of non-state-owned forests are controlled by the collective. Farmers are difficult to obtain forestry incomes, which results in the lack of management and poor quality of non-state-owned forests.

In 2008, China has basically completed the reform of collective forest right system with "clear property rights, deregulation operations, reduce taxes, regulate circulation" as the main content,
which aims to strengthen the management and protection of forest resources, increase the income of farmers. Since the implementation of the reform of collective forest right system, farmers get the management rights of timberland, the autonomy and initiative to the development of forestry gradually strengthened. However, the government bans cutting ecological public forests and performs Cutting Quota System after the Natural Forest Protection Project. Even if farmers get the forest management rights, from the perspective of ecological public forest, the subsidy of national ecological forest is 10 yuan per mu per year, the provincial ecological public forest is 5 yuan per mu per year. From the perspective of commercial forest, the period of forest management is too long and difficult to get cutting quotas. From two perspectives, forestry income that households can get is still very small, which would weaken the enthusiasm of farmers to management and protect forests. It will hinder the purpose of the reform of collective forest right system.

In such a realistic background, under-forestry economic has become an organic complement to the reform of collective forest right system. This fully staffed business model provides an effective way for better implementing collective forest right system reform policies and improving the living conditions of farmers. The development of Under-forestry economic has been the strong state support, the Twelfth Five-year Plan of Chinese Forestry proposed to "accelerate the development of forestry industry system," with particular reference to actively promote the forest economics.

Liaoning Province is rich in forest resources, which the forest area is 5.57 million hectares and the forest coverage rate is 38.24%, ranked 14 in China. Meanwhile, Liaoning Province has tradition to gather forest products, which is a good basis for the development of under-forestry economic. As one of the first provinces which complete reform of collective forest right system, Liaoning Province attaches great importance to develop the under-forestry economics. In 2010, the Liaoning Provincial Forestry Department released Liao Lin Word 10 document (2010), which made great efforts to promote the construction of forestry economic base, promote the rapid development of "one county, one industry", speed up construction of forest products processing enterprises and other development goals. The output value of under-forestry economics increase from 3.07233 billion yuan (2011) to 6.07895 billion yuan (2013), ranked 14 in China.

1.2 Research questions

Based on the good benefits of under-forestry economics, from the national to the local launch
of a range of support policies to promote the development of under-forestry economics. In accordance with the general idea, developing the under-forestry economics has benefits, farmers should have a high passion to develop, but the reality is that the popularity of under-forestry economics remains low, a relatively small number of farmers to develop the under-forestry economics. The situation is similar with the domestic-based farmers adopt agroforestry low reality, which carries a lot of influence factors research on the development of agroforestry farmers perspective. Related normative analysis abroad, from a technical point of view, promoting the development of agroforestry brings great risk and uncertainty to farmers, promotion of agroforestry essence of this new model is to promote a kind of uncertainty (Low, 1974; Ellis, 1993). Such risks and uncertainties that may affect the farmers to develop agroforestry decision-making behavior (Mercer and Miller, 1998). Keynes decision theory that the future earnings forecasts and the degree of confidence in forecasting results to determine a person's decision-making behavior (Anderson et al., 1997), decision-makers will be to their predictive value assigned a weight, when the number of the relevant information can be obtained relatively is small and quality is poor, will give his prediction a lower weight, the possibility of the adoption of the decision subject also smaller (Keynes, 1971). For agroforestry, which requires farmers to plant trees on agricultural land. Since the trees are labor-intensive, return is not immediate, tree planting may be an unfamiliar technology for farmers. Thus, even if farmers obtain information on the long-term benefits of agroforestry, due to an imbalance in the short term investment and return, they will be very little weight on earnings estimates on agroforestry, this may result in the lower rate of adopting agroforestry (Scherr, 1995).

More of the current studies abroad use stepwise discriminant analysis, mean comparison and logit regression, found that have received training in forestry extension, satisfied with the current plantations, the number of planting trees, the proportion of farmland covered by timberland, agricultural land area, the level of education have a positive impact on adopting agroforestry; farmer has timber distribution rights, age, number of children at home, income level, raising the amount of the family horse, more than 16 year-old daughter, the distance to get fuelwood, etc. has a negative impact on adopting agroforestry(James F. Casey, 2004; Meghan M., 2008; FA CAVENESS etc., 1993; Kamal Kishor Sood et al., 2011).

