

Property Rights and Land Degradation in China

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Degradation: causes and effects

The land resources of China have been significantly degraded over the past 50 years.

The area affected by soil erosion is 367 million hectares or around 38 per cent of the nation. Soil losses due to erosion are estimated at around five billion tonnes per annum. Salinity affects a further 100 million hectares (Huang 2000).

The consequences of this degradation are many and varied.

Erosion related soil nutrient loss over the period 1976-89 resulted in a five per cent reduction in grain crop yields (Huang and Rozelle 1995). That is equivalent to 6 million tonnes of grain worth US\$700m. Dust storms resulting from grass and forest land degradation are experienced across the nation (Zou and Zhai, 2004). Sand invasion and dune movement have permanently buried some 670,000 ha of arable land and 2.35 million ha of range land (ADB 2003). Furthermore, dust storms have been found to cause severe health impacts for people especially in urban areas (MacBean, 2007).

Flood frequency increased due to enhanced run-off and because the height of river beds above the flood plain increased with higher sediment loads. Major floods on the Yellow River can impact on 90 million people (Giordano et al 2004) and raising levee banks cost US\$2 billion every 10 years (World Bank 1993).

Around 15-20 per cent of fauna and flora species in the upper reaches of the Yellow River are classified as threatened because of deteriorating environmental conditions (Si 2001).

In sum, the impacts of land degradation in China are both diverse and significant. One estimate by Berry (2003) puts the direct costs of land degradation in the order of US\$7.7 billion per annum with indirect costs approaching US\$31 billion per annum.

While it may be convenient to blame a rising population coupled with a fragile ecosystem (particularly in the western provinces) for the overall trends in resource degradation, this is a superficial diagnosis. More fundamental causes lie in the policy settings of consecutive governments.

From 1949 when Chairman Mao rose to power through to 1978, land in China was owned by the state through the collectives and was managed according to production plans set by the central government. The goal was to achieve self grain sufficiency in order to support the development of heavy industry. Individual farmers had little decision making power, there was an egalitarian distribution of collective income and the state monopolised procurement. Together these forces meant that farmers' incentives to be productive were limited and land and water resources were frequently over-used in order to meet the short term requirements of production plans (Brown and Chen 1999). Furthermore, the centralised decision making process focused on unrealistic production goals without recognition of local resource constraints (Lin and Zhang 1998).

In 1978, consistent with a policy shift toward a more decentralised, market-orientated economy, the Household Responsibility Scheme (HRS) was introduced. The HRS is a village based communal land tenure system in which farmers are assigned land use rights but not rights to the land itself. The land remains under the ownership of the collective. The HRS generated incentives for production efficiency by giving farmers decision making freedom and linking rewards to performance.

However, incentives for land and water resource conservation remained inadequate. Without rights to the land asset, incentives for land conservation are weak. This is especially true in grazing areas where the herd is owned but the pasture is held by the collective. Between 1978 and 1997, China's sheep flock grew from 170 million to 256 million.

Farmers also face insecurity of access to land because of redistributions brought about by changes in family composition and the sovereign risk of land seizure for urbanisation and industrial development (Chen and Davis 1998). Furthermore, few farmers are willing to transfer the land to which they have current access even on a short term lease basis because of the fear of having that land 'adjusted' away from them (Li 2003).

The consequence of this land rights insecurity is that individual farmers have over-exploited the land resources in pursuit of short term gain. There is little incentive to invest in land conservation works or to invest in fixed agricultural infrastructure. Accessing the gains from trade in agricultural land – the transfer of land to more efficient uses and users – has similarly been impeded through the paucity of completely defined and well defended rights.

The policy response

The response of the Chinese Government has come in two directions. First, the recognition that property rights matter in natural resource management has been reflected in the development of new legal and regulatory settings. This approach addresses the fundamental causes of degradation.

