

# **Who Owns Carbon in Rural China?**

**An Analysis of the Legal Regime and Practices with Preliminary Policy Recommendations**

**Zhu Keliang, Darryl Vhugen and Nathan Hilgendorf**

## THE RIGHTS AND RESOURCES INITIATIVE

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Rights and Resources Initiative  
*Washington DC*

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## EXECUTIVE SUMMARY

Despite decades of rapid economic growth in China, rural areas remain largely undeveloped. Rural China is home to more than 195 million hectares of forestland – the equivalent of around 5 billion tons of carbon. The ecological and environmental value of forestland and trees in rural China cannot be overstated.

Rights to forestland are either 1) broad use rights of individual farm families or 2) the remaining ownership rights of village collectives. No law directly specifies who owns the carbon sequestered in farmers' forestland and trees, but there is a strong inference from existing law, policy and practices that farmers should be the rightful owners of carbon. Nevertheless, because of historical and institutional factors, particularly the weak rule of law in the countryside, farmers' rights are far from secure. Village officials and local governments can undermine or deprive farmers of their rights in a variety of ways.

Farmers' rights to their forestland and trees are further compromised by several large-scale payment-for-ecosystem-services (PES) initiatives concerning forest growth and carbon sequestration. Under the government PES programs, China has reforested more than 92 million hectares of land since 1980, improving the nation's forest cover percentage to a respectable 18% in 2008. Pursuant to the Natural Forest Protection Program (NFPP), logging is banned on more than 100 million hectares of forest. Official reports indicate that these programs have resulted in significant environmental benefits to the country at this moment, but numerous affected farm families remain uncompensated for the financial loss caused by being deprived of economic use of their forestland and trees.

To ensure the long-term success of these carbon sequestration programs while addressing welfare of the affected rural poor, it is essential for China to continue its reform efforts on several fronts. Most importantly, the security of farmers' rights over forestland and trees should be bolstered and adequate compensatory regimes established for farmers affected by carbon sequestration programs.

## 1

## CONTEXT AND HISTORICAL BACKGROUND

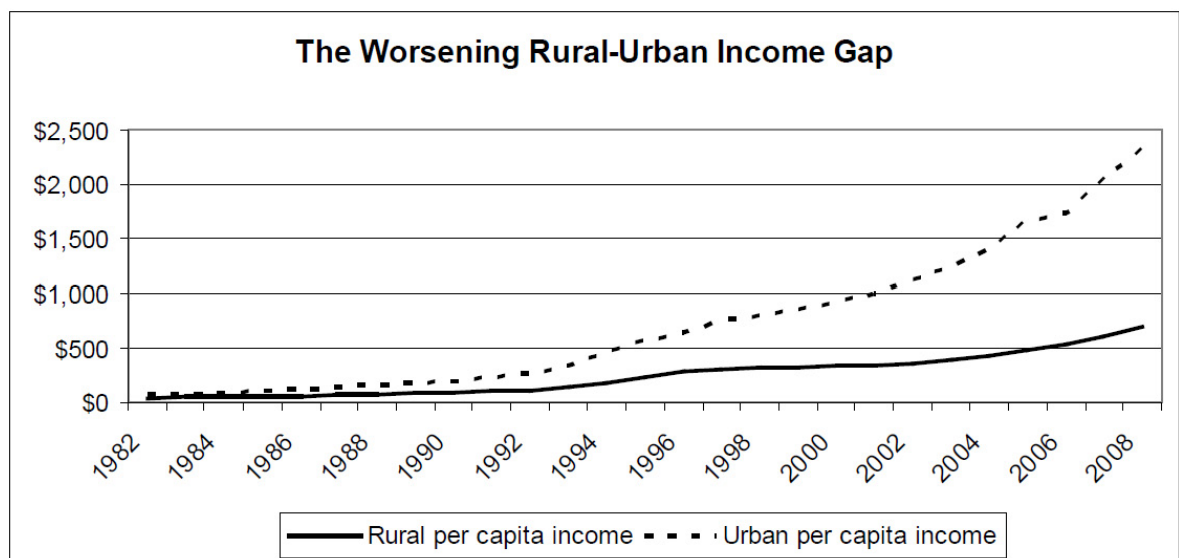
## 1.1

## BACKGROUND ON RURAL CHINA

China is the biggest economic development and global integration success story of the last thirty years. China is now the world's second largest economy on a purchasing power parity basis, having experienced average annual GDP growth of 9.6% from 1979 to 2004.<sup>1</sup> But this rapidly increasing prosperity has not been shared by all Chinese. Over the last twenty years the focus of China's economic reforms has been on the large urban areas. As a result, the vast majority of the 800 million rural Chinese<sup>2</sup> lag far behind their urban counterparts in virtually all aspects of life. In 2008, urban per capita income reached \$2,320, more than three times higher

than rural per capita income of about \$700.<sup>3</sup> This 3.3:1 ratio represents the worst urban-rural income gap in the modern history of China.<sup>4</sup> The income gap has been widening at an accelerating speed. Moreover, the GDP ratio actually understates the difference as it does not reflect basic medical care, elementary education, and social security benefits that are available only in cities.

In recent years the central government has treated the rural income issue as one of its top priorities. It has adopted several short-term measures that aim to boost farmers' income, including cash subsidies to farmers and reduction or elimination



of agricultural taxes and fees. Nevertheless, the urban-rural divide continues to worsen.

There is increasing concern that this ongoing income disparity will jeopardize China's long-term growth and stability if significant improvement is not achieved in the near term.

Healthcare and education in the countryside lag seriously behind the cities. The great majority of the estimated 700,000 annual deaths of children under five in China occur in the countryside.<sup>5</sup>

Incidents of rural unrest, including violent confrontations between governments and farmers, have been on the rise.<sup>6</sup> The top rural grievance in China relates to land, especially when government land takings or expropriations are involved.<sup>7</sup> Four years ago, Premier Wen Jiabao acknowledged that the efforts to narrow the rural-urban wealth gap fell short and land grabs by officials were provoking mass unrest in the countryside that could threaten national stability and economic growth.<sup>8</sup>

## 1.2

## A BRIEF HISTORY OF CHINA'S FORESTLAND REFORMS

### FOREST LAW AND POLICIES IN THE EARLY DECADES OF COMMUNIST CHINA

The Land Reform Law, the first land law promulgated by the new Chinese communist government, was enacted in 1950, right after the founding of the People's Republic of China in 1949. The law provided that China adopt a "peasant land ownership system."<sup>9</sup> Land confiscated from landlords was allocated to poor peasants "fairly, rationally and uniformly for them to own."<sup>10</sup> With respect to forestland ownership, the law followed the pre-1949 legislation in distinguishing large forests and distributable forestland. The law stated that large forests and forestland under intensive forest farming with advanced equipment and techniques shall be owned by the state but managed and operated by original owners.<sup>11</sup> Other types of forestland were to be allocated equally among peasant households in the community for private farming.<sup>12</sup>

Private ownership of forestland and arable land did not last long. In 1955 the government introduced collective farming, following the example of the Soviet Union. In 1956 the National People's Congress passed a policy directive that converted the private ownership of farmland into ownership under collectives. It provided that collective members "must transform privately owned land, draft

animals, and large farm equipment and other major production means into collective ownership."<sup>13</sup> By the end of 1958 the agricultural collectives, which had been merged into Rural Peoples' Communes, included in their membership approximately 90 percent of the rural population. The communes became the sole owner of all property. Farmers had no individual stake in arable land or forestland and were paid for time spent working together in the fields.

The collectivization campaign was disastrous for China's agriculture and people. Grain production declined substantially for three years in a row starting in 1959, leading to perhaps the world's worst famine of the twentieth century.<sup>14</sup> Per capita grain production in 1977 fell below 1956 levels.<sup>15</sup>

### REFORMS AFTER THE 1970s

After the death of Mao Zedong, the new reform-minded leadership headed by Deng Xiaoping began to explore ways to bring rural China back on track in the late 1970s. The government adopted a new form of private farming, later called the Household Responsibility System (HRS). This system allocated land-use rights to members of the collective for individual farming, while allowing the collective entity to retain ownership. By 1983,



more than 20 years of collective farming had finally come to an end as virtually all arable land had been allocated to individual households.<sup>16</sup>

Encouraged by successful application of the HRS to arable land, China decided in the early 1980s to try similar reforms on collectively-owned forest land. The goal was to motivate farmers to invest in tree planting and forest management. The forest tenure reform also separated use rights from collective ownership of forestland. The initial phase of forestland reform involved allocation of small areas of collective forestland to individual households as “private mountains;” the bulk of collective forestland was contracted to these households as “responsibility mountains.” By 1986, more than 70% of all collectively owned forestland had been allocated to farmer households.<sup>17</sup>

From the early 1980s through the 1990s, the Chinese government promulgated a series of policy documents. In 1984 China enacted the first law governing trees and forestland: Forestry Law of the People’s Republic of China.<sup>18</sup> A central policy direc-

tive formally ratified the separation of land use rights from ownership rights by requiring that collectively owned land be allocated and contracted to farmer households for a term of 15 years. The Document permits a longer contract period for projects with a long production cycle and/or of a development nature, such as fruit trees, forests, and restoring denuded hills and waste lands. The Document institutes a principle of “whoever plants the tree owns the tree” and permits inheritance of the trees planted to encourage farmers to grow trees.

The 1984 Forest Law legalized individual possession of forestland use rights. It required the issuance of a forest rights certificate to affirm individual rights to use trees and forestland.<sup>19</sup> While permitting private “ownership” of trees on private mountains, house foundation plots, and contracted wasteland,<sup>20</sup> only privately-owned trees grown on foundation plots could be harvested without permission.<sup>21</sup> The current legal regime on forestland rights is largely established by the revised 1998 Forest Law and other regulations, as discussed below.

## 2

**CHINA'S CURRENT LEGAL AND REGULATORY REGIME ON RURAL FORESTLAND****2.1****COLLECTIVE OWNERSHIP OF FORESTLAND**

China's Constitution provides that rural collectives own all land in rural and suburban areas.<sup>22</sup> However, the law contains serious ambiguities over the precise nature of this collective land ownership structure, especially on how collective ownership rights are exercised.

The new Property Law, adopted in March 2007, defines collective ownership as joint ownership by all members of the community.<sup>23</sup> The law essentially provides that every member of the collective owns an indivisible share of an unidentified portion of the land located within the community. The law does not explicitly answer the fundamental question of who actually controls and exercises ownership rights to the land. The ambiguity increases when the modern law is silent on which level of a village collective—village (commonly known as “administrative village”), or the villager group (commonly known as “natural village”)—is the primary owner of collective land. The result is that the villager group, which has the least power and is vulnerable to arbitrary decisions by the higher levels of the collective and government agencies, may lack the legal and practical power to assert any authority over forestland.

