



# Understanding landowners' interest and willingness to participate in forest certification program in China



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## ABSTRACT

Forest certification is considered a viable market-based strategy for promoting sustainable forest management by providing landowners with financial incentives and social recognition for responsible forest practices. In China, it is an issue of international as well as domestic concern, especially considering the magnitude of country's wood exports. To examine landowners' perceived barriers to and interests in forest certification in China, we conducted a landowner survey in Shandong province in 2016 and analyzed whether and how landowners' ownership motivations, management objectives, sociodemographics, and perceptions about benefits and drawbacks associated with certification schemes influenced their willingness to participate in certification programs. Results indicate that the majority of landowners in Shandong province are not currently familiar with forest certification programs but are willing to consider participating when provided with pertinent information. There may be a potential market for certification programs in China with appropriate outreach and extension. In addition, landowners' willingness to participate in certification programs is significantly affected by the expected benefits and limitations associated with certification schemes, landownership motivation, management objectives, and characteristics of the forestland and households. Findings will be useful to institutions and policy makers interested in understanding and promoting the market for forest certification in China and other developing countries with similar circumstances.

## 1. Introduction

Forests play a critical role in protecting ecological environments, regulating climate, maintaining soil, and improving water quality. Historically, China depended heavily on natural forests to produce timber, which resulted in widespread illegal logging and over-harvesting, particularly during the rapid industrialization period and the Great Leap Forward (1958–1961), which led to severe depletion of China's forests (Shapiro, 2001; Liu, 2010). Furthermore, the collectivization movement of the late 1950s deprived individuals of their forest ownership and discouraged people from sustainably managing forests (Ma, 2008). Those incidences have caused natural forests throughout China to see biodiversity decline, soil erosion, environment degradation, and other natural disasters such as floods. The disastrous 1998 Yangtze River floods—which devastated large areas, destroyed many homes, killed 3600, and caused billions of dollars of economic damages—are believed to have been a product of upstream over-logging (Ma, 2008; Sun et al., 2017). A series of similar events gradually convinced Chinese officials of the need to combat deforestation by sustainably

managing national forests. Forest certification, created to promote sustainable forest management, received political and policy support after the threat caused by historically unsustainable, poor forest management was realized.

The second driver for China to engage with forest certification is economic globalization, particularly since China entered the World Trade Organization (WTO) in 2001. While forest certification has gained popularity among forest landowners and industry stakeholders in Europe and North America, it is not yet as popular in China. However, promoting certification schemes may be imperative in order for China to maintain market access in U.S. and European markets (Auld et al., 2008; Han, 2004; Campbell et al., 2008) and supply responsibly grown timber to maintain its share in the global market. In addition, public procurement policy and timber legality verification are also key drivers for forest certification (Chen et al., 2011).

Finally, a growing population of wood product consumers' willingness to pay a premium for certified wood is yet another driver of forest certification in China and other timber-producing countries (The Forest Certification Handbook, 1996; World Wide Fund, 2009; Cai and

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Aguilar, 2013). For instance, Liu et al. (2006) and Cai and Aguilar (2013) found that consumers in Beijing, China, were willing to pay 10% more for a night table made from certified wood. Considering that China's modern forestry development aims to improve forest ecology, maintain ecological benefits, and achieve sustainable management, forest certification as a market-based mechanism can be an effective policy instrument for China to fulfill those objectives.

Forest certification was initially advanced by non-governmental organization (NGO) as a response to deforestation and poor forest management in tropical forests (Leslie, 2004; Rametsteiner and Simula, 2003; Cashore et al., 2005; Durst et al., 2006; Pattberg, 2007). More recently, it has become a preferred strategy among forest industries across the world to promote sustainable forest management. Despite being a significant global exporter of a wide range of forest products (Campbell et al., 2008), China observed a slow start in certification. The first certified forestland was the Changhua Tree Farm in Zhejiang Province in 2001, under the internationally recognized Forest Stewardship Council (FSC) certification scheme. Another commonly used certification scheme in China is the Programme for the Endorsement of Forest Certification schemes (PEFC), which is a more "industrial-friendly" forest certification program begun in 1998 (Dietrich and Tosun, 2013; Gulbrandsen, 2014). In addition to the FSC and PEFC certification schemes (Hui et al., 2008), China has also developed its own national forest certification regulations, overseen by the China Forest Certification Council (CFCC), which is endorsed by PEFC (China Forest Certification Council, 2014).