The duration of land use rights for agricultural production has been extended to 30 years and for forestry-related activities, 70 years. The Rural Land and Contracting Law of 2002 has prohibited land rearrangements due to family size changes and

established the right to transfer exchange and assign use rights to other households (PRC 2002). The Property Law of 2007, while maintaining state ownership over land, gives individual use rights the same level of protection as afforded state and collective rights (PRC 2007). In 2008, China pushed forward collective forestry land reform under which a household contract system in the management of collective forestry land and ownership of wood was promoted nationwide (PRC 2008). Users of forestry land could transfer, lease or mortgage their land use rights. Most recently, farmers have been permitted to 'transact' land use rights through markets, sometimes in exchange for access to social security when moving to urban areas.

The second form of response addresses the consequences of degradation. In particular, the Chinese Government launched the Conversion of Cropland to Forest and Grassland Program (CCFGP) in 1999. Alternatively known as the Grain for Green Programme or the Sloping Land Conversion Programme, the CCFGP is aimed at reducing the incidence of dust storms and floods as well as increasing biodiversity in the Yellow and Yangtze River Basins through the conversion of steep-sloped and other degraded cropland to forest or perennial grassland. Since 1999, the CCFGP has involved more than 60 million people across 25 provinces and to 2005 had resulted in the conversion of 20.2 million hectares. The CCFGP is a scheme that implicitly acknowledges land rights (even if only use rights) as it provides payments to programme participants.

The other major policy response to address the same issues is the Natural Forest Protection Programme (NFPP). This programme takes the exact opposite stance regarding property rights as it consists of a logging ban akin to a 'regulatory taking' that takes away user rights to forest land holders with modest compensation and in some places even without offering compensation. The NFPP can be seen as a 'command and control' instrument while the CCFGP is a more market based policy (akin to a payment for ecosystem services scheme). The NFPP provides an example of how major land use policy responses in China do not fully espouse the 'property rights paradigm'. By banning logging, the NFPP has the perverse incentive of discouraging the replanting of production forests.

The land use changes achieved through the CCFGP have been stimulated through the state provision of grain, cash and seedlings to participating farmers. To 2005, over 62 million tons of grain, CNY13 billion of cash and CNY20 billion worth of seedlings were distributed (SFA 2000-05). This makes the CCFGP the world's largest land conversion programme outside the US Conservation Reserve Programme (Xu et al 2004).

The policies designed to address the causes of degradation have moved some way to providing farmers with more secure rights over their land uses. However, there remains significant reluctance on the part of the Chinese central government to relinquish state ownership of the land. Hence, the root cause of the problems has not been addressed.

Some have directly questioned whether such a move towards pure private rights in the Chinese context would have an unequivocally positive impact on the land and water resources. For example Jacoby et al (2002) estimate the social benefits that would result from improved investments in land and water due to greater tenure security and

find that these benefits are likely to be small. Likewise, Brandt et al (2002) find that the case for land tenure reform in China may not be as strong as the theory would suggest.

Given this, there is a question of whether the resource productivity gains likely to be achieved through property rights reform are sufficient to justify the transactions costs involved in such a policy shift (Burgess, 2001). However, these doubts are based on inefficiencies resulting from variation in returns to land, and disincentives to invest in land. By further acknowledging that land tenure reform affects household welfare and economic productivity through more complex and dynamic avenues, and in particular through an impact on household migration decisions, one can make an additional argument for property right reform in China (Mullan, Grosjean and Kontoleon, 2008). This logic was the basis of the work by Groom et al (2008) and Grosjean and Kontoleon (2009) discussed below.

Furthermore, the long term effectiveness and efficiency of the remediation policies – particularly the CCFGP – have been questioned.

Policy impacts

Will the land use changes made by farmers under the CCFGP be maintained beyond the expiry of the payments from government? This is an important question to answer in order to assess the effectiveness of the Programme. The most comprehensive evaluation to date of livelihoods with and without the Programme is based on a survey of 400 rural households across four counties in North West China (Xie et al 2006).

The survey shows that the land use changes triggered by the CCFGP have been significant. The cropping land area of the sampled farms fell by 70 per cent with a consequential shift in revenue streams. While crop revenues fell, substitute income was generated not only from the Programme payments but also from livestock, forest and grass products (including a range of fruits) and from off-farm income. Farm cost structures also shifted to reflect the changes in land use.