Moreover, when farmers' land rights are threatened by external forces, there is no collective

entity to defend the farmers' land rights because of the lack of clear legal authorization to do so.<sup>24</sup> Thus, major decisions concerning collective land, including collective forestland, could be in practice made by all members of the community, by all households in the community, by a few village officials or community elites, or even by the government.

Failure to legally identify the control rights to collective forestland has at least two consequences. First, it facilitates the ability of collective cadres to control the land themselves. There are numerous reports of collective cadres assuming control over forestland previously allocated to farmers and transferring the land to non-villager contractors without even notifying the farmers.<sup>25</sup> Indeed, all possible owners may assert “ownership rights” when there are economic benefits associated with forestland, such as proceeds from the sale of forest products or from transferring collective forestland to non-villager contractors. Second, the absence of clear legal rules tends to allow and sometimes encourage various levels of the Chinese government to unilaterally adopt regulatory programs or initiatives that substantially undermine farmers' forestland rights, as discussed in sections below.

## 2.2

**INDIVIDUAL RIGHTS TO USE COLLECTIVELY-OWNED FORESTLAND**

As discussed above, China's collective forestland reform in the 1980s was intended to motivate individual Chinese farmers to invest in forest development and management. However, whether farmers are willing to make such investments, especially long-term ones where gains are deferred, depends to a considerable degree upon tenure security and a possessor's ability to exercise valuable rights such as harvesting and selling timber.

The first law to recognize farmers' rights to collective forestland was the 1984 Forest Law, which called for protection of individual rights to use forestland and own forest products<sup>26</sup> but did not provide any meaningful rules regulating such rights. The subsequent revised Forest Law (1998) also lacks substantive rules governing the nature, length and scope of farmers' rights to forestland. It was not until the 2002 adoption of the Rural Land Contracting Law (RLCL) that farmers' rights to collective forestland were meaningfully regulated. Under the RLCL, farmers' rights in land, including forestland, are categorized as "contracting and operation rights" and are allocated to individual rural households through contracts of 30 years or longer.<sup>27</sup> The new Property Law (2007) permits renewal at the end of the contract term.<sup>28</sup> The "Decisions on Speeding up Forest Development" (Document No. 9 of 2003) provides additional forestland rights to farmers.<sup>29</sup>

Importantly, the Property Law explicitly defines farmers' rights to farmland, including forestland, as usufructuary property rights established by law rather than by contract.<sup>30</sup> These rights apply to all persons and legal persons, while contractual rights can be asserted only against other parties to the contract. Moreover, usufructuary property rights have priority over obligatory (contract) rights if both rights exist on one item of property at the same time. Usufructuary rights are generally suitable for registration with the authorities, while contract rights are rarely subject to registration.

The RLCL legally defines the scope of forestland use rights. Under the RLCL, farmers' land rights include "rights to use, profit from, and transfer land contracting and operation rights, and the right of autonomy over production and operations, and disposition of products" and "the right to receive the corresponding compensation" for the land taken by the state or collective for non-agricultural purposes.<sup>31</sup> Farmers' land rights "may be transferred, leased, exchanged, assigned, or transacted by other means in accordance with law."<sup>32</sup>

It is important to note that the broad rights in forestland established by the RLCL appear to be subject to the 1998 Forest Law restrictions.<sup>33</sup> The latter limits the transfer of use rights and tree-cutting permits to the following types of forestland:

- Timber stands (forests and trees aimed mainly at timber production, including bamboo groves)
- Economic forests (trees aimed mainly at the production of fruits, edible oils, soft drink ingredients, industrial raw materials, and medicinal materials)
- Firewood forests (trees aimed mainly at the production of fuels)
- Other forestlands stipulated by the State Council<sup>34</sup>

Aside from those enumerated above, transfers of use rights for other categories of forestland (e.g. those designated for ecological, defense, or other special purposes) are expressly prohibited.<sup>35</sup>

Despite the fact that the recent land laws in China have increased the breadth and strength of farmers' forestland rights, serious tenure security issues exist. For example, local government and village officials still possess somewhat unchecked

authority to take away farmers' forestland and then lease it to outside companies or developers. The rent or profit is largely kept by the few local powerful actors because village officials can claim they are exercising the collective's ownership rights by conducting such one-sided transactions. When the

rule of law is weak and the political accountability is rare in rural China, how the residual collective ownership should be exercised and how the boundary between collective ownership and farmers' use rights is established are largely left to the discretion of a few village and local officials.

### 2.3

## FOREST TRANSACTIONS

Under the RLCL, all rural land, including forestland, should be contracted out to village households with the exception of lands unsuitable for household contracting (including wasteland mountains, gullies, hills, and beaches).<sup>36</sup> The law articulates different rules governing transactions of the land subject to household contracting and the land subject to non-household contracting. With respect to the latter, the collective entity may transfer wasteland as described above to non-villager entities, including corporations engaging in forest production, through competitive bidding, auction, and public negotiation<sup>37</sup> upon the consent by two thirds of villagers' assembly or villagers' representatives, plus approval of the township government.<sup>38</sup>

A different set of rules applies to forestland that has been contracted to farmer households. In order to safeguard farmers' interests in land from being violated by local officials through dubious "compulsory land transactions," the RLCL emphasizes the principles of "consultation on an equal footing, voluntariness and compensation" in land transfers (ie. subcontract, lease, exchange, or transfer by other means).<sup>39</sup> Contracting farmers legally possess forestland rights obtained through household contracting;<sup>40</sup> as such, farmers enjoy exclusive rights to negotiate and transfer their contracted land to third parties.<sup>41</sup> The law explicitly prohibits local officials from intercepting any part of the proceeds from such transactions.<sup>42</sup>

Although the issue is not explicitly addressed, it would appear that a non-household entity

cannot legally acquire collectively-owned and managed forestland that has yet to be contracted to individual households. As noted above, the RLCL only permits direct contracts to third parties of wasteland that is not suitable for household contracting. Because forestland with existing trees is suitable for household contracting, transfers other than by contract to village households, appear illegal.

Mortgage of forestland rights is seriously restricted under Chinese law. While mortgage of rights to wasteland is explicitly permitted upon collective approval,<sup>43</sup> mortgage of "use rights to arable land, residential plots, private plots, private mountains and other collectively-owned land" is prohibited.<sup>44</sup> Any mortgage contract pledging rural land contracting and operation rights as collateral is treated as void.<sup>45</sup> Although the law does not clearly state whether trees may be mortgaged, it permits registration of mortgages, implying the legality of tree mortgage.<sup>46</sup> Policies adopted by the government suggest that forestland mortgages may be permissible. Document No. 9 of 2003 categorically permits mortgage of trees and forestland use rights, without distinctions between wasteland and forestland.<sup>47</sup> In addition, certain provisions of the Trial Measure Registration of Forest Resources Assets in 2004 can be interpreted as permitting mortgage of all kinds of forestland rights subject to legal restrictions on mortgageability of land rights.<sup>48</sup> However, as these policy documents contradict current law, the legality of mortgages on forestland rights is, at best, highly questionable.

## 2.4

**DOCUMENTATION AND REGISTRATION OF FORESTLAND RIGHTS**

The 1998 Forest Law requires county level governments to register individually owned trees and individually used forestland and issue forest certificates to confirm these rights.<sup>49</sup> It provides that these rights are protected by law against infringement by any unit or individual.<sup>50</sup>

In order to streamline and unify the process of registering forest related rights, the State Forest Administration promulgated the Measure of Forest and Forestland Rights Registration in 2000.<sup>51</sup> Under the Measure, the registration agency (county-level forest administration) must register forest rights and forestland rights, and the people's govern-

ment at the county level or above must issue forest certificates to confirm such rights once the rights-holder provides certain specified information.<sup>52</sup> The Measure specifies a uniform nation-wide format for the forest rights certificate.<sup>53</sup> It contains detailed information concerning the nature and extent of farmers' rights to forestland and forest products and assigns a unique identification number to each of the 200 million rural households in China. This has laid the foundation for a national system for registering forestland use rights, but China has yet to formally adopt it.

## 2.5

**DOCUMENTATION AND REGISTRATION OF FORESTLAND RIGHTS**

China's national policy on logging restrictions is reflected in the 1998 Forest Law. Every five years, the state establishes an annual logging quota (ALQ) for each province, prefecture and county.<sup>54</sup> The ALQs are set based on applications from counties and provinces. Each year, the State Council draws up a timber production plan consistent with the ALQ.<sup>55</sup> Except for "scattered trees" on farmers' private mountains or around farmers' residential houses, all logging must be approved with an appropriate logging permit issued by the Forestry Bureaus.<sup>56</sup>

In Dec. 2005, the State Council approved a new ALQ plan for the Eleventh Five-year Period from 2006-2010.<sup>57</sup> A significant new feature of this ALQ plan is that the overall quota is divided into only two categories: commercial timber and non-commercial timber. Previously, there were multiple categories, including commercial timber, farmers' self-consumption timber, and firewood timber,

leading to confusion and abuse as the definitions of each category lacked clarity and precision.<sup>58</sup>

Owners of large scale new growth commercial timber forests must draw up a "forest management scheme" setting forth a logging schedule. After approval, the proposed logging will automatically become permissible.<sup>59</sup> Logging of timber in forests developed by foreign investors also requires logging permits from provincial-level forestry bureaus.<sup>60</sup> In both cases, the amount harvested must be within the provincial ALQ. However, when the quota for artificially planted commercial timber forest in any given year is used up, additional logging is permitted by using the logging quota allocated for natural forest or ecosystem-protection forest.<sup>61</sup>

The most problematic aspect of the quota system is that farmers have no meaningful ability to participate in discretionary nature of the process used in determining ALQs and allocating logging permits or to challenge decisions arising from the

process. The system lacks any publicly announced parameters for setting ALQs and granting cutting permits. The absence of standards facilitates “rent-seeking” by officials with power to review applications for highly desirable logging permits. As a result, bribery and corruption appear to be fairly common, which further compromises the purpose of the ALQ system.

Moreover, farmers in China have virtually no recourse when their cutting permit applications are denied. The dispute resolution provision in the 1998 Forest Law is limited to certain ownership and usage rights disagreements<sup>62</sup> and does not cover disputes over logging permits.