China has made notable progress in forest certification in recent years. Total PEFC-certified forest area has increased from 439,630 ha in 2006 (Yuan and Eastin, 2007) to over 5.8 million hectares in December 2016 (PEFC, 2016). In addition, the afforestation rate in China is now the highest in the world, with forest cover increasing from 12% (1983) to more than 21% (2013) in about 30 years (PEFC, 2014). The current goal is to reach 23% forest coverage (or 223 million hectares) by 2020 (PEFC, 2014). Certification would be an important policy for the long-term ecological and economic sustainability of these newly established and old forests. Accordingly, China has a large forest certification market potentially available to both national and international certification schemes in the near future. With rapid growth in China's international trade of forest products and associated goods, it is also important to institutionalize best management practices like certification.

In a global context, numerous studies have examined the potential constraints faced by landowners regarding forest certification. Some have found that the relatively high costs and stringent requirements of forest management under certification are major concerns to landowners, especially small landowners (Molnar et al., 2004; Kilgore et al., 2007; Tikina et al., 2008; Leahy et al., 2008; Zhao et al., 2011; Ma et al., 2012; He et al., 2015). For example, a study of non-industrial private forest (NIPF) landowners in Pennsylvania, United States, identified the high cost of certification as a major barrier (Bensel, 2001). A similar study by Perera et al. (2007) found that landowners in Louisiana and Mississippi (also in the United States) were not averse to having their forests certified, but they were unwilling to bear the cost associated with the certification process.

In China, Zhao et al. (2011) also found that the cost of certification was a major concern among landowners. The same study also mentioned that forest certification was not widely understood by the landowners in China, another major factor limiting participation. However, studies in some parts of the United States have also found low levels of certification knowledge among NIPF landowners (e.g., Kilgore et al., 2008; Leahy et al., 2008). Based on a recent case study of collectively owned forest ownership, He et al. (2015) found that decentralized forest tenure is one of the main obstacles for forest certification in China. Liu and Zhi (2012) found that multiple barriers, including poor forest management and low recognition/familiarity of forest certification, hindered forest certification in Yunnan province.

Knowing the relative significance that landowners place on

attributes of forest certification schemes is as important as understanding the potential factors affecting landowners' attitudes. Chen and Innes (2013) and Zheng and Wei (2011) reported that forest certification has increased business profitability because the increased value of certified timber outweighs the increase in forest management costs after certifying. Zhao et al. (2011) reported that the economic benefits of certifying half of China's commercial forests would be around US\$ 150 million. Comparing this with the cost of certification (US\$ 0.66–\$86.63), it is clear that the benefits of forest certification far outweighed the cost. Moreover, Zhang et al. (2014) reported that the ecological and environmental protection in state-owned forest farms in the Shunchang county of Fujian province was significantly improved with forest certification.

Despite a handful of studies, a knowledge gap still exists in understanding what factors determine landowners' willingness to participate in forest certification programs. To address this gap, we designed a survey-based study with several objectives, including 1) assessing landowners' knowledge of and attitudes toward forest certification, 2) exploring the opportunities and barriers associated with landowners' participation in certification programs, and 3) identifying the factors that influence landowners' willingness to participate in forest certification programs. This information will be important to forest policy makers and forest certification institutions in promoting forest certification and sustainability in China and other developing countries with similar forest resources and forest industry characteristics. In addition, policy makers can use the findings to design and launch outreach and extension programs to enhance landowners' awareness and interest in forest certification.

## 2. Materials and methods

### 2.1. Study area

This study was conducted in the Shandong province of China, which is on the eastern coast of China at the mouth of the Yellow River and has a population of about 97 million people (Shandong Statistical Yearbook, 2015). Shandong province has approximately 15 million hectares, with forested area of about 2.55 million hectares as of 2012, for forest coverage of around 16.73%. The rich diversity of forest vegetation includes about 80 families, 203 genera, and 615 species. The most popular forest type in the region is fast-growing, high-yield poplar. Data for this study were collected using face-to-face surveys with a convenient representative sample of forest landowners in large, heavily forested cities, including Taian, Jinan, Linyi, Liaocheng, Jining, and Weifang.

### 2.2. Data collection

A survey of landowners was conducted in the summer of 2016. A 15-page instrument was first developed after a thorough review of literature regarding landowners' interest in forest certification. Questions regarding constraints and opportunities were adopted from similar studies conducted elsewhere (e.g., Kilgore et al., 2007) and modified to fit the context in China. The survey comprised questions regarding landowners' knowledge and perception of forest certification and their willingness to have their forests certified. A total of 27 questions were included in three segments: 1) forest ownership details, ownership motivation, and management objectives, 2) knowledge of and interest in forest certification participation and perceived benefits and drawbacks with forest certification, and 3) sociodemographics. Survey questions included Likert-scale items regarding respondents' level of interest (1 = very unlikely, 5 = very likely) in participating in forest certification programs under different program requirements and their level of agreement with statements about perceived benefits and drawbacks of forest certification (1 = strongly disagree, 5 = strongly agree).

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