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Ecological Hidden Troubles and Countermeasures under Reform of Collective Forest Tenure

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Abstract Three stages of reform of collective forest tenure after reform and opening up are reviewed. The reform of forest tenure brings sharp increase of economic benefit. However, due to forest farmers' subjective pursuit for economic benefit and objective lack of necessary economic, financial and technical support, ecological hidden troubles are created. Based on these, we put forward countermeasures, including strengthening forest farmers' awareness of ecological protection and solving ecological problems in accordance with actual conditions of the region.

Key words Reform of forest tenure, Economic benefit, Ecological benefit, Ecological hidden trouble, Countermeasures and suggestions, China

The reform of collective forest tenure system is actively and reliably moving forward in the whole country and bringing real benefits for forest farmers. Nevertheless, in the course of this reform, hidden troubles in ecological security are left due to farmers' subjectively pursuing economic benefits and objectively lack of necessary economic, financial and technical support. Therefore, it is required to combine the protection of ecological public welfare and safeguarding of farmers' rights and interests, and jointly build new forest tenure mechanism in risk society.

1 Development course of collective forest tenure reform after reform and opening up

Since the reform and opening up, the development of collective forest tenure reform has generally gone through three stages: exploration stage, deepening stage and overall promotion stage.

1.1 Exploration stage In 1981, the Central Committee of the Communist Party of China and the State Council released *Decisions on Several Issues Concerning Protection of Forestry Development* and decided to realize "allocating mountain to household" and implementing the policy of stabilizing forest tenure, defining privately farmed hilly land and responsibility mountain, and establishing forestry production responsibility system. From 1984, the forest tenure reform with stabilizing tenure as the major part and little open up is formally popularized and implemented in the whole country.

1.2 Deepening stage In 2003, the Central Committee of the Communist Party of China and the State Council issued *Decisions on Speeding up the Development of Forest Industry*

and three No. 1 documents to incorporate the reform of forest tenure into further deepening of rural reform. Later, the Central Committee of the Communist Party of China and the State Council issued *Several Opinions Concerning Promotion of Socialist New Countryside Construction* to include "accelerating reform of forest tenure and promoting healthy development of forest industry" into major measures for new countryside construction.

1.3 Overall promotion stage In 2008, the Central Committee of the Communist Party of China and the State Council issued *Opinions on Overall Promotion of Reform of Collective Forest Tenure System* (hereafter referred to as *Opinions on Forest Tenure Reform*). The *Opinions on Forest Tenure Reform* states that it is planned to complete the reform task of clear tenure and household Contracting in about five years. "On the precondition of sticking to collective forest tenure, it is allowed to contract the right of management and right of ownership of forest land. It is expected to establish subject status of farmers as contractor of management right of forest land through household contracting." In this way, it is planned to rebuild a fair and reasonable profit allocation pattern in vast forest zones.

2 Sharp increase of economic benefits

The starting point of forest tenure reform is to guarantee maximization of farmers' economic benefits. Facts also have shown that the forest tenure reform brings substantial benefits for forest farmers. The typical example is Hongtian Village of Hongtian Town in Yongan City of Fujian Province. Hongtian Village is praised as a Demonstration Village of Forest Tenure Reform in China. According to statistics, after the forest tenure reform, annual per capita of forest farmers from forestry rises from 312 to 3 000 yuan, accounting for 51.7% of farmers' annual per capita total net income 5 800 yuan^[1].

Along with acceleration of the third stage of forest tenure reform, increase of farmers' income will be faster. At present,

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18 provinces have basically completed task of clear property right, allocated forest farmers with clear property right for 149 million hm², accounting for 81.69% of the total area of collective forest land in the whole country. Up to 68.25 million farm-

ers have obtained the forest tenure licenses and over 300 million farmers are directly benefited^[2]. Following is a comparison of several groups of data (Table 1).