There are some differences between agroforestry and under-forestry economics, but the study abroad based on farmers' perspective to have a certain significance. In order to promote the
development of under-forestry economics, it is necessary to find out factors that affect farmers’ choice whether they develop under-forestry economics from policy factors, participation of forestry factors, timberland factors and household conditions factors.

2 theoretical model

2.1 measurement model

Probit model is a generalized linear model, which obeys normal distribution. A simple probit model is something that explained variable $y$ is a 0-1 variable, event probability depends on the explanatory variables, that is to say, the probability of $y = 1$ is a function of $X$, where $f(x)$ obeys the standard normal distribution. The formula is:

$$\Pr(\text{pro} = 1 | X_1, \ldots, X_n) = F(\beta_0 + \beta_1 X_1 + \ldots + \beta_n X_n)$$

$\beta_i$ is the parameter estimation, $X_i (i = 1, 2, 3, \ldots, n)$ factors influencing farmers development of under-forestry Economics and farmers income of non-timber forest product.

The first part be explained variables for “the farmers are the development of under-forestry Economics”, the second part of the explanatory variables for “the development of under-forest farmers' economic non-timber forest production the amount of income”, according to the characteristics of the variables in this study, combined with the previous related research experience determine the econometric model used in this study.

The Tobit model applies to the results of a continuous distribution at a time of a positive probability and contains a partial variable that takes a positive probability as zero.

According to the actual requirements, using the $E(y | x, y > 0)$ model Tobit this expectation. The expected value $E(y | x, y > 0)$ is the expected value of the given $x$ for the given $y$, and the $Y$ is the value of the sub population at the time of the positive value. The formula is:

$$E(y | y > 0, x) = x\beta + E(u | u > -x\beta) = x\beta + \sigma E[I(u/\sigma) | (u/\sigma) > -x\beta/\sigma]$$

$$= x\beta + \sigma \phi(x\beta/\sigma) / \Phi(x\beta/\sigma)$$
The second part of the research is the factors that influence farmer’s income of the under-forestry economics products who have been developing forestry economics, so the parameters of Tobit model are estimated.

2.2 variable selection

In the choice of variables, in addition to the relevant areas of research, but also combined with the actual situation of forestry in Liaoning. The factors that can study the economic factors of farmers' development of under-forestry Economics are determined by the variable of "whether farmers are developing the under-forestry Economics". For the development of under-forestry Economics of farmers, for the further study of farmer’s non-timber forest product income is the amount of factors, and determined the "has been developed under-forestry Economics farmer’s non-timber forest product income amount" as the second dependent variable.

There are many factors affects the peasant household to the development of forestry economic, in this paper, the possible influence factors points to forestry policies, Farmer participation in forest reform, Timberland conditions, The household conditions four categories (see Table 1).

In the forestry policy in this class variables, combined with the actual situation determine village forestry cooperative organizations, farmers received forestry science and technology service, all the farmers of timberland in the proportion of timberland area of forest insurance three variables.

In the Farmer participation in forest reform for this variable, including farmers of the forest change overall situation is satisfactory, all the farmers of timberland in has been awarded the proportion of forest right certification of forest area, all the farmers of timberland by tender auction, transfer and other means to obtain the timberland area ratio and each forest area of three variables.

Under the Timberland conditions, the area of the forest land area and the total area of the farmers' public forest area of the forest area accounted for two variables.
In the household conditions categories, including age of household head, household head education level, whether farmers have off-farm work, family dependency ratio, per capita forest area is greater than 50 acres of the five variables.

3 data source and description

This research was carried out in Liaoning Province, which began to collective forest right system reform in March 2005 and basically completed the work to indeed the right. Liaoning Province is one of the provinces of the completion of the first collective forest right system reform. The forest area of the province is 5645000 hectares, the forest cover is 38.8% which is high. At the same time, Liaoning province is an important Chinese herbal medicine production, especially Lin Shen, wood frog and other forest products business in our country in a leading position.

3.1 data source

The sources of data used in this study is from national forestry bureau of collective forest reform benefit investigation in Liaoning research. We carried on the questionnaire survey in Qingyuan, Liao yang, Tie ling County etc. with 500 household farmers. The data used was panel data for the survey of 500 households in 2012 and 2013 years. In addition to the investigation of households, we also get the village level of the village of 10 counties 50 data by the village committee interviews.