## 3

## FOREST CARBON SEQUESTRATION AND PAYMENT FOR ECOSYSTEM SERVICES IN CHINA

### 3.1 GLOBAL INITIATIVES ON CARBON SEQUESTRATION

Ratified by 192 nations, the 1994 United Nations Framework Convention on Climate Change (“UNFCCC”) laid the foundation for the global initiative to reduce greenhouse gas (“GHG”) emissions and combat global climate change. Under this convention, governments agreed to:

- gather and share emissions information, national policies, and best practices
- launch national strategies to address emissions, which include providing financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change<sup>63</sup>

The 1997 Kyoto Protocol amended the UNFCCC treaty and added more specific, legally binding, measures. Under the Protocol, thirty-seven industrialized countries and the European community (“Annex B signatories”) were bound to meet specified standards with regards to reducing GHG emissions, averaging a 5% reduction from 1990 levels over the five-year period 2008-2012. 184 parties of the UNFCCC ratified the Kyoto Protocol, which entered into force in 2005.<sup>64</sup>

To meet the goal of reducing GHG emissions, the Kyoto Protocol allots a yearly emissions al-

lowance to each Annex B signatory. The Protocol offers various mechanisms for nations to meet their reduction goals. The first, known as emissions trading (ET), is essentially a free market arrangement whereby nations can trade “credits” among themselves. For example, a nation that has surplus allowances can sell them to countries that emit more than their allotted share. In addition to the direct transfer of surplus credits through ET, countries may utilize the following mechanisms:

- Joint Implementation (JI), whereby two Annex 1 nations cooperate in climate change mitigation projects. This results in Emission Reduction Units (ERUs) or Removal Units (RMUs), both of which are bought and sold as described above.
- Clean Development Mechanisms (“CDMs”), in which one or more Annex B countries undertake a climate change mitigation project with a non-Annex B nation. The output of the CDM is the Certified Emissions Reduction (CER) which, as with surplus allowances, ERUs, and RMUs, is purchased by the nation in need of additional credits.<sup>65</sup>

The worldwide carbon trading market was valued at \$30 billion in 2006.<sup>66</sup> Since then it has grown

dramatically, reaching an exchange volume of 4.9 gigatons of CO<sub>2</sub> equivalent and total value of \$125 billion in 2008.<sup>67</sup>

Under the CDM, an Appendix B signatory invests in an emissions-reduction project in a developing country, thus providing CERs for purchase by the investing nation.<sup>68</sup> Many see the CDM as particularly useful because it meets the Kyoto goals while giving developing nations foreign investment and technical expertise. So far it has proven highly attractive: between 2004 and 2008, two thousand CDM projects were approved and registered worldwide. The projects have generated more than 365 million CERs, a number expected to grow to 2.9 billion during the first commitment period (ending 2012).<sup>69</sup> As of March 22, 2010, there were more than 4,200 projects in the “CDM pipeline,” of which 2,099 had been formally registered.<sup>70</sup>

The latest UN Climate Change Conference, held in Copenhagen in December, 2009, aimed to achieve a comprehensive emissions reduction plan starting in 2012. However, a legally-binding agreement on specific reduction goals was not reached. Instead, members made a “political accord” recognizing the threat of global climate change and agreeing to scale up reductions activities.<sup>71</sup> As a result, the much-debated goals for the post-2012 period remain to be set.

Despite criticisms, notable gains were achieved in Copenhagen on several key issues. One of these was an agreement on a framework for re-

ducing deforestation through the UN collaborative program, Reducing Emissions from Deforestation and Forest Degradation (“REDD”). REDD’s approach is to reduce deforestation and forest degradation by creating financial value in the carbon stored in trees, thus offering incentives for developing nations to increase the carbon absorption capacity of their forested lands. Deforestation and forest-degrading activities are responsible for about 20% of global greenhouse gas emissions, more than the entire global transportation sector.<sup>72</sup> As such, the financial implications of including forest carbon into the market are significant: the potential monetary flow from emissions reductions through REDD are estimated to be \$30 billion/year.<sup>73</sup>

In contrast, the cost of allowing unchecked deforestation could be grave, as forest resources directly support the livelihoods of the majority of the world’s 1.2 billion who live in extreme poverty.<sup>74</sup> To address these concerns, signatories of the Copenhagen accord agreed to “the immediate establishment of a mechanism [to address emissions from deforestation] including REDD-plus”<sup>75</sup> and to provide developing nations with “substantial finance” to pursue REDD-plus programs.<sup>76</sup> The agreement establishes the “Copenhagen Green Climate Fund” and lists REDD-plus as one of the initiatives to benefit from a new \$30 billion commitment from developed nations for the period 2010-2012.<sup>77</sup>

### 3.2

## CHINA’S INITIATIVES ON PAYMENT FOR ECOSYSTEM SERVICES AND CARBON SEQUESTRATION

Payment for Ecosystem Services (PES), broadly defined, is the practice of offering incentives to farmers or landowners in exchange for managing their land to provide an ecological service. These so-called “services” are essentially the environmental benefits enjoyed by households, communities, and economies, including agricultural food and

fiber production, fresh water, air quality regulation, climate regulation, erosion regulation, water purification and waste treatment, disease regulation, pest regulation, and so forth.<sup>78</sup> Notably, three focus areas – climate change mitigation, watershed services, and biodiversity conservation – are currently receiving the most money and interest worldwide.



PES programs are typically voluntary and mutually beneficial contracts between consumers of ecosystem services and the suppliers of these services. One party (the custodian) holds the property rights over an environmental good that provides a flow of benefits to another party (the beneficiary) in return for compensation. Under basic economic theory, the beneficiaries should be willing to pay a price lower than their welfare gain (utility) resulting from the services. Accordingly, the providers of ecosystem services are willing to accept a payment that is greater than their cost in providing the services.<sup>79</sup>

China is a vast country with more than 195 million hectares of forestland, 58% of which is collectively owned by rural villages.<sup>80</sup> China's forests have captured and stored an estimated 7.81 billion tons of carbon.<sup>81</sup> The ecological and other resulting benefits of such carbon sequestration cannot be overstated.

Chinese government boasts one of the world's largest PES programs concerning forest growth and carbon sequestration. The twist is that most of the PES programs are largely established, operated and administered in a centrally-planned manner by the Chinese government. Although PES is sometimes referred to as a "market-based instrument" or a "market for ecosystem services," the extent of market transactions for the PES in China is low. In a country where the property rights regime concerning collective-owned forestland is not clearly defined, this is probably necessary but it also creates a variety of issues.

Other than the private forestry sector where individual farmers or entities plant trees on various land, there are three prominent forestry initiatives in China that bear on carbon sequestration – the Nationwide Reforestation Campaign, the Grain for Green program, and the Natural Forest Protection Program. So far, these initiatives have been highly successful in reducing carbon emissions. From 1985 to 2005, these initiatives achieved a combined reduction of carbon emission in the amount of 5.1 billion tons.<sup>82</sup>

## **NATIONWIDE REFORESTATION CAMPAIGN**

China often credits itself with the largest-scale and longest-running reforestation campaign in the world. From 1980 to 2008, official data shows that China reforested more than 92 million hectares of land. The forest cover percentage improved from 8.6% in 1949 to 18.21% in 2008. Today China adds approximately 4.7 million hectares of newly-planted forest each year.<sup>83</sup>

Generally, new trees are planted in two ways. On the one hand, the Chinese government advocated a voluntary-reforestation-by-citizens program involving public mobilization campaigns, establishing a national holiday for tree planting, and assigning tree-planting quotas to schools, state-owned enterprises, government offices and so on. In this case, the labor is free, and tree seedlings are provided by local forestry bureaus. On the other hand, local forestry bureaus hire professional tree planting firms – mostly state-owned forest enterprises as well as farmers – to complete their respective reforestation quota each year. Initially the payment for each mu (1/15 of a hectare) of reforestation was 100 yuan. In recently years, the payment has been increased to 200 yuan in most provinces. During the fieldwork recently conducted by the author, all the parties participated in paid reforestation work complained that the actual cost of tree planting is significantly higher than the payment.<sup>84</sup>

Chinese government has announced an ambitious goal of increasing the country's forest cover percentage to 23%, with 5 million hectares of newly planted trees added each year.<sup>85</sup> In 2009 alone, China reportedly reforested 5.9 million hectares of land involving the planting of 2.48 billion trees.<sup>86</sup>

## **GRAIN FOR GREEN PROGRAM**

Within the reforestation strategy, China has also implemented the "Grain for Green" program (also known as the Sloped Land Conversion Program) to convert hilly or sandy farmland to forestland in order to alleviate erosion problems. Pilot projects began in Sichuan, Shanxi, and Gansu

provinces in 1999. The program was rolled out in 17 provinces in 2000 and expanded to a nationwide campaign in 2002.<sup>87</sup> During the past ten years of implementation, the Chinese government invested an excess of US\$28.2 billion in order to convert 26.9 million hectares of arable land into forestland.<sup>88</sup> The newly added forests equal roughly 1 billion m<sup>3</sup> of timber and 3.6 billion tons of sequestered carbon.<sup>89</sup> The new trees planted under Grain for Green constitute the bulk of all national reforestation activities: in recent years, more than 60% of China's reforestation is attributed to the Grain for Green program.<sup>90</sup>

Lands targeted under the program often suffer from serious erosion or desertification. Farmland on steep slopes, in mountainous regions, or near deserts is eligible for conversion to tree- or grass-covered land.<sup>91</sup>

The effects of the program have been widespread and significant. Overall, Grain for Green has affected 32 million rural households (approximately 124 million rural residents) according to government data, and a direct result is that these households have less land to farm and grow crops.<sup>92</sup>

Farmers whose arable land has been designated for conversion are given the following compensation:

1. A one-time reforestation reimbursement of \$110 per hectare;
2. An annual cash subsidy of \$44 per hectare;
3. An annual grain subsidy of 1,500 kilograms of wheat per hectare in northern China and 2,250 kilograms of wheat or comparable grain per hectare in central and southern China;
4. The annual subsidies will continue for 8 years if ecological forest is planted, 5 years in the case of commercial timber forests, and 2 years for grass. Note that 80% of all land converted under the Grain for Green Program must be ecological

forest subject to the general ban on logging.<sup>93</sup>

Given that the per capita amount of arable land in China is merely 0.09 hectare, the amount of compensation is as follows when changed to per-capita basis:

1. One-time reimbursement for reforestation of \$10 per person;
2. An annual cash subsidy of \$4 per person;
3. An annual grain subsidy of 140 kilograms of wheat (approximately \$29) in northern China, and 210 kilograms of wheat (approximately \$43) in central and southern China, per person;<sup>94</sup>

With the recent expiration of the first 8-year period, China opted to extend the compensation period for another 8 years. Currently, affected farmers are to receive an annual cash subsidy of \$198 per hectare (approximately \$19 per capita) in northern China, and \$276 per hectare (approximately \$26 per capita) in central and southern China. Regardless, the compensation standard is widely deemed low when considering the effects on farmers' livelihood and the ecological benefits provided by the reforested land. The compensation standard is even lower when applying the established criteria for compulsory land acquisitions.

Grain for Green is yet another example of a campaign conceived and implemented in a largely top-down manner. Though one of the purported principles of the program is the voluntariness of affected farmers, little negotiation took place: local officials unilaterally made decisions on which lands to convert without seeking input or consent from affected farmers. Based on 2004 surveys, a majority of farmers in Shaanxi, Gansu, and Sichuan responded that they:

- had not been consulted before initiation of the program,

- did not have rights over the species of tree to be planted,
- did not have rights over how much land was to be converted; and
- did not have rights over which piece of land was to be converted.<sup>99</sup>

The apparent lack of meaningful participation, combined with an insufficient compensation standard and the seemingly short-term nature of the program, is a recipe for discontent and potentially serious livelihood problems among affected farmers. The newly added forests certainly benefit the entire country as a whole, but a great number of farm households are paying the price.