Table 1 Influence of forest tenure reform on forest farmers' income

Item	Year	Item compared
Direct output of forest in the whole country	2003	1 260 yuan/hm ²
	2010	2 970 yuan/hm ²
Percentage of forest farmers' income in 2 550 forest reform counties in annual income per capita	2009	12.96%
	2010	Above 20.00% (over 60% in major counties of forest zone)
Per capita income of farmers in Ruqiang County of Xinjiang Uygur Autonomous Regions	2001	2 216 yuan
	2010	Up to 30 000 yuan for income from red jujube

3 Prominent ecological hidden troubles

Two basic rules of collective forest tenure reform are "farmers being benefited" and "ecological environment being protected". The present situation is that farmers have been benefited, while ecological environment protection has some problem in the course of forest tenure reform.

3.1 Natural environment is damaged from fast growing forest replacing virgin forest Compared with virgin forest, fast growing forest has short growth cycle, so the economic benefit is substantial. Virgin forest has long growth cycle and the economic benefit produces low result. Thus, forest farmers plant those fast-growing and high yield woods with high profit and added value, and bright market prospects. For instance, the above mentioned Hongtian Village has promoted many fast-growing high yield trees such as eucalyptus, smooth bark birch^[1] in the course of forest tenure reform. Along with implementation of policy of allocating forest to household, more and more forest farmers replace fast-growing high yield woods with natural virgin woods. Fast-growing woods consume but not cultivate lands. In addition to chemical fertilizer and pesticide, impoverishment of soil is exacerbated. In rural areas, if the land has been planted with fast-growing woods, it will be difficult for other plants to grow. Therefore, fast-growing forest is harmful to environment and land.

3.2 Single type of tree will destroy biological diversity

Since the reform of forest tenure, forest farmers plant much artificial forest. The tree type is single, leading to not coordinated with ecological function. In Jingzhou of Hunan Province, merchants from Guangdong only plant willow to produce wood chips^[3]. In Xishuangbanna, a pearl on the crown of the tropical flora kingdom, there are similar situations: both road sides of forest zone are all rubber plantation. Large-scale planting of rubber seriously affects climate of Xishuangbanna. In ten years, the average temperature rises about 0.4–0.5 °C, and the humidity decreases. In Jinghong City, foggy days are 184 in 1954, but in 2005, it is only 22 days^[4]. Single type of tree results in increasing loss of biological diversity in forest zones, while the existence of biological diversity plays a critical role in keeping the balance of ecological system. Southwestern Droughts in 2010 prove that large-scale planting of eucalyptus and rubber tree is, to some extent, correlated with droughts. Hybrid rice developed by Yuan Longping and other scientists is

also contributed to rich and colorful wild rice. Therefore, the biological diversity is of great importance, and single type of tree planting in forest tenure reform will certainly have influence on biological diversity and large-scale production.

3.3 Bad quality tree in forest zone fails to guarantee the forest quality The forest tenure reform may raise area and quantity of forest, but cannot guarantee forest quality. Thus, forest resources will be vulnerable to influence and destroy of various natural and human disasters. After forest tenure is determined, due to lack of financial, technical and personnel support, forest farmers cannot promptly deal with intrusion of harmful organism. Besides, they cannot make effective and active treatment for spread of plant diseases and insect pests. For those forest zones with barren land, they cannot plant appropriate tree in appropriate place. In development technology, they have to continue using traditional extensive type cultivation due to lack of professional training and effective guidance. For example, in Ying'ebu Town of Jilin Province, all collective forests are secondary forest, so the utilization efficiency is low. In addition to destroy of natural disaster, the forests are riddled with gaping wounds^[5]. For another example, in Pengyang County of Ningxia Hui Autonomous Region, the forest is choked with weeds, and the forest zone is in primitive state, bringing great hidden trouble for fire prevention in winter^[6]. For hilly areas in Xuchang City of Henan Province, due to financial, technical and information limitations, afforestation rate at deserted hills and lands with gradient above 25 degrees is extremely low^[7]. At present, one of the difficulties is low quality of forest resources. About 47 million hm² sapling forest urgently demands tending, 27 million hm² low production forest needs transformation, and the entire function of ecological system badly requires improvement^[2].