3.2 data description

After screening, in the effective sample of 458 households, the development of under-forestry Economics has 133 households, accounting for 29.04% of the total. In the development of under-forestry Economics 133 households, the average annual non-timber forest product revenue for 2.64 million yuan, but to million yuan is the condition of the unit, it is obvious that there is a large gap between the amount of non-timber productio among those who has developed under-forestry Economics from the standard difference. The results of the other variables are shown in Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Explanation</th>
<th>Undeveloped under-forestry economics</th>
<th>developed under-forestry economics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 data description
### dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>325 households</th>
<th>133 households</th>
</tr>
</thead>
<tbody>
<tr>
<td>developed under-forestry economics</td>
<td>1=yes, 0=no</td>
<td>0</td>
</tr>
<tr>
<td>Income of under-forestry economics</td>
<td>10 thousand</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>yuan</td>
<td></td>
</tr>
</tbody>
</table>

### independent variables

**Forestry Policy**

<table>
<thead>
<tr>
<th>Variable</th>
<th>325 households</th>
<th>133 households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Forestry Cooperation Organization</td>
<td>a</td>
<td>0.36</td>
</tr>
<tr>
<td>village</td>
<td></td>
<td>0.68</td>
</tr>
<tr>
<td>Whether the forestry technology service</td>
<td>1=yes, 0=no</td>
<td>0.17</td>
</tr>
<tr>
<td>received</td>
<td></td>
<td>0.38</td>
</tr>
<tr>
<td>Insurance in forest timberland area ratio</td>
<td>%</td>
<td>0.29</td>
</tr>
</tbody>
</table>

**Farmer participation in forest reform**

<table>
<thead>
<tr>
<th>Variable</th>
<th>325 households</th>
<th>133 households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied with the overall situation of forest reform</td>
<td>1=yes, 0=no</td>
<td>0.86</td>
</tr>
<tr>
<td>Forest land area ratio of forest tenure certificate</td>
<td>%</td>
<td>0.35</td>
</tr>
<tr>
<td>The proportion of the forest land area obtained by bid invitation, transfer and other means of obtaining the forest land</td>
<td>%</td>
<td>0.13</td>
</tr>
</tbody>
</table>

**Timberland conditions**

<table>
<thead>
<tr>
<th>Variable</th>
<th>325 households</th>
<th>133 households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each forest land area</td>
<td>mu</td>
<td>17.49</td>
</tr>
<tr>
<td>Proportion of public welfare forest land area</td>
<td>%</td>
<td>0.44</td>
</tr>
</tbody>
</table>

**The household conditions**

<table>
<thead>
<tr>
<th>Variable</th>
<th>325 households</th>
<th>133 households</th>
</tr>
</thead>
<tbody>
<tr>
<td>The householder age</td>
<td>years</td>
<td>54.13</td>
</tr>
<tr>
<td>The education level of the head of the household</td>
<td>1=over primary</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>school, 0=below</td>
<td>0.48</td>
</tr>
<tr>
<td>Whether the head of household non-agricultural work</td>
<td>1=yes, 0=no</td>
<td>0.45</td>
</tr>
</tbody>
</table>
4 Empirical model and estimation

In this paper, Probit and Tobit regression analysis of 458 valid samples obtained by Stata10.0 were used, and the results were shown in Table 2.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Probit Model</th>
<th>Tobit Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Forestry Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Forestry Cooperation Organization village</td>
<td>0.233**</td>
<td>0.099</td>
</tr>
<tr>
<td>Whether the forestry technology service received</td>
<td>0.426**</td>
<td>0.179</td>
</tr>
<tr>
<td>Insurance in forest timberland area ratio</td>
<td>0.728***</td>
<td>0.211</td>
</tr>
<tr>
<td>Farmer participation in forest reform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied with the overall situation of forest reform</td>
<td>-0.223</td>
<td>0.216</td>
</tr>
<tr>
<td>Forest land area ratio of forest tenure certificate</td>
<td>0.223</td>
<td>0.228</td>
</tr>
<tr>
<td>The proportion of the forest land area obtained by bid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>invitation, transfer and other means of obtaining the forest land</td>
<td>-0.177</td>
<td>0.263</td>
</tr>
<tr>
<td>Timberland conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each forest land area</td>
<td>0.007</td>
<td>0.004</td>
</tr>
<tr>
<td>Proportion of public welfare forest land area</td>
<td>-1.116***</td>
<td>0.224</td>
</tr>
<tr>
<td>The household conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The householder age</td>
<td>-0.007</td>
<td>0.008</td>
</tr>
<tr>
<td>The education level of the head of the household</td>
<td>0.228</td>
<td>0.175</td>
</tr>
<tr>
<td>Whether the head of household non-agricultural work</td>
<td>-0.457***</td>
<td>0.168</td>
</tr>
</tbody>
</table>
Family dependency ratio  | -0.075 | 0.315 | -1.622* | 0.956
Whether the per capita  |        |        |         |        
timberland area is more than 50 | 0.171 | 0.337 | 1.285 | 0.888
mu                      |        |        |         |        
Constant                | -0.736 | 0.551 | 10.986*** | 1.976