### NATURAL FOREST PROTECTION PROGRAM

In response to severe flooding of the Yangtze River in 1998, several provincial governments in southwest China instituted forest logging bans. In 2000 the central government formalized the Natural Forest Protection Program (NFPP), a 50-year initiative to preserve dwindling forest resources and biodiversity and improve overall environmental quality in ecologically-fragile areas. The most prominent feature of the program is its prohibition on logging within NFPP-designated regions. Based on official declaration, the NFPP is planned to last for half century (till 2050).<sup>100</sup>

The NFPP contains three layers of objectives:

- Short-term objectives (for the year 2000) include the complete ban of commercial logging in the upper and middle regions of the Yangtze and Yellow Rivers, a substantial reduction of logging in Northeastern regions, and appropriate resettlement of laborers employed in state-owned forestry enterprises.
- The objective in the mid-term (until 2010) is to improve management of NFPP forests and

shift timber production to plantation forests outside NFPP regions.

- The long-term objectives (by 2050) include full restoration of NFPP forests and the establishment of a sustainable system for forest management and timber production.<sup>101</sup>

Overall, other than Hainan and Xinjiang, the three major NFPP regions cover the following fifteen provinces:

- Yangtze River region includes Yunnan, Sichuan, Guizhou, Tibet, Chongqing, and Hubei (*see pink area in the following map*);
- Yellow River region includes Shanxi, Gansu, Qinghai, Ningxia, Shan'xi, Henan and Inner Mongolia (*see green area in the following map*);
- Northeastern region includes Jilin, Heilongjiang, and Inner Mongolia (*see yellow area in the following map*).<sup>102</sup>

According to official reports, 104 million hectares of forestland has been designated as NFPP regions at the national level.<sup>103</sup> The covered forests are also known as “national priority public-interests forest” in the above-listed seventeen provinces. Of the 104 million hectares of NFPP forest, 60% is state-owned forestland, 34% is collectively-owned, and 6% is owned by other special entities.<sup>104</sup>

Meanwhile, provinces and prefectures also have authority to designate and establish “local” NFPP regions where logging is banned. Currently 77 million hectares is estimated as local NFPP forests as an addition to the national program. Essentially, all provincial jurisdictions in China, except Shanghai, have either national or local NFPP programs as of today.<sup>105</sup>

Within each NFPP region, multiple classes of forestland are created based on ecological sensitivity and demands. For instance, preservation of forest is typically the primary and sometimes



the exclusive purpose of existing and high-value natural forest, while reforestation is for waste or barren land.

Due to the logging ban, more than 740,000 workers and employees of state-owned forest farms, timber factories, and forest bureaus were laid off.<sup>106</sup> Compensating and resettling the displaced forestry work force has been an ongoing problem for the State Forestry Administration (SFA) and local governments. A portion of the work force has been converted into NFPP custodians to monitor, manage, and enforce logging bans on protected forests. Another portion has been employed in the reforestation of NFPP or other forests. But a substantial number of the surplus work force remains insecure and without stable source of livelihoods.

This sweeping initiative resulted in the immediate halt of commercial logging in NFPP regions. In counties where the NFPP program was implemented, commercial logging was reduced by more than half and in some cases eliminated altogether. From 2000 to 2003, a total of 320 million m<sup>3</sup> of

timber resources that would otherwise have been expended were reportedly saved by the NFPP.<sup>107</sup>

Initial assessments have shown that ecological and environmental qualities are improving gradually as a result.

Since the launching year of 2000, China has instituted a uniform standard to financially support the operation of the NFPP. For the better part of the first decade of the program, the central government provides 5 yuan per mu (approximately US\$11 per hectare) every year to local forest bureaus to carry out the necessary monitoring, preservation and management duties for NFPP forests.<sup>108</sup> The bulk of this funding is spent on employing a full- or part-time “forest protection work force” consisting mostly of local farmers or forestry industry surplus workers.<sup>109</sup> This work force carries out the daily duty of monitoring and managing NFPP forests.

The level of funding has recently increased: according to a recent central regulation from the SFA, the 5-yuan-per-mu standard has doubled to 10-yuan-per-mu (approximately US\$22 per hect-

are).<sup>110</sup> This increase is substantial, but based on literature review and the author's fieldwork conducted in NFPP regions in Yunnan, Guizhou and Shanxi provinces, the actual cost of monitoring and maintaining the NFPP forests is considerably higher than even the 10 yuan standard. Moreover, the implementation of the NFPP program has caused great financial strains on remote and often poor counties where logging and the wood-processing industry are important revenue sources.<sup>111</sup> Consequently, the NFPP program employees as well as local governments have been suffering significant financial losses, which is an evident problem for both state-owned and collectively-owned forestland.<sup>112</sup>

Another glaring flaw of the program is that millions of affected farm households and rural villages whose land is targeted by the NFPP receive virtually no compensation for their loss of land use rights (not mentioning the compensation for the value of the sequestered carbon). The aforementioned funding (5 or 10 yuan per mu) is used exclusively for the purpose of maintaining and improving NFPP forests. The central policies and regulations of the NFPP rarely mention any compensation for affected farmers and rural villages. Although not an established legal rule in China, the rationale of "regulatory taking" may apply here when a government regulation deprives property owners of all viable economical use of the property, the effects of the regulation is similar to a physical taking of the property by the government and thus proper compensation is called for.<sup>113</sup> Because of the logging ban, farmers and rural communities are prohibited from making any economic use of the forestland or trees. Consequently it makes sense that the government should compensate for the diminished value of the forestland and trees as a result of the NFPP.

It should be noted that most of the NFPP regions are located in the interior – and generally poor – Southwest, Northwest, and Northeast. Income levels in the NFPP regions are considerably lower than in the coastal areas. As such, the affected farmers were heavily dependent upon trees and forestland for basic needs, and NFPP imple-

mentation constituted a direct deprivation of their livelihood. The literature so far has confirmed this trend: since implementation, income and standards of living have fallen among affected farmers and rural communities.<sup>114</sup>

## **AFFORESTATION AND REFORESTATION UNDER THE CLEAN DEVELOPMENT MECHANISM**

Pursuant to the Kyoto Protocol, Carbon sequestration through afforestation and reforestation are legitimate methods by which developing countries can produce CERs. "Afforestation" refers to the direct human-induced conversion of land that has been classified as non-forest for the past 50 years. "Reforestation" means the direct human-induced conversion of land that was categorized as non-forest as of December 31, 1989 and at the beginning of the project.<sup>115</sup>

Despite the fact that China is a major producer and seller of CERs on the global market, afforestation and reforestation remain unpopular vehicles for producing carbon credits. This is true not only in China: worldwide, forestry accounts for only a handful of CERs created each year. Accordingly, very few such projects have been pursued in China.<sup>116</sup>

The first such project occurred in Guangxi in 2006. Huangjiang County and Cangwu County signed an agreement with the World Bank to undertake a 4,000-hectare reforestation CDM project. By the year 2035, the project is expected to achieve 770,000 tons of carbon sequestration.<sup>117</sup> Of the 4,000 hectares of the land, about one fourth is forestland that was previously allocated and contracted to farmers for a term of 50 years in the early 1980s. The remaining three fourths of the land is forestland owned and managed by village collectives. The land is pooled together for reforestation by third parties, and the project was to benefit 20,000 local people and generate \$5.5 million, including \$2 million from sales in carbon credits. Revenues were to be divided between local farmers and the forest companies that invested in the tree planting. Specifically, farmers and village collectives receive an annual rent of US\$8.8 per hectare, and will be

entitled to 40% of the income from the future sales of timber products and 60% of the income from the sales of carbon credits for most of the land.<sup>118</sup>

A 2007 project funded by a German company took place in Tengchong County, Yunnan. The 476-hectare afforestation project is anticipated to generate 170,000 CERs. The land at issue is collectively-owned by villages and farmers and was mostly barren since 1959. Farmers were consulted and gave informed consent to the project, and a local forest farm provided resources, equipment and labor to undertake the afforestation. The funds generated from CER credits, to be distributed as subsidies over a 30-year period, are to be shared among

affected farmers (in this case, 433 farm households) and the local forest farm.<sup>119</sup>

In addition, Liaoning, Sichuan, Inner Mongolia, and Hebei have undertaken carbon sequestration projects, and a number of other provinces are currently exploring similar opportunities.<sup>120</sup>

Multiple technical and management factors determine whether such afforestation and reforestation projects can be successful in the long run.<sup>121</sup> For the purposes of this paper, one must note that there is great deal of tenure insecurity involving forestland, which seems to become a major obstacle to achieving the goals of sustainable forest management and equitable development in the countryside.

## 4

**THE EMERGING ISSUES OF CARBON OWNERSHIP IN CHINA**

Insecure or unclear property rights over forest areas have led to widespread deforestation as a result of uncontrolled logging and conversion of forestland to other uses. Secure and clearly-defined property rights for forest owners and dependents, together with better systems for valuing and pricing forest resources to include their environmental and carbon mitigation functions, have important roles to play in safeguarding forests as stores of carbon and in reducing carbon emissions.<sup>122</sup> In

recent years other countries have made a conscientious effort to enact laws and regulations regarding the ownership and management of forest carbon. However, introducing a brand new and rather unique subject such as carbon into centuries-old property rights regimes is no easy task. Regardless of their ultimate success or efficacy, these comparative experiences are valuable models for China to consider adopting.

**4.1****INTERNATIONAL COMPARATIVE EXPERIENCES ON CARBON OWNERSHIP**

As alluded to above, there exists no single success story on how carbon ownership should be defined and legislated. Australia can be considered the nation with the most “advanced” formal framework on forest carbon, but it is subject to ongoing controversies and only time will tell if the framework achieves its intended goals and impact.