3.4 Intervention of external capital in forest tenure reform damages ecological benefits After forest tenure is decentralized, forest farmers become masters of forest land. However, along with speed up urbanization and development of new industries, many forest farmers turn to processing and manufacturing industries, which brings opportunities for developers. Many developers take opportunity of forest tenure reform to purchase contractual management right of forest land from farmers. They hoard forest land to carry out land speculation and develop real estate in a disguised form. Such action is in

fact wasting forest land resource and destroying ecological environment. Due to vision limitation and lack of information, farmers fail to make proper judgment for operation of external enterprises. Some forest farmers directly hire management right of forest land to timber industry enterprise or coal mining enterprises, which may destroy forest or forest land. As a result, forest farmers only obtain low rental charges, but lose enormous ecological benefits, leading to environmental crisis.

3.5 Decentralized management of forest farmers increases difficulty in risk prevention After forest tenure reform, management of forest farmers is decentralized. Thus, the management difficulty is great and not favorable to forming the scale advantage. Take example of Liaoning Province which is a province with little forest, mountain forest owned by forest farmers is less than 0.5 hm². Since cognitive degree and operating objective of forest farmers are different, management and protection of forest land is individual family or household. Thus, it is difficult to form scale management and hard to manage and protect decentralized forest land^[8]. As a result, it objectively increases difficulty in prevention of forest land risks, and responsibility of forest supervision is hard to put in place. The forestry is an industry with risk factor. In forestry, there are uncertain factors. Once accident happens, without safeguard of perfect risk prevention system, the consequence is beyond imagination. It will not only influence forest industry, but also spread to other fields, even may influence life and health, as well as property safety.

4 Internal reasons for ecological hidden troubles

Farmers' weak ecological awareness and various limiting conditions are two internal factors leading to prominent ecological hidden troubles.

4.1 Subjective factor of ecological hidden troubles: farmers' simply seeking economic benefits Forest farmers are one of most important subjects in forest tenure reform. As implementers and beneficiaries of forest tenure reform, farmers' ecological awareness influences to some extent the success of forest tenure reform. In real life, because forest farmers pay excessive attention to economic benefits and simply pursue immediate interests, but neglect long-term significance of ecological protection, they may have some actions not favorable to maintaining stability of ecological system. For instance, they replace virgin woods with fast-growing woods, plant single type trees. These actions may lead to intervention of external capitals in forest tenure reform. Relevant survey and analysis carried out by some experts show that up to 66.25% of forest farmers in Fujian forest tenure reform areas have temporarily not considered the ecological protection^[9]. It is just because forest farmers fail to put protection of ecological environment and seeking economic benefits in equal position, prominent drawbacks appear in ecological environment protection.

4.2 Objective factor of ecological hidden troubles: economic, technical and financial limitations Forest farmers' ideas and awareness may influence the forest tenure reform. In

the course of afforestation, forest farmers will be confronted with such objective limitations as financial, technical, information and economic conditions, which will to some degree influence and limit stable advance of forest tenure reform. First, forest farmers do not have much effort to take care of their trees and have few capitals and low technology to prevent diseases and insect pests. Second, forest farmers will have to do nothing for barren lands, and all they can do is using traditional way of digging a hole and planting a tree. Third, although forest farmers have obtained utilization and operation rights of forest lands, their afforestation rate is low and difficulty in forest growth is high due to lack of planting technical training. Fourth, without adequate capital and technical support, forest farmers fail to put much manpower, many material and financial resources into cultivation, utilization, development, management and protection of forest resources. In consequence, a series of ecological environmental problems appear.

5 Countermeasures against ecological hidden troubles

For ecological environmental problems resulted from the forest tenure reform, the most effective countermeasures are strengthening forest farmers' ecological environmental awareness and carrying out the forest tenure reform in accordance with actual conditions of regions.