Overall, the livelihood assessment showed an increase in farm profitability resulting from the conversion. The result was found to be robust even with a 50% fall in the prices received for the “new” forest and grassland products. It is clear why farmers have been so enthusiastic in their support of the CCFGP. Some confidence in the sustainability of the land use changes can be gained from this finding.

To test further the behavioural incentives underpinning the Programme, a sensitivity analysis was conducted to examine specifically the impact of the Programme payments on livelihoods. The results are not altogether clear cut. In some counties, even without the Programme payments, the changes in land use precipitated by the Programme are profitable. In others, they are not. As well as showing that the application of a single rate of payment to farmers for the conversion is inefficient (some would make the changes for lower payments than others), it also points to issues associated with barriers to land use change.

Even though Programme payments were not required to induce land use change in most counties surveyed, the land use changes shown to be profitable were not made

without the payments. This may be because of a lack of capital to help farm households make the transition or a lack of knowledge about the potential of alternative income streams.

Moreover, it is important to note that the land use changes encouraged by the CCFGP involved farmers shifting from short return period annual crops to options such as tree crops that generate income over extended periods. A key reason for farmers to eschew more profitable but slower returning options is the risk that access to the future income stream will be lost. An annual crop requires confidence in land access only of four to six months. An investment in a tree crop requires an extension of that confidence period to between five and 10 years. And security of use rights, even out to 30 years, can be insufficient to promote that confidence.

Groom et al (2008) offer another analysis of the impacts of the CCFGP on rural livelihoods. Instead of assessing income impacts directly they focus on the programme's indirect effects on improving access of surplus on-farm labour to more lucrative off farm employment opportunities. They show how, under certain conditions, the provision of the CCFGP subsidies enables farmers to take on off-farm jobs. In turn this reduces pressures to crop more land. Groom and his colleagues interviewed farmers who had been involved in the CCFGP and those who had not to find out if differing property rights regimes changed off-farm labour migration patterns before and after the programme. They show that incomplete property rights and associated high transactions costs are serious impediments for CCFGP participants to reallocate labour towards more lucrative off-farm activities. Put simply, inadequate property right definition and defence remain important contributors to the vicious circle of inefficient land production processes, poverty and environmental degradation. This work hence lends further support for property right reform as a necessary requirement for the long term sustainability of the CCFGP through the indirect impact of property right reform on off farm migration patterns.

The work by Xie et al (2006) and Groom et al (2008) is useful in gaining a better appreciation of the relative outcomes of the CCFGP. However, the conclusions drawn regarding the reasons why farmers did not make the environmentally improving and more profitable changes in land use without the Program remain mostly conjectural. A further study has developed a way of looking more deeply into these motivations.

The work assessing the CCFGP impacts on livelihoods provides *indirect* evidence on the long term viability of the programmes. In contrast, the analysis of Grosjean and Kontoleon (2009) provides a more *direct* assessment of this issue by directly examining farmer behaviour and motivations affecting the sustainability of the Programme. This was done in two ways.

First, they interviewed 286 Chinese farmers participating in the CCFGP to find out what they would do with their land after the CCFGP finished given two possible scenarios: that the programme was renewed in its current form and that the programme was terminated. The surveyed farmers were also asked about their intentions to take off-farm work under the same two post-CCFGP scenarios.

Farmers' land use and labour decisions were assessed together since they are so closely linked. It was found that property rights have an impact on the long term viability of the CCFGP in three ways:

1. Property rights directly impact on farmers' choices to maintain their reforested land if subsidies are terminated).
2. Secure property rights alleviate farmers' 'use it or lose it' concerns that stop household members from seeking off-farm opportunities.
3. Property rights impact off-farm labour choices *indirectly* through their impact on land use decisions.