Note: 1. The data from the state forestry administration monitoring survey in Liaoning province forestry tenure reform.
2. * in this table represent the 10% significance level, representative from ** 5% significance level, *** represents the 1% significant level.

According to the four categories of variables, the influence of the independent variables on the dependent variables is analyzed respectively.

4.1 The analysis of forestry policy places impact on farmers’ under-forestry economics development

Forestry policies in this set of variables, the number of cooperative organization in our village, whether to accept a forestry science and technology service, attend insurance of forest timberland area proportion of farmers whether forests have great effects on the under-forestry economics development, and the three variables affect under-forestry economics development has positive direction, the forestry policy under the three variables for farmers forests can promotes the under-forestry economics development.

(1) The more forestry cooperation organization in our village, the greater the chance of undergrowth farmers to develop the economics. According to the relationship between the land use types and the distance to the city center, the development of forestry regions is often far from the distance between urban centers, which also caused the relative occlusion of information. Individual farmers in the production of small, far from the market, product sales is difficult. And forestry cooperative organization through will operate under the same kinds of under-forestry economics product of economic organization of farmers, on the operation of the whole process guidance, the formation of industrial relative scale, easy to with the outside world for information exchange and customer site acquisition, guarantees the product market, so as to promote the farmers developing under-forestry economics enthusiasm.

(2) The farmers who received the forestry science and technology service are more inclined to develop under-forestry economics. Based on actual undergrowth of economic
development in Liaoning province, is the main form of planting ginseng under forest and forest frog breeding. The two main forms of operation in the process of seed selection, production process and the harvest is the technical level has certain requirements, and at the early stages of the production and business operation needs large capital investment, so there is a higher risk for ordinary farmers. For forestry science and technology service of farmers mastered the production and operation of a certain technology, less risk of under-forestry economics development technology, more under-forestry economics development's enthusiasm.

(3) Rural households in the greater the proportion of forest land area of forest insurance, forests can promote economic role for the development of under-forestry economics. Under-forestry economics, trade and industry in Liaoning province is higher, to the requirement of forest land for economic development forests of farmers, in the case of pro phase invest more, once the forest from being destroyed by the disaster, will shoulder the great economic losses for farmers. The forest insurance can reduce the economic loss of the farmers when the disaster occurs, and reduce the risk of the development of the under-forestry economics to some extent, and promote the farmers to develop the under-forestry economics.

(4) The current inquiry forestry policy is mainly for the farmers to reduce the risk of developing forestry economics, the role of primary forest economics is to promote the under-forestry economics development of farmers' enthusiasm, and policy support for the latter to provide fewer sales. As can be seen from the Tobit model, the three factors of current research policy, only the number of village cooperatives and post the most relevant sales significantly affected income for non-wood forest under-forestry economic participation of farmers. Village cooperatives greater the number, the higher the income of non-wood forest products development of under-forestry economics of farmers. Village cooperative organizations can acquire NWFP farmers ensure the sales of non-wood forest products. At the same time compared to the farmer cooperative organizations have a strong bargaining power, can improve the non-wood forest products prices. Both of these levels may increase under-forestry economics income households.
4.2 Farmer participation to forest reform farmers to develop the under-forestry economics impact analysis

Farmers forest reform in this set of variables involved in the case under the overall situation of forest tenure reform are satisfied with the proportion of forest warrants timberland area, the ratio of business to participate in joint household forest area, through a tender auction to get circulation gain of forest area and other means to get the no significant effect on the proportion of households is the development of under-forestry economics.

(1) For a farmer who has grown the forest economics, forest farmers to change the overall situation for the higher level of satisfaction, the higher the income of non-wood forest products. A larger initial investment for farmers to develop under-forestry economics has played a certain impediment for forest change overall satisfaction for the development of under-forestry economics means that farmers hold a positive attitude in the run under-forestry economics forest land will be a corresponding increase in investment, resulting in higher income of under-forestry economics products.

