

Forest certification and sustainable development of rural areas and the environment in China

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Abstract: The mountainous regions of China, where 64% of the rural population reside, cover 2/3 of its land area. In these rural mountainous areas, production of non-timber forest products (NTFPs) is closely related to development and the forest-based ecological environment. Certification of sustainable forest management is a market mechanism-based tool promoting sustainable forest management, and it has increasingly led to global recognition of environmentally healthy and socially reliable forest products. A well-managed forest usually meets responsible management criteria in environmental, social, and economic terms. These criteria can assure sustainable management, which is why forest certification (including certification of NTFPs) is conducted. This paper discusses the production of forest products (and NTFPs) in rural areas with emphasis on sustainable development of the ecological environment through certification-associated environmental and social impact assessments. China, with its many challenges is only beginning to utilize forest certification, and should continue to improve its maintenance and recovery of forest biodiversity, popularization of forest certification-associated knowledge, and both social and environmental impact assessments. [En, 11 ref.]

Key words: forest certification; non-timber forest product (NTFP); environmental impact assessment; social impact assessment; sustainable development

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1 Valuation of a forest and forest certification

A forest is a renewable resource that not only provides human beings with tangible, ecological functions, such as soil and water conservation, climatic regulation, environmental improvement, and quantifiable timber as well as non-timber forest products (NTFPs), but also exerts intangible functions of forest and biodiversity conservation. All of these benefit human beings. Tangible timber and forest products have a marketplace with a definite scale at home and abroad, while the marketplace for the forest's ecological utility has not yet formed. As a result, in the existing market system, the value of forest ecological tasks is not determined through direct exchanges between forest

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managers and beneficiaries^[1].

Nevertheless, the role of forest ecology plays an important part in international trade, which, in turn, directly influences a nation's economic development. Some countries even use environmental factors as a weapon for trade protectionism. To exert an influence on other countries' environmental policies and to protect their own interests, some nations set up trade barriers on the basis of laws, regulations, and standards of environmental protection. This non-tariff trade-protection strategy is called "green trade barrier". Therefore, sustainable management of forest resources can help resolve conflicts between the concrete, tangible and the vague, intangible forest products. Forest certification, which emerged in the 1900s, is an effective means to overcome these barriers.

Certification of sustainable forest management is a market-oriented tool to promote better forest management. A well-managed forest usually meets responsible management criteria in environmental, social, and economic terms. These criteria can assure sustainable management, long-term health, and high forest productivity, while giving full play to the role of the forest in production, wild animal habitat preservation, prevention of soil erosion, and purification of water sources. In addition, high-value social benefits from the forest, such as maintenance of a stable community employment rate, will be assured.

Forest certification includes forest management (FM) certification and forest product certification with the latter often referring to certification of chain of custody (CoC). FM certification is a process to verify forestry measures so that the forest is managed in accordance with publicly recognized principles and criteria, whereas CoC certification certifies the whole chain of events by which wood is transformed from a tree in the forest to a final product in a wholesale or retail market^[2]. Therefore, forest certification encourages adoption of responsible forestry practices to protect the forest. Through certification a judgment is made on whether the forest is well-managed or not.

2 China's (non-timber) forest production, development in rural areas, and ecological environment

China is a country with a large population, most of which is found in its rural areas. The 2001 census showed China had a total population of 1.3 billion with 0.8 billion (63.9%) from rural areas^[3]. Most people in rural areas reside in mountainous regions, which cover two thirds of China's total land area^[4]. These areas are an important source of water, energy, and biodiversity. Important resources, such as minerals, forest products, and agricultural products, also come from the mountainous regions. Thus, these areas are a recreational garden. Furthermore, the environment of the mountainous regions forms a complex ecosystem with diverse fauna and flora that is important for maintaining the global ecosystem. Therefore, development of the rural area is closely associated with progress in mountainous regions, and it is strongly related to forest resources, forest production, and a forest-based ecological environment.

Diverse forest types constitute a forest. In addition to a timber forest, China's non-timber forest is an important forest type that is closely associated with rural area development. In recent years, the ecological environment in the rural areas has deteriorated. One phenomenon, soil compaction from overuse of chemical fertilizers and pesticides, has occurred on a large area of farmland resulting in poor physicochemical performance, decreased organic matter in the soil, and surface pollution caused by soil erosion.

In the past several decades, to develop the rural economy in China, the non-timber forest has expanded on a large scale. It has played an important role in enlarging forest coverage, producing NTFPs, and helping farmers rise out of poverty.

As of 2000, the total non-timber forest area in China was 23.34 million hm^2 , or 20% of the total national forest area, and about 60% of the total national plantation area. This was a production value of 100 billion Yuan (USD 12.8 billion) or approximately one half of the total forestry production value (not including processing value added). Since 1991, the non-timber forest has increased 0.8—1.0 million hm^2 annually — the fastest growth for

a forest type.

Production of the non-timber forest in China has been characterized by a large area of monocrop and intensively managed plantations. Increased yield has mainly depended on an increased area and intensive management with application of large amounts of pesticides and fertilizers. From 1996 to 2005, China has increased chemical fertilizer production by 90.7% with fertilizer use 2.5 times more than the world average.