Every state in the Australian Commonwealth allows for distinct legal interests in forest carbon that are separate from land ownership. In other words, the carbon storage capacity of trees can be owned as a commodity on land without owning the land itself – and even without owning the trees containing the carbon.<sup>123</sup> Though the laws among the states vary, the approach generally adopted in Australia has been to structure a legal hierarchy of

rights that distinguishes between ownership of the underlying land, ownership of the trees, and ownership of “carbon sequestration rights.”<sup>124</sup> This lays the foundation for the purchase and sale of carbon rights that are protected through title registration in both the freehold and leasehold context<sup>125</sup> (with the exception of Victoria, in which leasehold registration is not available).<sup>126</sup>

The Australian model could give rise to separate ownership of the trees and the sequestered carbon on a given property. The potential conflict between these rights is addressed in the state of Victoria, where only the forest property owner can enter into a carbon rights agreement.<sup>127</sup>

But the reality presents a much more challenging case for the new law. Under the existing

common-law property structure, a metaphor of a bundle of rights, akin to a bundle of sticks, has been perpetuated to describe different kinds of property rights. Adding a new stick (i.e., carbon rights) seems to be a plausible solution, but carbon rights are not quite like a regular stick such as the right to take something (crops, timber, soil, minerals or animals) from another's land. A carbon sequestration property right involves something (carbon) that is absorbed by trees growing on the land. Conceptually and practically, this has caused quite amount of confusion.<sup>128</sup> There actually has been a rising amount of carbon litigation in Australia. Reports indicate that property owners are even organizing to engage in civil disobedience campaigns – threatening to chop down trees – currently under federal court actions, in an attempt to win the right to be compensated for the forfeited carbon rights on private property.<sup>129</sup>

In contrast, Canada took a different approach. The “conservation easement” was created as a stat-

utory mechanism to establish carbon sequestration rights.<sup>130</sup> Conservation easements are property interests by which a landowner grants a person rights in land and takes on certain obligations with respect to the land. When registered, the interest runs with the land title and is enforceable against subsequent owners. As researchers have pointed out, this model suffers deficiencies because there are substantial limitations on who may hold a conservation easement, how the easement can be transferred, and other factors.<sup>131</sup> For example, only a limited class of “qualified organizations” such as a government agency or a private organization dedicated to natural conservation can hold a conservation easement under the law in Alberta. Moreover, the conservation easement is not freely tradable in the market under the same Alberta law. Both these restrictions significantly hamper the marketability and the value of carbon rights derived from conservation easement.<sup>132</sup>

## 4.2 FARMERS AS CARBON OWNERS IN RURAL CHINA

China has yet to formalize what might qualify as a carbon right and who might be a rightful owner. Accordingly, the question of who owns carbon in rural China must be answered in reference to the existing laws governing forestland and trees.

As discussed in Section II, a majority of the forestland in rural China is collectively owned. Starting in 2008, China began an ambitious and comprehensive collective-forestland tenure reform. A 2008 Central Policy Directive defines the essence of the reform: to further clarify and improve forestland tenure security by allocating and “contracting” practically all collectively owned and managed forestland to individual farm households for a term of 70 years.<sup>133</sup> The SFA estimated completing the reform within five years and allocating 167 million

hectares of collective forestland to Chinese farmers.<sup>134</sup> New forestland certificates are to be issued to confirm farmers' rights. As noted earlier, under the RLCL of 2002, farmers' use rights to land (or contractual rights, as commonly known in China) include the right to use, profit from, transfer, and claim autonomy over production, operations, and disposition of products.<sup>135</sup> The 2008 Directive guarantees these rights and goes further, providing that ownership of all existing trees and forests on the allocated forestland will go to the respective farm households (of course still subject to the existing restrictions under the NFPP or the Grain for Green program). This may represent the single largest transfer of ownership of trees and carbon



in the world, considering approximately 110 million hectares of forestland is at stake.

The Chinese legal regime has not provided any guidance on the ownership of forest carbon, yet the ownership of trees appears to be a resolved issue. Article 27 of the Forest Law provides the following:

“Rural residents who plant trees around their residential houses or in their private mountains or land own such trees. Collectives or individuals who contract state- or collectively- owned waste mountain or waste land, and thereafter plant trees, own such trees, unless the contract provides otherwise.”<sup>336</sup>

Later, the SFA issued a regulation along similar lines – trees planted after the initial land reform, which occurred in 1940s and 1950s, belong to whoever plants and manages such trees.<sup>337</sup>

As stated above, the 2008 Central Policy Directive makes farmers the legal owners of trees and forests on the forestland allocated and contracted to them during the ongoing collective forestland tenure reform project.<sup>338</sup> Also the forestry certificates recently issued to individual farm families during the ongoing collective-forestland tenure

reform contain one column specifying who is the owner of the trees. In virtually all cases, the farm family who receives the contracted forestland is designated as the owner of the trees standing on such land – regardless of who planted these trees.

Thus, for contracted forestland, private mountains, or waste mountains over which farmers hold use rights, farmers possess complete legal ownership rights over trees on these land. The logical conclusion, then, is that whoever owns the trees, owns the carbon. To conclude otherwise would be contrary to the vested interests and rights of the farmers as provided by existing law and policy.

Such a conclusion is actually being acknowledged in practice. In the Yunnan afforestation project discussed above, affected farmers were invited to participate and signed contracts with the project implementation company where the farmers agreed to provide the land for afforestation in exchange for a share of the future financial benefits. In another afforestation project in Sichuan province, 12,000 farmers whose land is used for the project will receive 30-40% of the total revenue generated from the future sale of carbon credits. Such payments to farmers are essentially a reflection of the value of farmers’ rights over forestland and the carbon credits contained therein.

### 4.3

## THREE PRELIMINARY POLICY CONSIDERATIONS

### DISMISSING STATE OWNERSHIP OF CARBON

The above conclusion that farmers own forest carbon in rural China is merely an inference, albeit a strong one. There is no formal legislation, regulation or policy directly on carbon rights. Without any legal rules as to creation and ownership of carbon rights, disputes can arise over the legal title to “emission reductions” and who should pay whom for the benefits of sequestered carbon. In the case of China, the collectives remain the owners of

forestland, and local governments are powerful players who may “regulate” forest carbon rights given their potential economic value. Although private parties may enter into detailed and carefully crafted contracts for individual carbon transactions, such a solution could mean inconsistent understanding and expectation of the rights and value of forest carbon as well as high transaction costs. Therefore, it makes sense to have a national rule that spells out a basic framework on how carbon can be owned and transacted.

As a starter, China should avoid rules separating ownership rights to the trees from rights to the carbon sequestered in the trees. Not only would doing so undermine farmers' interests, but public ownership of carbon would be difficult to reconcile with the current legal structure on forest and forestland. Doing so would add another layer of confusion and uncertainty to the already troublesome forestland tenure system if hundreds of thousands of collectives own forestland, hundreds of millions of individual farm families possess use rights over forestland and ownership rights over trees, and the state or the public somehow owns the carbon sequestered in the forestland and trees. Moreover, any attempt at "nationalizing" carbon ownership would run counter to the ongoing collective forestland tenure reform where rights over forestland and trees are now being decentralized and transferred to individual farmers.<sup>139</sup>

The experience in New Zealand is instructive. In 2002, the government of New Zealand decided to retain ownership over credits or debits for carbon from plantations on public and private land. Unfortunately, the decision led to a significant decline in plantation establishment and also a net decrease in New Zealand's forest production area. The policy was strongly opposed by the private forest industry, which argued that landowners should hold the rights to forest carbon in their trees. In 2007 the policy was reversed, with credits devolved to forest owners as part of a new trading scheme.<sup>140</sup>

### **STRENGTHENING FARMERS' RIGHTS OVER FORESTLAND AND TREES**

Studies show that deforestation rates are lower where forest tenure is secure. It is widely agreed that clearly defined and secure property rights are essential for the forest-dependent poor to improve their income and well-being.<sup>141</sup> As one scholar commented, "property rights are found to be most valuable, and create the strongest incentives for resource management, when they are secure."<sup>142</sup>

China should focus on its ongoing efforts to clarify and strengthen farmers' tenure security over forestland and trees. An equally important task is to develop institutions and practices that make farmers' rights "real" in reality. As a recent Food and Agriculture Organization paper observed, land policy and tenure systems need to deliver adequate tenure security so as to provide incentives for good land and resource management and reduced vulnerability.<sup>143</sup> Indeed, tenure insecurity is probably the largest obstacle to China's efforts to develop a sustainable forestry sector and promote carbon sequestration.

In a paper that aims to provide strategy to Yunnan on how to promote forest carbon sequestration projects, the authors' first recommendation is to improve the current collective forestland tenure system so as to provide more clarity and security for investors. Without this, substantial uncertainty will remain, increasing either transaction costs or the risk of disputes.<sup>144</sup>

Another policy paper largely sidesteps the tenure reform issue, recommending that afforestation and reforestation CDM projects avoid southern China altogether. Whereas large-scale, state-owned forest farms are common in northern China, and thus the rights issues are relatively straightforward, collectively-owned forestland is more common in the South. Given the current state of collective tenure, controversies regarding ownership and other rights will be much more likely to occur in southern China, as compared to the north.<sup>145</sup>

These articles agree that the main challenge is to improve the clarity and security of farmers' rights to forestland and trees. The good news is that China appears committed to the reform process: the allocation of collectively-owned forestland to individual farm families is a massive undertaking. The process includes issuing a standardized forestland certificate, including a map of the forestland, to each family. The collectives remain legal owners of the forestland, but such ownership rights have become symbolic and almost obsolete (at least under the law). Farmers' usufructuary rights to forestland are broad and long-term under

the law. In addition, for those who have already received their plots, the question of tree ownership (and the carbon therein) is a settled issue, as farmers have become the exclusive owners.

In general, China is heading in the right direction by allowing hundreds of millions of individual farmers to enjoy extensive rights over their forestland. Besides benefiting individuals, it makes good policy sense: farmers who are engaged in the process have far greater incentive to cooperate toward the goal of sustainable and sensible forest preservation. A recent survey covering eight provinces in China shows that farmers with stronger and clearer rights tend to plant more trees. The survey paper states the following: “where rights were shifted towards households, the reform had a positive impact on incomes and reforestation, and where rights were shifted back towards the collective, incomes from forestry diminished and increase in reforestation was less pronounced.”<sup>146</sup>

### **PAYING FARMERS FOR ECOSYSTEM SERVICES AND CARBON SEQUESTRATION**

By certain measures, the Payment for Ecosystem Services (PES) programs in China have achieved noteworthy results. The Nationwide Reforestation campaign, the Grain for Green program, and the NFPP are success stories in terms of increasing carbon sequestration and improving ecological health. However, an ideal PES program should be a voluntary and mutually beneficial contract between the beneficiaries and suppliers of ecosystem services. China’s programs have largely fallen short in this regard.

As discussed above, the actual payments to farmers who provide ecosystem and carbon sequestration services are inadequate. For affected families whose farmland is converted to forestland under the Grains for Green program, each person

receives the equivalent of about \$40 a year as compensation.<sup>147</sup> The NFPP deprived the farmer-owners of all economically viable use of their forestland and trees, but no compensation is paid.<sup>148</sup> Based on Chinese research surveys, affected farmers expressed a relatively high level of dissatisfaction with compensation standards under the NFPP and Grain for Green. Recent research and policy papers have noted this problem and called for improvement in compensation.<sup>149</sup>

The benefits of ecosystem services and carbon sequestration generated by these programs are monumental. However, the mandatory and sometimes coercive nature of the implementation of these programs is exacerbated when fair compensation is lacking.<sup>150</sup> As discussed above, when land is deprived of all viable economic use due to the implementation of a government regulation or initiative, fair compensation should be in place to make up for the loss. It is not the intention of this paper to discuss what might be the best criteria to measure the loss and calculate the compensation for the farmers affected by the Green for Grain program or the NFPP, but the compensation standard for compulsory takings of *arable* land under the existing law is instructive.<sup>151</sup> Meanwhile, in areas where there is a reasonably number of market transaction concerning forestland and the pricing or rent information is readily available, it is also advisable to adopt an approach so that compensation can be derived from the fair market value of the land. Regardless what approach is adopted, affected farmers should receive proper compensation for their loss of the use of and the diminished value of the land (and preferably, for the value of the carbon stored in the trees and land). This is key to the long-term success of not only the carbon-sequestration programs but also the ongoing collective forest tenure reform.