Gorsjean and Kontoleon find that if CCFGP subsidies were renewed 63% of farmers would sign up to the program and maintain or increase the extent of their reforested land and 42% would decrease their on-farm labour activities. Under the other scenario whereby subsidies were terminated, only 38% of farmers would continue to maintain their reforested lands while 67% would increase their on-farm labour activities. In exploring the determinants of these decisions the authors consider a series of factors including three type of property rights: tenure security, user rights over type of trees planted and usage of trees, and land rental rights. They find that for current CCFGP participants, a decision on whether to keep their land reforested if the Programme was closed is impacted by user and land rental rights (though not tenure security) and that these impacts were amongst the strongest of all other factors. They further find that whether to keep (or increase) off-farm jobs in the circumstance of a terminated programme depends heavily on tenure security and land rental rights. Lastly, they find strong evidence that the land use decision affects the off-farm labour choice and hence that property rights have an *additional (albeit indirect)* important role to play in promoting the sustainability of the CCFGP.

The policy implications of these findings are clear: property rights must be enhanced in order to increase the likelihood that reforested lands are maintained after the expiry of the CCFGP. Ensuring that households make land use decisions that take into account environmental impacts in a long lasting manner requires broader property right reform, which includes enhanced rental rights and more secure tenure.

The second form of direct analysis undertaken by Grosjean and Kontoleon (2009) investigated the preferences of farmers (both participating and not participating in the first phases of the CCFGP) for alternative CCFGP programmes. Their work uses the Choice Experiment method to assess potential participation in a new CCFGP scheme. Alternative new schemes were described to surveyed farmers in terms of their:

1. direct payments made;
2. revenues available from production;
3. land tenure;
4. rights to exchange; and,
5. likelihood of implementation.

By presenting respondents with an array of possible combinations of the levels these policy option attributes can take, the study was able to infer the participation rates of farmers in the Program under different institutional arrangements.

It was found that increasing the subsidy increases the participation rate. Specifically, if an addition CNY1 was paid per mu, participation would rise by 14 per cent. Allowing farmers the right to plant all of their converted land to commercial tree crops (instead of mandating a proportion of plantings for purely ecological improvement goals) would double current participation rates. Increasing the

confidence with which farmers expect the program to be actually implemented also has a positive impact on participation, although the strength of the effect varies according to past experience with the Programme's administration.

Of particular interest is the impact of property right reform. Both the introduction of full property rights over land and the prohibition of land re-distribution have positive effects on participation. In other words, if the CCFGP was introduced including property right reform, its success would be amplified. Looking at this result another way, the current rates of participation generated by the Programme could be achieved at much lower cost if property right reforms were attached. And in another way, a 50 per cent participation rate could be achieved either by offering a CNY370/mu/annum direct payment without property right reform or with a CNY145/mu/annum payment with property right reform.

The implication from these 'contingent behaviour' results is that significant cost savings could be achieved in securing land use change by changing the property right arrangements to land. This offers clear support to the argument that land use change is dependent on the land rights position. The proposition put by Xie et al (2006) that the failure of farmers to take up profitable alternative land uses in the absence of the Programme's payments is at least partially due to insecurity of property rights is supported.

Conclusions

The Grosjean and Kontoleon (2009) analysis clearly demonstrates that Chinese farmers have a strong aversion for land redistribution and a strong preference for the development of more secure land rights. This finding runs contrary to the concern that land right reform may undermine the function of land as a social safety net and insurance mechanism (Burgess 2001). For that reason, a key concern of Chinese policy makers has been to trade-off the economic and environmental benefits of private property rights against the prospect of opposition from the rural population. In the current economic slow-down and the consequential movement of migrant workers back to rural areas, these concerns are highlighted. However, the contingent behaviour data outlined in this paper show there is no such trade-off. Instead, private property laws offer an opportunity to achieve economic and environmental gain that will be supported by a majority of farmer households.

Together with the livelihood analysis of Xie et al (2008), these findings demonstrate that land degradation is best addressed initially by looking to the key drivers of farmers decisions. Much progress toward the goal of improved land management could be achieved without schemes such as the CCFGP if secure private property rights to land were well defined and defended. It is also clear from both studies that the level of environmental repair achieved by a property rights based approach may not be sufficient to achieve society wide goals. To go further will require a carefully designed scheme of incentive payments to farmers. A 'one-size fits all' type policy such as the CCFGP is very inefficient in this respect. Market based instruments such as auctions in which farmers or aggregates of farmers bid for access to payments in return for proposed environmental enhancing activities offer the prospect of flexibility to ensure cost-effectiveness.

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