However, generally speaking, crops have a low fertilizer use rate in China. For example, the utilization rate of nitrogen fertilizers on the average is 28%—41%, for phosphate fertilizers is 19.5%, and for potash fertilizers is 47.1%. Nonetheless, the mineral resources available for the manufacture of phosphate and potash fertilizers are very limited. By 1997 the known phosphate stock suitable for global production of phosphate fertilizers was estimated to last for 50 years at most. Potash fertilizer production is also not very optimistic.

Overuse of fertilizers has caused not only a decreased quality of forest products and forest soils, but also surface pollution, which easily occurs under disastrous weather conditions, through soil erosion on forestland. For example, usually 800 kg of nitrogen fertilizer, which is much higher than that international standard for water resource free of pollution ($225 \text{ kg} \cdot \text{hm}^{-2}$), is applied to each hm^2 of a Lei bamboo (*Phyllostachys praecox*) plantation. In addition, winter application techniques, which require complete irrigation before mulching, have been widely adopted. Therefore, an irrigated bamboo plantation is usually near a water body. However, overuse of fertilizers has resulted in a much higher nitrate content in bamboo shoots than industry standards, increasingly polluted water bodies in terms of carbon, nitrogen, and phosphate and decreased soil quality, which has had a negative influence on the export of bamboo shoot and other relevant products. Thus, intensive management of the non-timber forest has led to decreased quality of forest products and soils with pollution of the surrounding environment. This, in turn, has influenced farmers' income in producing regions and local economic development.

Both agricultural and forest products have ecological, economic, and social values^[5]. Consequently, non-timber forest production, development of the rural area, and preservation of the ecological environment are closely associated with one another.

3 Forest certification in the development of rural areas and sustainability of the ecological environment

Certification is an action for responsible forestry. Forest certification is a groundbreaking milestone in improved, sustainable forest management that has led to greater recognition of the importance of environmentally and socially sound forest products; it has engaged producers, consumers, and retailers in a positive effort to help clean up the forest industry. One benefit from forest certification is confirmation that forest operational practices meet high environmental and social standards. It is also a tool for marketing to customers, for access to new markets, and for legitimacy with the environmental community, the media, and the public.

Forest certification considers not only forest management, but also environmental and social issues, which are reflected in the certification standards. Thus, certification standards are very important in forest certification. A certified forest usually meets the certification standards in environmental, social, and economic terms. Therefore, forest certification can play an important role in promoting development of rural areas, especially those closely related with forests or forest production, and an ecologically sustainable environment.

An example of an organization that sponsors forest management certification is the Forest Stewardship Council (FSC). FSC is an international network that promotes responsible management of the world's forests, and globally it is one of the two most influential certification schemes. FSC has a unified certification standard that includes 10 principles (P) under which there are 56 criteria (C). The 10 principles are as follows: 1) compliance with laws and FSC principles; 2) tenure and use rights and responsibilities; 3) indigenous peoples' rights; 4) community relations and workers' rights; 5) benefits from the forest; 6) environmental impact; 7) management plan; 8)

monitoring and assessment; 9) maintenance of high value conservation forests; and 10) plantations^[6]. Specifically, environmental considerations in forest management are found in C 1. 3 and C 1. 4 of P1; C 5. 1, C 5. 3, and C 5. 5 of P 5; C 6. 1 through C 6. 10 of P 6; C 7. 1 of P 7; C 8. 1 and C 8. 2 of P 8; C 9. 3 and C 9. 4 of P 9; and C 10. 2 through C 10. 8 of P 10; whereas socio-economic aspects in forest management are included in C 1. 1 through C 1. 5 of P 1; C 2. 1 through C 2. 3 of P 2; C 3. 1 through C 3. 4 (if applicable) of P 3; C 4. 1 through C 4. 5 of P 4; C 5. 1, C 5. 2, and C 5. 4 of P 5; C 7. 1 and C 7. 3 of P 7; C 8. 2 of P 8; C 9. 1 and C 9. 2 of P 9; and C 10. 8 of P 10.

These principles and criteria show that in forest certification much emphasis is put on environmental, social, and economic performance of forest management. Hence, forest certification can assure a managed forest with forest production that is environmentally and socially sensible. This type of forest should be encouraged and popularized. If forest certification, especially NTFP certification, is considered in rural areas, then production of NTFPs, social and economic development, and sustainable development of the ecological environment will proceed harmoniously.

4 Research challenges for forest certification in China

So far China has drafted a forest certification standard that covers 9 principles, 45 criteria, and 118 indicators, but it has not been approved by the Certification and Accreditation Administration of China (CNCA) nor has it been recognized by the international community. In addition, there have been no field applications of the standard and no specific details describing NTFPs. In NTFP production, the State Forestry Administration (SFA) has started setting standards for specific NTFP production, which, in some sense, is favorable to future NTFP certification. In addition, the FSC China Working Group has been established, with its members from government agencies, research institutes, higher learning institutions, forest management units, wood processing enterprises, social organizations or groups, non-government organizations, and media from more than 20 provinces, municipalities, or autonomous regions. As a result, the working group is widely represented.