# 5

## CONCLUSION

Even though no formal law has made a definitive declaration, the answer to the question of carbon ownership in rural China – based on the inferences from existing laws, policies and practices – appears to be clear: farmers are and should be the rightful owners of the carbon sequestered in trees in their land. The forestland tenure system is unique in that farmers possess supposedly broad use rights while village collectives remain the land-owners. Consequently, significant questions remain as to how farmers could deal with the carbon rights

and to what extent farmers should be entitled to compensation concerning carbon transactions or payment for ecosystem services. To ensure effective forest and carbon management as well as the economic welfare of the rural residents, it is advisable that China continue its efforts to improve the security of farmers' forestland rights as well as increasing institutional and other incentives to farmers whose forestland and trees are performing a vitally important environmental function for the nation.

## ENDNOTES

<sup>1</sup> Liu Quan, Corrected Historical GDP Figures Show 9.6 Percent Average Growth From 1979 to 2004, XINHUA NEWS AGENCY, Jan. 10, 2006, [http://news.xinhuanet.com/politics/2006-01/10/content\\_4031606.htm](http://news.xinhuanet.com/politics/2006-01/10/content_4031606.htm); The World Factbook, <https://www.cia.gov/cia/publications/factbook/index.html> (last visited Oct. 11, 2006).

<sup>2</sup> See UNFAO STATISTICAL YEARBOOK 2004, at tbl. A.1 (2005), available at [http://www.fao.org/statistics/yearbook/vol\\_1\\_1/index\\_en.asp](http://www.fao.org/statistics/yearbook/vol_1_1/index_en.asp).

<sup>3</sup> Income Gap Between Rural and Urban Residents Widens to 1:3.22 in 2005, XINHUA NEWS AGENCY, Feb. 22, 2006, <http://news.sohu.com/20060222/n241957993.shtml>. See also National Bureau of Statistics of China, Yearly Data, <http://www.stats.gov.cn/english/statisticaldata/yearlydata/> (last visited Oct. 11, 2006) (select “2005” under “Rural Households”; then follow “Chapter 10 People Livelihood” hyperlink).

<sup>4</sup> Rural-urban gap statistics are cited in dozens of reports by the Ministry of Finance and the World Bank. See Guo Puhui, Reform of Income Distribution Continues: China’s Rural-Urban Income Gap Still Growing, CHINA BUSINESS NEWS, June 6, 2006, <http://finance.sina.com.cn/g/20060626/01372679578.shtml>; Zhao Manhua, The Income Gap in China: Rural Areas Need a Lift, BEYOND TRANSITION, Feb.-Mar. 2001, <http://www.worldbank.org/html/prddr/trans/febmarch2001/pgs13-14.htm>.

<sup>5</sup> Robert E. Black, et al., Where and why are 10 million children dying every year?, 361 LANCET 2226, 2227 (2003).

<sup>6</sup> See, e.g., Jim Yardley, Farmers Being Moved Aside By China’s Real Estate Boom, N.Y. TIMES, Dec. 8, 2004, at A1; Joseph Kahn, China Crushes Protest, Turning 3 Friends Into Enemies, N.Y. TIMES, Oct. 13, 2004, at A1; Howard W. French, Protesters Say Police in China Killed Up to 20, N.Y. TIMES, Dec. 10, 2005, at A1.

<sup>7</sup> Zhao Ling, Rural Activism Seriously Changes: From Tax Disputes to Land Ownership, SOUTHERN WEEKEND, Sept. 2, 2004.

<sup>8</sup> Joseph Kahn, Chinese Premier Says Seizing Peasants’ Land Provokes Unrest, N.Y. TIMES, Jan. 21, 2006, at A3.

<sup>9</sup> The Land Reform Law of PRC (June, 1950), art. 1.

<sup>10</sup> *Id.* art. 10.

<sup>11</sup> *Id.*, arts. 18 and 19.

<sup>12</sup> *Id.*, art. 16.

<sup>13</sup> The Charter of Advanced Agricultural Production Cooperatives (1956), art. 13.

<sup>14</sup> Fifteen to thirty million incremental deaths occurred, as agricultural production plummeted. See Susanne Weigelin-Schwiedrizik, Trauma and Memory: The case of the Great Famine in the People’s Republic of China (1959-1961) (2003); Xizhe Peng, Demographic Consequences of the Great Leap Forward in China’s Provinces, 13(4) Population & Development Review 639 (1987).

<sup>15</sup> C. Carter & Fu-Ning Zhong, China’s Grain Production and Trades 5 (1998); see also N. Lardy, Agricultural Reforms in China, 39(2) J. Int’l Affairs 91 (1986).

<sup>16</sup> Wu Xiang, Zhongguo Nongcun Gaige Shilu (Records of China’s Rural Reforms) 172 (2001); see also Huang Qinghe, “Review and Current Issues on the Rural Land Policy in China,” paper presented at the PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON RURAL LAND ISSUES IN CHINA 8 (Sept. 1992).

<sup>17</sup> Yin Runsheng; Jintao Xu; Zhou Li, Building Institutions for Markets: Experiences and Lessons from China’s Rural Forest Sector, Environment, Development and Sustainability, Vol. 5, No. 3-4.

<sup>18</sup> Zhonghua Renmin Gongheguo Senlin Fa [Forestry Law of the People’s Republic of China] (1984).

<sup>19</sup> The Forest Law (1984), art. 3.

<sup>20</sup> *Id.* art. 22.

<sup>21</sup> Id. art. 28.

<sup>22</sup> PRC Const., art. 10.

<sup>23</sup> The 2007 Property Law, art. 59.

<sup>24</sup> It should be noted, though, that administrative village has in practice functioned as the owner of villager-group-owned forestland in many places in China partly because of the lack of administrative capabilities at the villager group level. However, this should not be seen as vesting ownership with the administrative village.

<sup>25</sup> Sun Yan, Xu Jintao and Li Ling, Reforms on Forest Rights and their Impact on Forestland Management: Research Report on Forest Reforms in Jiangxi Province, FORESTRY ECONOMICS (China), August issue (2006).

<sup>26</sup> The 1984 Forest Law, art. 3.

<sup>27</sup> Rural Land Contracting Law, art. 20.

<sup>28</sup> The 2007 Property Law, art. 126.

<sup>29</sup> The Central Committee and the State Council Decisions on Speeding Up Forest Development (Document No. 9 of 2003), art. 13.

<sup>30</sup> The 2007 Property Law, Chapter III.

<sup>31</sup> Rural Land Contracting Law, art. 16.

<sup>32</sup> Id. art. 32.

<sup>33</sup> Under China's Legislation Law, where there is a conflict of law between a general law and a special law on the same subject matter, the special law prevails. See the Legislation Law, art. 83. Therefore, transactions of forestland rights should be governed by relevant provisions of the Forest Law.

<sup>34</sup> 1998 Forest Law, arts. 4, 15.

<sup>35</sup> 1998 Forest Law, art. 15.

<sup>36</sup> RLCL art. 3.

<sup>37</sup> Id. arts. 3 and art. 44.

<sup>38</sup> Id. art. 48.

<sup>39</sup> Id. art. 33.

<sup>40</sup> Id. art. 34.

<sup>41</sup> Id. arts. 34, 37. Note, however, that complete assignments of contracted lands (but not subcontracts, leases, exchanges, or "other means") require consent of the party giving out the contract (eg. the collective).

<sup>42</sup> Id. art. 36.

<sup>43</sup> The 1995 Guaranty Law, art. 34.

<sup>44</sup> Id. art. 37.

<sup>45</sup> The Supreme Court Explanations on Application of Law in Hearing Cases Concerning Rural Land Contracting Disputes (2005), art. 15.

<sup>46</sup> The 1995 Guaranty Law, art. 42(3).

<sup>47</sup> Document No. 9 of 2003, art. 14. However, the Document permits such mortgages to be conducted only "in accordance with law," and perhaps should be interpreted as permitting that is, apparently

<sup>48</sup> The Trial Measure Registration of Forest Resources Assets (2004), arts. 8, 9(3) and 9(6).

<sup>49</sup> The 1998 Forest Law, art. 3.

<sup>50</sup> Id.

<sup>51</sup> The Measure of Forest and Forestland Rights Registration (2000).

<sup>52</sup> Id. art. 11.

<sup>53</sup> Id. art. 16. In contrast, there is no parallel legal requirement for arable land certificate. As a result, arable land certificates do not have a nationwide uniform design, leading to wide variances in contents and formalities of the certificate, including provisions that directly violate existing laws on arable land. See Keliang Zhu et al,

The Rural Land Question in China: Analysis and Recommendations Based on a 17-Province Survey in 2005, NEW YORK UNIVERSITY JOURNAL OF INTERNATIONAL LAW & POLITICS, Vol 38 (November 2006) (results of a survey covering 17 major agricultural provinces conducted by RDI in cooperation with Renmin University of China and Michigan State University).

<sup>54</sup> The 1998 Forest Law, art. 29.

<sup>55</sup> The 1998 Forest Law, art. 30.

<sup>56</sup> The 1998 Forest Law, art. 32.

<sup>57</sup> See news report at <http://www.wzforestry.gov.cn/Article/ShowArticle.asp?ArticleID=338>.

<sup>58</sup> OPINION ON FOREST LOGGING QUOTA FOR VARIOUS REGIONS DURING THE ELEVENTH FIVE-YEAR PERIOD (State Forestry Administration, or “SFA”, 2005).

<sup>59</sup> NOTICE ON THE ADJUSTMENT OF PLANTED TIMBER FOREST LOGGING MANAGEMENT POLICIES (SFA, 2002).

<sup>60</sup> Article 33 of the IMPLEMENTATION REGULATION ON FORESTRY LAW. (State Council, 2000).

<sup>61</sup> OPINION ON IMPROVING COMMERCIAL TIMBER FOREST LOGGING MANAGEMENT (SFA, 2003)

<sup>62</sup> The 1998 Forest Law, art. 17.

<sup>63</sup> “The United Nations Framework Convention on Climate Change,” [http://unfccc.int/essential\\_background/convention/items/2627.php](http://unfccc.int/essential_background/convention/items/2627.php) (last visited Jan. 7, 2010).

<sup>64</sup> “Kyoto Protocol,” [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php) (last visited Jan. 7, 2010).