(2) Transfer bidding auction was obtained and otherwise acquired greater proportion of forest area, the less under-forestry economics income households. By bidding and auction timberland obtained, farmers may still exist in running unstable property ownership concerns, once the policy change led to land ownership change, for non-wood forest timberland development may bring a lot of farmer’s economic losses. Therefore, farmers in developing under-forestry economics may not be on forest land through bidding, auction or other ways to get the development, but rather the development of under-forestry economics in their own forest land obtained by determining the right. In addition, the timberland farmers get for bidding and auction may reduce investment in under-forestry economics of labor or other factors of production, resulting in the production of non-wood forest timberland less lower income. These are likely to cause the proportion of tender and auction wooded area to get the larger under-forestry economics products, the less revenue situation.

4.3 The characteristics of the farmers to develop under-forestry Economics
Due to the natural conditions for agricultural and forestry land has a strong dependence, timberland conditions for under-forestry economic development also play a crucial role.

(1) Public forest land area ratio, the smaller the possibility of farmers to develop under-forestry economics. Public Welfare Forest mostly in the more remote mountain areas, the development of production and labor costs are high forest management operations consumed production difficult. Meanwhile, the national Public Welfare Forest management and utilization management for more stringent management and protection of Public Welfare Forest alone does not give farmers bring a better income, so farmers generally lower for Public Welfare Forest management initiative. Forest area greater proportion of households may be due to forest conditions and reduce the role of developing heart preferences under-forestry economics initiative.

(2) Through exchanges with farmers, collective forest tenure reform is indeed the right after partially formed part of a small wooded area, not suitable for the development of under-forestry economics, for farmers to develop under-forestry economics, the greater the area of timberland each non-farmers The higher the income-wood forest products. The main purpose of the reform of collective forest right system is distributed to farmers through the forest, between farmers can achieve economies of scale through the transfer of forestry production and operation. For the under-forestry economics, it is easier to implement forest area scale and improve operational efficiency if the area is larger, leading to more non-wood forest products income for farmers. On the other hand, the larger the area of each timberland, farmers to develop greater under-forestry economics space, increase the amount of plant breeding farmers can increase yields of non-timber forest products and farmers income of under-forestry economics products.

4.4 Household basic characteristics affects develop the under-forestry Economics

(1) The basic characteristics of the households in this group of variables, householder’s nonfarm jobs for farmers inhibited the development of under-forestry economics. Farmers have off-farm work, are less likely to develop the under-forestry economics. Forestry wood production and management for a long time, under-forestry economics in the pr
duction and management although farmers relationship forestry income, but in Liaoning Province, the current development of forest ginseng and forest frog nor in a short period of time to obtain economic benefits. Migrant workers or engage in other work can reap economic benefits compared to a relatively short time, based on some farmers no long-term development vision of time preference and income, may not choose to develop the under-forestry economics. When the head of household non-farm work, not engaged in agricultural and forestry production and management of time, so the development of under-forestry economics will be restrained enthusiasm.

(2) For farmers to develop under-forestry economics, the family, the higher dependency ratio, the lower the household income of non-wood forest products. Family dependency ratio is the ratio of the number of families with dependent population (non-labor) and labor force numbers, which can reflect the burden of raising a family, family dependency ratio means that the higher a family’s labor force to bear the heavier dependency burden, the more we need a higher family income. NTFP income developing under-forestry economics requires a longer period of time, for family support larger farmers may choose to bring the economic benefits of non-forestry work in a short period mainly only the less time energy management for under-forestry economics, resulting in a lower yield, less income. It could also be because of the limited management effort, only the less developed areas of timberland under-forestry economic management, resulting in lower income of under-forestry economics products.

(3) The older age of household’s head who develop under-forestry economics, the lower the income of non-wood forest products. On the one hand the development of under-forestry economics needs a lot more labor input, older probably because of labor shortage caused by lower investment yields and result in less revenue. Also headed for older low acceptance of new things, probably because of backward production technology and sales information-poor and reducing non-wood forest products revenue.

(4) Education level-headed non-wood forest products revenue for the negative direction of the impact, which does not match with the expectations and the results of the theoretical analysis. The reason for this situation is the number of samples for the analysis of Tobit leads to less large deviation.
5 Conclusions and recommendations

A major purpose of collective forest right system reform and deregulation, the right to operate after promoting the development of under-forestry economics, new ways for farmers to obtain an increased forestry income. The current number of farmers in Liaoning Province development of under-forestry economics is relatively limited, farmers develop forest economics there are still many concerns, under-forestry economics of production and management there is no scale. Government support in funds, technology, sales and safeguards provided also slightly less, based on the above findings, we propose policy recommendations from the following aspects.