5.1 Strengthening forest farmers' awareness of ecological protection At present, major understanding of forest farmers in the forest tenure reform is increase of income source and satisfying living needs. They have not put environmental protection in primary position or equal position with economic benefits. In addition, government's interest demand should be enhancement of forest resource protection and maintenance of public interests^[10] (Table 2). If forest farmers realize the importance of ecological benefits, such as water conservation, climate regulation and biological diversity protection, they will fundamentally attach importance to cultivation and maintenance of virgin forest. Therefore, government should enhance farmers' awareness of ecological protection. At the time of selecting and fostering trees, farmers should take the cultivation of virgin forest at the first place. It is improper to seek immediate benefits at the sacrifice of long-term benefits, or neglect ecological value for purpose of seeking economic benefits. Farmers should "optimize manner of afforestation and increase the proportion of mixed forest, local and rare trees"^[2]. It is required to energetically renew afforestation manner, and plant excellent type, high quality and value trees in proper place. Besides, it is proposed to scientifically cultivate young and half-mature forest, in combination with professional training, and utilize scientific technology to improve quantity and quality of forest. Furthermore, it is recommended to build mixed forest and guarantee a certain proportion of broad leaf trees in mixed forest. The mixing manner may be varied to increase the biological diversity. In planting pattern, it is proposed to combine economic forest and ecological forest. At planting level, it is expected to pay attention to planting at levels and three-dimen-

sional management. As to vulnerable ecological areas, we should protect their original species, do not destroy original natural landscape. We should put an end to artificial disturbance and cultivate and renew young forest trees. For major public welfare forest zones, we should close mountains to cultivate and protect rare and endangered trees, seedlings and young

trees, and to satisfy special demands of endangered wild plants and animals for quantity and quality of habitats. It is hoped to deepen farmers' cognition of forest tenure reform and understanding of ecological public welfare of forests, and implement maintenance and protection of ecological environment.

Table 2 Different demands from different subjects for reform of forest tenure

Interest parties	Demands and purposes of interest parties
Senior and middle government	Strengthen forest resource protection and maintain public interests
Grass-roots government	Increase local financial revenue and protect local environment
Department of forestry administration	Survival and development of unit and forest protection
Enterprises and employees related to forest industry	Survival and development of enterprises and protection of forest
Forest farmers	Increase income source and satisfy demand of farmers for fagot and grazing
Rural collective	Supervise and protect forest

5.2 Conducting forest tenure reform in accordance with actual situations of regions The ecological protection not only depends on heightening or improvement of forest farmers' awareness, but also relies on support and assistance of the state, government and the whole society. Forest farmers in all regions should develop characteristic economic forest, woody cereal- and oil-yielding plants, ecological public welfare forest and scenic forest in accordance with local situations. If condition permits, they may develop crop planting or aquaculture in forest, and explore various management patterns. Government should establish forestry insurance mechanism, perfect the forestry risk prevention system, and actively incorporate the social insurance into forestry management, to have a full preparation for prevention of disease and insect pests. Apart from these, it is required to energetically develop forestry technology, increase input in forestry, promptly update relevant information, and widen marketing channels, to ensure that farmers develop forest land in high quantity and quality. Government should insist on legal, voluntary and paid principles to guide forest farmers to establish various operation organizations through family combination, entrusted management and joint stock partnership, and to actively promote industrialized, standardized and intensive operation of forestry. Also, government should practically implement responsibilities and measures of supervision and control, and strengthen management of cultivation.

The forest tenure reform is a state policy to make people get rich, but it has not been lifted to legal level. There are still no special laws or regulations on forest land contract. Provisions on forest land contract are simply described in *Forest Law of the People's Republic of China*, *Law of the People's Republic of China on Land Contract in Rural Areas*, *Land Administration Law of the People's Republic of China*, *Property Law of the People's Republic of China*. In this situation, the state should formulate laws and regulations or local regulations on forest tenure reform in full consideration of natural, social, economic, cultural and historical conditions of all regions, to make definite policy and clear responsibility put in place. The forest tenure reform and ecological protection should be interdependent and mutually restricted, and then it may achieve advance of both aspects side by side.

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