One of the objectives of the working group is to organize experts from different fields to discuss and revise the drafted National Standard for Forest Certification in China. Then, it has to be approved by the Chinese government with mutual recognition by FSC on the basis of input and adoption of stakeholders' comments and opinions.

In China, many challenges and opportunities with forest certification coexist. For instance, maintenance and recovery of forest biodiversity is a key point in sustainable development of the rural area and the environment. This has been attempted through an increase in forest coverage to improve the ecological environment with plantation establishment as one of main avenues. One example of plantation establishment is the project sponsored by the World Bank for sustainable development of forestry in China which includes establishment of timber and non-timber forests^[7]. At present, China has 53 million hm^2 of plantations, ranking it 6th in area worldwide^[8]. In addition, China is among the countries that have more than 1 000 native tree species^[9]. Nevertheless, along with selection of tree species based on site conditions and biodiversity, plantation establishment should also consider economic returns.

Forest certification recognizes the importance of biodiversity as well as environmental and social benefits of forest management. Meanwhile, the non-timber forest which is directly related to income can improve the farmers' economic situation. Although it has strong experience with single-species plantation establishment (including species selection and corresponding cultivation measures), when considering economic returns, China lacks knowledge in selecting species that are suitable for local site conditions with mixed forests and their corresponding measures for cultivation (such as reduction in pesticide and fertilizer use). These weaknesses in terms of ecological management and forest health are especially true for non-timber forest production. This is one of challenges faced by foresters.

Another problem is that even though it has been five years since the first forest was certified in China, popularization of forest certification is still weak. Thus, few forest production units (farms) or farmers know about

forest certification, and few researchers and scholars specializing in forest management are working on forest certification. Therefore, extension of the forest certification program should be strengthened, especially among young people. In addition, the certified forests in China are timber forests, and no non-timber forest has been certified. Forestland ownership and use rights in the rural areas complicate this matter. However, for certification of NTFPs, such as edible forest products, there are NTFP certifications, organic certifications, and fair trade labels^[10, 11]. Hence, conducting forest certification according to the actual conditions in China is worth further exploration.

As mentioned before, the criteria for forest certification stresses socially and environmentally sound forest management with local communities being one of the stakeholders participating in forest management for social impact assessments. This is especially true for the production of NTFPs. In the past few decades, to provide adequate food and clothing, the focus of management was on growing area, target species and varieties, and measures for high yield, to name a few. Social and environmental impacts were seldom considered, and for assessment and monitoring of social and environmental impacts, the situation was worse. Many domestic scholars working on cultivation and afforestation of tree species knew little about forest certification, and in relation to forest management, they were not familiar with social and environmental impacts. Some of them felt that there was no technical element in social and environmental impact assessments. Thus, these were not key research topics. This common weakness in forest production requires urgent attention. One possibility to look into is setting up an indicator system for assessments.

All in all, forest certification in China is still in its infancy. However, with efforts from people throughout the country, forest certification can help promote sustainable development of rural areas while aiding the ecological environment in China.

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森林认证与中国农村及环境的可持续发展

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摘要: 中国的山区面积占陆地面积的 $2/3$, 农村 64% 的人口居住在山区。非木质林产品的生产与农村(山区)的发展及基于林分的生态环境紧密相关。森林可持续经营认证是基于市场机制的促进森林可持续经营的工具, 森林认证工作的开展在国际上已越来越多地引起人们对环境友好型及社会效益良好的林产品的认同。经营良好的林分往往能在经济、环境和社会方面达到标准, 而这些标准可以确保林分的可持续经营。森林认证(含非木质林产品认证)就是按照这样的标准来进行操作的。从森林认证中的环境和社会影响评价及环境可持续发展的角度, 就非木质林产品生产、农村发展与环境的可持续发展进行了论述, 认为我国在森林认证尤其是在林分生物多样性的维持与恢复, 森林认证相关知识的普及, 社会影响评价与环境影响评价方面存在较多问题, 任重而道远。参 11

关键词: 森林认证; 非木质林产品; 环境影响评价; 环境影响评价; 可持续发展

浙江林学院科研成果服务新农村建设

为期 2 天的浙江(衢州)首届农村科技信息交流大会于 2007 年 3 月 18 日胜利闭幕。浙江林学院科技处组织 5 名专家携带相关成果资料参会, 主动与地方企事业单位进行产品、信息、技术等方面对接, 洽谈合作项目。竹产业科技创新服务平台与衢州市衢江区林业局、柯城区林业局签定了有关竹产业提升的科技支撑合作协议。

本次农科会以“信息政策到农民, 资金订单到农户, 科技农资到农村”为主题, 由衢州市委、市政府与省农业厅、省农科院联合主办。大会还邀请 30 多位省市农业专家, 现场接受农民的有关咨询, 并在会场上设立网上市场交易区、农技成果展示区、农资和先进农机展示展销区等。

(余学军)