<sup>65</sup> “Emissions Trading,” [http://unfccc.int/kyoto\\_protocol/mechanisms/emissions\\_trading/items/2731.php](http://unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php) (last visited Jan. 7, 2010).

<sup>66</sup> “Mechanisms under the Kyoto Protocol,” [http://unfccc.int/kyoto\\_protocol/mechanisms/items/1673.php](http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php) (last visited Jan. 7, 2010).

<sup>67</sup> PointCarbon, Carbon Market Monitor (Jan. 2009), available at <http://www.pointcarbon.com/research/carbon-marketresearch/monitor/1.1034635> (last visited Mar. 10, 2010).

<sup>68</sup> “Mechanisms,” *supra* note 66.

<sup>69</sup> Press Release, Climate Change Secretariat, Clean Development Mechanism Passes 2000th Registered Project Milestone in Less than Two Years (Jan. 6, 2010), available at [http://unfccc.int/files/pressreleases/application/pdf/press\\_release\\_cdm\\_passes\\_2000th\\_registered\\_project.pdf](http://unfccc.int/files/pressreleases/application/pdf/press_release_cdm_passes_2000th_registered_project.pdf).

<sup>70</sup> “CDM Statistics,” <http://cdm.unfccc.int/Statistics/index.html> (last visited Mar. 22, 2010).

<sup>71</sup> Copenhagen Accord, U.N. Framework Convention on Climate Change [UNFCCC], -/CP.15, U.N. Doc. FCCC/CP/2009/L.7 (2009).

<sup>72</sup> (UN-REDD Programme, About REDD, <http://www.un-redd.org/AboutREDD/tabid/582/language/en-US/Default.aspx>.)

<sup>73</sup> *Id.*

<sup>74</sup> Charlie Parker et al., Global Canopy, The Little REDD Book at 13 (2009).

<sup>75</sup> “REDD-plus” is distinguished from “REDD” by its inclusion of “enhancement of carbon stocks” as an additional objective.

<sup>76</sup> (UNFCCC Copenhagen Agreement, Dec. 18, 2009, UN doc. FCCC/CP/2009/L.7, pars. 6, 8.)

<sup>77</sup> Copenhagen Agreement, pars. 8, 10.

<sup>78</sup> See generally James Salzman, Creating Markets for Ecosystem Services: Notes from the Field, NEW YORK UNIVERSITY LAW REVIEW, Vol 80 at p870 (2005); Stefano Pagiola, Agustin Arcenas and Gunars Platais, Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America, WORLD DEVELOPMENT, Volume 33, Issue 2, February 2005, Pages 237-253.

<sup>79</sup> *Id.* See also Perrot-Maitre, D. (2006) The Vittel payments for ecosystem services: a “perfect” PES case? INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, London, UK.

<sup>80</sup> The total size of the forestland is based on the official report of the SFA in 2010 (available at <http://www.forestry.gov.cn/portal/main/s/65/content-326341.html>). The percentage of collectively owned forestland is according to an SFA's nationwide forest resources survey completed in 2003 (data available at <http://finance.sina.com.cn/g/20050704/1512175179.shtml>).

<sup>81</sup> Understandably, the determination of the amount of total carbon sequestration is not exact science. See Fang Jingyun, Guo Zhaodi, et al, Calculation of Carbon Amount for Land-covering Trees and Vegetation in China During 1981-2000, CHINA SCIENCES: EARTH SCIENCES, Vol 37(6), p804-812 (2007).

<sup>82</sup> SFA, News Report on SFA Press Conference on November 6, 2009, available online at [http://www.cnr.cn/all-news/200911/t20091106\\_505587425.html](http://www.cnr.cn/all-news/200911/t20091106_505587425.html).

<sup>83</sup> Id. See also Jia Zhibang (Director General of SFA), Speech at National Forestry Division and Bureau Directors Conference, Jan. 21, 2010, available online at <http://www.forestry.gov.cn/ZtAction.do?dispatch=content&id=335236&zName=2010tjhy>.

<sup>84</sup> See article 24-27 of the Implementation Regulation of Forestry Law (2000). See SFA, Annual Report on National Greening Status in 2007, (March 12, 2008). See also Article 11 of the 1998 Forestry Law.

<sup>85</sup> See speech by Jia Zhibang, *supra* note 83.

<sup>86</sup> Id.

<sup>87</sup> Li Yucai (Deputy Director General of SFA), Speech at Grains for Green Field Experiences Exchange Conference (2002). <http://tghl.forestry.gov.cn/portal/tghl/s/936/content-200292.html>. See Regulation on Grains for Green Program, promulgated by the State Council in December 2002.

<sup>88</sup> Gu Zhongyang & He Lu, Ten-year's Grains for Green Program Benefits 124 Million Farmers and Reforested More than 400 Million Mu, PEOPLE'S DAILY, Sept. 17, 2009. Among the 26.9 million hectares of new forest, 9.3 million hectares comes from conversion of arable land, 15.8 million hectares from afforestation of waste land or mountain, and 1.8 million hectares from hillside closure and cultivation.

<sup>89</sup> Ding Wenjie, China Completes Grains for Green Program for 364 Million Mu and Affected Farmers' Subsidy Will be Extended, YUNNAN DAILY (Aug. 26, 2007). <http://news.sina.com.cn/c/2007-08-26/092312451953s.shtml>.

<sup>90</sup> Id.

<sup>91</sup> Articles 15, 16 and 23 of the Regulation on Grains for Green Program, promulgated by the State Council in December 2002.

<sup>92</sup> See Gu Zhongyang, *supra* note 88.

<sup>93</sup> Article 16, State Council, Opinions on Improving Measures regarding Grains for Green Program, April 11, 2002; Ministry of Finance, Method on Cash Subsidy Management of Grains for Green Program, Nov. 6, 2002.

<sup>94</sup> Article 10, Opinions on Improving Measures regarding Grains for Green Program.

<sup>95</sup> Article 4, State Council, Notice on Improving Grains for Green Program, Aug. 9, 2007.

<sup>96</sup> Id.

<sup>97</sup> Wang Lei, "Study on Compensation Standard and Period of Converting Farmland to Forest in the Perspective of Incomplete Property Rights," Ecological Economy (China), vol. 215 (2009), p159.

<sup>98</sup> The Grain for Green program does not involve physical taking of the land by government, but the restrictive and compulsory program has deprived farmers of all economically viable use of the converted land. Although not widely known in China, this may constitute a compensable "regulatory taking" under the law of many other countries such as the U.S. If we apply such a rationale, the present compensation levels for the Grain for Green program will most likely fall short of the standards for compulsory land takings as provided by present Chinese law including the 1998 Land Management Law and 2007 Property Law.

<sup>99</sup> Xu Jintao et al., "China's Ecological Rehabilitation: Unprecedented Efforts, Dramatic Impacts, and Requisite Policies," 57 ECOLOGICAL ECONOMICS 595, 605 (2006).



<sup>100</sup> SFA, National Planning Commission, et al, Notice on Carrying Out Natural Forest Protection Program in Priority State-owned Forest Areas in Yangtze River Upper Region, Yellow River Upper & Middle Region, Northeastern Region and Inner Mongolia, 2000; SFA, Management Regulations on Natural Forest Protection, May 2001.

<sup>101</sup> Lei Jiafu (Deputy Director General of SFA), speech made at National NFPP Field Conference held in Lijiang, Yunnan (2007 11 20).

<sup>102</sup> SFA, Notice on Drafting Implementation Plans on Natural Forest Protection Project Counties (Bureaus), 2007 2 8. See also Classification and Designation Method of Public-interest Forests, promulgated by SFA in March 2001.

<sup>103</sup> For the government data on the amount of NFPP forestland, it appears that wetland, shrub land and even waste land within ecologically sensitive regions are counted as “forestland”. Thus the total size of “forestland” for the purpose of the NFPP – currently counted as 285 million hectares – is much larger than the size of the real forestland which is 195 million hectares based on the most recent SFA data.

<sup>104</sup> Yao Changyi, Liu Jinfu, et al, Field Research Report on Regional Policies regarding Payment for Forest Ecosystem Services, published by Development Planning & Financial Management Division of SFA, 2008, available online at <http://www.gzf.gov.cn/info.asp?Newid=2416>.

<sup>105</sup> Id.

<sup>106</sup> PEOPLE’S DAILY, “Implementing the NFPP and Pushing Fundamental Reforms of the Forestry Sector,” Oct. 14, 2002, available at <http://www.envir.gov.cn/info/2002/10/1014026.htm>.

<sup>107</sup> BEIJING YOUTH DAILY, “SFA Boasts Annual Reforestation Achievements Exceeding more than 1% of the Country’s Territory,” Jan. 14, 2004, available at <http://www.ahnw.gov.cn/2006nwkw/html/200401/%7B6DBD2EAA-2B91-4067-A6F2-97461B1EA762%7D.shtml>.

<sup>108</sup> Ministry of Finance & SFA, Central Management Method of Subsidy Funds for Forestry Ecological Service Programs, Oct. 21, 2004.

<sup>109</sup> Article 4 of Id.

<sup>110</sup> Article 4, Central Management Method of Subsidy Funds for Forestry Ecological Service Programs, issued by Ministry of Finance & SFA in 2010.

<sup>111</sup> Xu Wei, Analysis of the NFPP Impact on Sichuan Rural Communities, REFORM OF ECONOMIC SYSTEM (China), Vol 1, 2001. p45-50; Qiao Rongfeng, Gao Jinyun & Zhang Anlu, Effect and Policy Suggestions of the NFPP on Affected Farmers’ Income in Hubei, Sichuan & Chongqing, RESEARCH OF AGRICULTURAL MODERNIZATION (China), vol 27(1), p40-43, 2006.

<sup>112</sup> Qi Xinmin, Wan Delu & Li Shixiu, Problems and Solutions for the Implementation of the NFPP in Collectively-owned Forestland in Guizhou, JOURNAL OF MOUNTAIN AGRICULTURE & BIOLOGY (China), vol 22(4), p339-344, 2003; Yang Lidian, A Case Study of Taijiang County of Guizhou Province regarding the NFPP and Payment for Ecological Services, JOURNAL OF MOUNTAIN AGRICULTURE & BIOLOGY (China), vol 23(2), p158-163, 2004.

<sup>113</sup> For example, the U.S. Supreme Court ruled that a legislative act that proscribed building on property within certain coastal zones deprived the owner of all economically viable use and therefore constituted a compensable regulatory taking, *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992).

<sup>114</sup> See generally, Wang Quandian, Policy Mechanisms and Compensation Standards regarding Public-interest Forests and Payment for Ecological Services, ZHENG FA LUN CONG (China), vol 2, April, 2008; Gui Ladan & Zhang Weiqiang, Policy Analysis of the Compensation System for Ecological Forests in Guangdong Province, NORTH-WEST POPULATION (China), vol 28(4), p54-57, 2007.