5.1 Increase in village-level cooperative organization, the formation of industrial management

Individual farmers in all aspects of production and marketing of non-timber forest products are at a disadvantage, and to the village as a unit formed cooperative organizations of various under-forestry economics of non-wood forest products, through the development of under-forestry economics the same product in the same village farmers to organize themselves to provide guidance in the selection and related services, production processes, and sales in the local form of industrialization to form a strong market competitiveness and attract buyers buyout. When the development of better cooperation organization, under-forestry economics can be primary processing products, increase the value of the product. In this way we can guarantee NWFP income households, to eliminate the concerns of developing under-forestry economics, promote local under-forestry economic development, boost the local economics.

5.2 On-demand technology and services, increase policy advocacy efforts

Due to the under-forestry economics development needs of forest production techniques, while farmers usually more a lack of knowledge of this area. For farmers, the main way to get technical support is provided by relevant departments of science and technology services. Through communication with farmers, currently providing technology services to carry out less frequently, in the form of more single, teach content may not match the needs of the farmers, causing inefficient current scientific and technological service
The future of technology and services can be carried out according to the actual needs of farmers in different stages of production forest economics. In addition, from the central to local levels to encourage the development of under-forestry economics, the village is necessary to increase the level of government propaganda policy, the current support measures communicated to the farmers, to enhance farmers for the development of under-forestry economics of identity and management initiative.

5.3 Improve insurance policy, provide market information

The current portion of the county in Liaoning Province has been rolled out forest insurance policy, the insurance reduces forest timberland by farmers in disaster when economic losses for farmers to carry out forestry operations to lift the worries. Farmers more sensitive to price, the lower the acceptable levels for commercial insurance, and less for their own expense policy forest insurance showed high acceptance. By further improving forest insurance policy, the insurance business in more counties, increase the insurance amount of insurance, timely claims losses of farmers, farmers confidence forestry operations. Meanwhile, units at all levels to provide timely for farmers as a complete market supply and demand information, the establishment of product sales network to ensure that under-forestry economics products income households.

5.4 Speed up the construction of ancillary services, encourage norms Forest Land

Faced with the initial investment in the development of under-forestry economics, some farmers have difficulty in funding, the local financial sector should further implement the forest right mortgage and forestry interest loans through looser lending conditions and lower interest rates to the under-forestry economics provide financial support. At the same time, related to the development of under-forestry economics electricity, water and roads infrastructure, government and relevant departments should also provide support and facilitation to the farmers. In addition, the current forest conditions also hinder the development of an important cause of under-forestry economics, to promote the under-forestry economic development, the relevant departments should encourage farmers want to develop under-forestry economics by regulating the flow of obtaining suitable for the development of forest, bring the whole forest area economic development.
5.5 Coordinate the development of under-forestry economics, not blindly expand Public Welfare Forest

Commercial Forest is the main target of farmers to develop under-forestry economics, general business conditions in poor current ecological public forest. In order to ensure basic income of farmers’ under-forestry economics, we should ensure a more stable commodity forest area, we cannot be blind to the commercial forest ecological forest conversion, how to make the commercial forest can play in economic benefits, ecological benefits more fully exploited, changing commodity business model, tree species and understorey crops constitution, relevant departments should explore scientific and rational planning, co-ordination across the region has achieved economic development, increase farmers for estry income.

5.6 Public Forest Compensation increase efforts to implement the compensation paid

Farmers for production and operation of the Public Welfare Forest in less active, mainly due to less income brought Public Welfare Forest, and the more remote location. No artificial Public Welfare Forest management and protection resulting in lower quality and ecological benefits declined to play. Public Welfare Forest through increased subsidies to encourage farmers to carry out Public Welfare Forest management and protection, to encourage farmers to develop the under-forestry economics in the Public Welfare Forest. In the incentive subsidies make farmers' income through the development of under-forestry economics, but also makes Public Welfare Forest play better ecological benefits. Currently, developed countries, while subsidies for public welfare forest, but these funds are often not granted the presence of the status quo in place, to a large extent hindered the development of forestry initiative of farmers, the relevant departments should implement the subsidies paid to farmers in a timely manner.
Reference