<sup>115</sup> UNFCCC, “Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol” and “CLEAN DEVELOPMENT MECHANISM GUIDELINES FOR COMPLETING THE CDM A/R FORMS FOR: THE PROJECT DESIGN DOCUMENT (CDM-AR-PDD) And THE PROPOSED NEW BASELINE AND MONITORING METHODOLOGY (CDM-AR-NM),” available at <http://unfccc>.

int/files/meetings/cop\_11/application/pdf/cmp1\_19\_modalities\_and\_procedures\_afforestation\_reforestat.pdf and <http://wetcarbon.com/docs/cdm-2008-pdd-guidelines-for-ar-version9.pdf>.

<sup>116</sup> Shao Zhen, Policy Research on Forestry Carbon Sequestration in China, SHANDONG FORESTRY SCIENCE & TECHNOLOGY (China), vol 4 of 2007, p87.

<sup>117</sup> Ma Guizhen, Discussion on the Development of Forestry Carbon Projects under the Clean Development Mechanism, JOURNAL OF SOUTHWEST FORESTRY COLLEGE, vol 28(4), p21, 2008.

<sup>118</sup> Gong, Yazhen, et al., Participation in the world's first clean development mechanism forest project: The role of property rights, social capital and contractual rules, ECOLOGICAL ECONOMICS (2010), p5-6.

<sup>119</sup> Li Guojin, Forestry Carbon in Yunnan, YUNNAN FORESTRY (China), vol 28(3), 2007, p17-18. See also Tengchong Conservation Carbon Project list at [http://www.carbonfund.org/site/projects/profile/teng\\_chong/](http://www.carbonfund.org/site/projects/profile/teng_chong/).

<sup>120</sup> Ma Guizhen, Discussion on the Development of Forestry Carbon Projects under the Clean Development Mechanism, JOURNAL OF SOUTHWEST FORESTRY COLLEGE, vol 28(4), p21, 2008; CHINA ECONOMIC DAILY, "The Benefits and Bottlenecks of Forestry Carbon Projects in China," Dec. 27, 2009. [http://www.citex.org.cn/news/2009/1217/article\\_12288\\_1.html](http://www.citex.org.cn/news/2009/1217/article_12288_1.html).

<sup>121</sup> Wu Shuhong, Zhang Xiaoquan & Li Junqing, Analysis on the Value and Risks of CERs from CDM Afforestation and Reforestation, JOURNAL OF NORTHEAST FORESTRY UNIVERSITY (China), vol 33 supp., Aug, 2005, p95-97; Lin Derong & Li Zhiyong, Policy Study of CDM Forestry Carbon-sink Projects in China, WORLD FORESTRY RESEARCH, vol 19(4), Aug, 2006, p52-56.

<sup>122</sup> Food & Agriculture Organization, Climate Change, Bioenergy and Land Tenure, Technical Background Paper, June 2008, p44.

<sup>123</sup> Sarah Lim & Renee Giskes, Carbon Commodities on Leasehold Land Under the Natural Resources and Other Legislation Amendment Bill 2004 (research Brief No. 2004/03), Australian Queensland Paliamentary Library (2004), at 6.

<sup>124</sup> Steven Kennett, Arlene Kwasniak, et al, Property Rights and Legal Framework for Carbon Sequestration on Agricultural Land, OTTAWA LAW REVIEW, vol 37(2), 2005-2006, p206.

<sup>125</sup> Spike Boydell, et al, Carbon Property Rights in Context, ENVIRONMENTAL PRACTICE, vol 11(2), June 2009, p108.

<sup>126</sup> David Takacs, Conservation International, Forest Cargon – Law and Property Rights 29 (Nov. 2009), available at [http://www.conservation.org/Documents/CI\\_Climate\\_Forest-Carbon\\_Law-Property-Rights\\_Takacs\\_Nov09.pdf](http://www.conservation.org/Documents/CI_Climate_Forest-Carbon_Law-Property-Rights_Takacs_Nov09.pdf).

<sup>127</sup> Kennett, p207, supra note 124.

<sup>128</sup> Australian Greenhouse Office, Planning Forest Sink Projects: A Guide to Legal, Taxation and Contractual Issues, Commonwealth of Australia government report, 2005, p12, available at <http://www.climatechange.gov.au/land/forestsinks-planning.html> ~accessed May 12, 2008!.

<sup>129</sup> Manning, A. 2007. The Countdown Is on the Chop Down a Tree Civil Disobedience Campaign: Extract from an Interview with Alistair McRoberts of the Commonwealth Property Protection Association. On 2WPR ABC Western Plains NSW Dubbo Rural Report with Alison Manning. Australia, May 30, 2007. See <http://www.abc.net.au/rn/breakfast/stories/2007/1937240.htm>.

<sup>130</sup> "Easement" is typically a non-possessory interest, under common law, to use real property in possession of another person for a stated purpose – for example, party A has the right to enter Party B's land to remove and collect seasonal fruit.

<sup>131</sup> Kennett, p200-202, supra note 124.

<sup>132</sup> Kennett, p201-202, supra note 124.

<sup>133</sup> Central Committee of CCP and State Council, Opinions on the Comprehensive Reform of Collective Forestland Tenure, June 8, 2008.

<sup>134</sup> See news report available at [http://www.china.com.cn/news/2008-07/22/content\\_16048508.htm](http://www.china.com.cn/news/2008-07/22/content_16048508.htm).

<sup>135</sup> Art. 32 of the 2002 Rural Land Contracting Law.

<sup>136</sup> Article 27 of the Forest Law.

<sup>137</sup> Article 12 of the Dispute Resolution Method on Forestland and Forests Rights, SFA, Oct. 1996.

<sup>138</sup> See 2008 Central Policy Directive, *supra* note 133.

<sup>139</sup> Introducing more layers of rights over forestland, trees and carbon is not an appealing option in other country settings as well. When discussing the difficulty on how to reconcile public ownership of forestland with private rights on carbon, one scholar commented: “if the state is to grant private property rights in carbon, such action raises important conceptual difficulties within a public or common-property regime. It creates a situation whereby the owner of superior property rights over the private land property holds the vegetation in which another party holds rights to the carbon credits over the vegetation that is being sequestered or, in the absence of alienation, held by the state as trustee for the public.” See Boydell, p110, *supra* note 121.

<sup>140</sup> Peskett, L. and Harkin, Z, Risk and Responsibility in Reduced Emissions from Deforestation and Degradation, FORESTRY BRIEFING 15, Overseas Development Institute, London, 2007.

<sup>141</sup> White A and Martin A, Who Owns the World’s Forests? Forest Tenure and Public Forests in Transition, 2002, p22; see also Global Forest Leaders Forum, Tenure, Property and Carbon Rights, available at [http://environment.yale.edu/tfd/uploads/GFLF\\_Background\\_Paper\\_on\\_Tenure\\_-\\_English.pdf](http://environment.yale.edu/tfd/uploads/GFLF_Background_Paper_on_Tenure_-_English.pdf).

<sup>142</sup> Brent Swallow, et al, Localizing Demand & Supply of Environmental Services: Interactions with Property Rights, Collective Action and the Welfare of the Poor, CAPRI Working Paper #42, Sept. 2005, p21.

<sup>143</sup> See FAO, p16, *supra* note 118.

<sup>144</sup> Cao Chaoxue & Wen Bing, Institutional Construction of Forest Carbon Sinks Trade in Yunnan Province based on CDM, FOREST INVENTORY AND PLANNING (China), vol 33(4), Aug 2008, p102.

<sup>145</sup> Lin Derong & Li Zhiyong, Policy Study of CDM Forestry Carbon-sink Projects in China, WORLD FORESTRY RESEARCH (China), vol 19(4), Aug. 2006, p55.

<sup>146</sup> Jintao Xu, et al, China’s Forest Land Tenure Reform: Impacts and Implications for Choice, Conservation and Climate Change, Washington: Rights and Resources Initiative, 2010, available at [http://www.rightsandresources.org/publication\\_details.php?publicationID=1403](http://www.rightsandresources.org/publication_details.php?publicationID=1403).

<sup>147</sup> See text in p. 19-20 of this paper. The average annual grain subsidy per capita is \$36 (northern China \$29 and southern China \$43), plus an annual cash subsidy of \$4 per capita, which results in \$40 per affected person.

<sup>148</sup> Many countries have adopted a theory to compensate property owners if a government regulation or program (e.g., zoning) deprives most of the economically viable use of the properties. Under this theory of “regulatory takings”, the property does not suffer a physical dispossession but its economic value is substantially reduced due to the regulation. See the U.S. Supreme Court case *Pa. Coal Co. v. Mahon*, 260 U.S. 393 (1922); see also Gerd Schmidt-Eichstaedt, The Law on Liability for Reduced Property Values Caused by Planning Decisions in the Federal Republic of Germany, WASHINGTON UNIVERSITY GLOBAL STUDIES LAW REVIEW. vol 6, p80 (2007); Thomas Kalbro, Compensation Rights for Reduction in Property Values Due to Planning Decisions in Sweden, WASHINGTON UNIVERSITY GLOBAL STUDIES LAW REVIEW. vol 6, p31 (2007).

<sup>149</sup> Qin Jianming, An Zhimei, et al, Thoughts on the Compensation Standard and Duration under the Grains for Green Program, INNER MONGOLIA FORESTRY INVESTIGATION & DESIGN (China), vol 29(1), March 2009, p20; Wang Quandian, Policy Mechanisms and Compensation Standards regarding Public-interest Forests and Payment for Ecological Services, ZHENG FA LUN CONG (China), vol. 2, April, 2008; Gui Ladan & Zhang Weiqiang, Policy Analysis of the Compensation System for Ecological Forests in Guangdong Province, NORTHWEST POPULATION (China), vol 28(4), p54-57, 2007.

<sup>150</sup> One piece of history is relevant here. In 1982, the World Food Programme of the U.N. invested approximately 20 million U.S. dollars in one of the poorest counties in Ningxia province. The aim was to retain local farmers to

plant trees and grass in the vast areas of waste and barren land in the county. The initial results were more than promising as trees and grass were planted on 104,200 hectares of land, transforming the entire ecological system of this historically barren county as a whole. However, when the project term ended in the mid-1980s, the local government knew nothing about “sustainable management” and failed to provide any incentives, financial or otherwise, to affected farmers to preserve and manage the planted trees and grass. In 1998, the county had only 34,400 hectares of forest- or grass-covered land, a mere one third of the previous record achieved in the 1980s. This unfortunate episode is well known in the development field in China.

<sup>151</sup> Under recent law and policy directives, compensation for land that is being compulsorily taken by government for public purposes is largely based on the average annual yield of the land. In addition to other types of compensation (e.g., for the loss of standing crops or structures), the compensation for the land can go as high as 30 times or more of the average annual yield of the land. See article 47 of the 1998 Land Management Law and article 18 of the State Council’s Decision on Deepening Reform and Tightening Land Management (issued on Oct. 21, 2004, also known as the No. 28 Central Document).



1238 Wisconsin Ave NW, Suite 204  
Washington DC 20007