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A Review of the Programme for Conversion of Cropland to Forest and Grassland

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1. Background

Deforestation, with subsequent accelerated rates of soil erosion and desertification, is the main immediate bio-physical cause of the increased frequency of flooding and serious sandstorms experienced in recent years in China. The public has paid more and more attention to these problems as their severity has increased. Especially, after the flooding in the Yangtze River Basin in 1998, environmental problems have become of greater concern to the government and the public.

The planting of annual crops and the grazing of livestock on deforested lands with a slope of over 25 degrees have led to accelerated rates of soil erosion in China. China has 6.067 million hectares of steep sloping farmlands of over 25 degrees, most of which is located in the Yangtze River and Yellow River Basins (SFA 2000).

In order to bring soil erosion and frequent flooding under control, the Chinese government initiated the Conversion of Cropland to Forest and Grassland Programme (CCFGP). During a visit to Shaanxi, Sichuan, and Gansu Province from August to October 1999, the former Chinese Premier, Zhu Rongji first articulated the key measures now associated with the policy that is referred to as the Conversion of Cropland to Forest and Grassland Programme (CCFGP):

1. "conversion of cropland to forest and grassland;

2. providing grain to farmers as compensation for their conversion activities;

3. closing off access to mountain areas for greening, and

4. contracting out tasks to individuals." (SFA 2000)

Immediately after the Premier's visit, the CCFGP was initiated in Shaanxi, Sichuan, and Gansu Provinces on a pilot basis.

In January 2000, the CCFGP was incorporated as a part of the Development Project of West China, in Document No.2 of the Chinese People's Council Central Committee and the State Council's Conference on the Development of West China (QREIW 2004). In March 2000, the State Forestry Administration, the former State Development Planning Commission (SDPC), and the Ministry of Finance, authorised by the State Council, issued "Announcement Regarding Pilot for Conversion of Cropland to Forest and Grassland in the Upper Reaches of the Yangtze River and the Upper and Middle Reaches of the Yellow River"(SFA and SDPC 2000). This formally launched the pilot project for the CCFGP.

In March of 2001, the former Premier Zhu's Government Work Report on the Fourth Session of the Ninth National People's Congress stated that: "the Natural Forest Protection Programme, the Conversion of Cropland to Forest and Grassland Programme, the Desertification Combat Project and Grassland Protection Project should be implemented stage by stage according to local conditions, in order to promote the self-rehabilitation capability of ecosystems and to establish a green

ecological barrier in the West of China" (PRC 2001a). In addition, The Congress agreed on the Outline of the 10th Five-Year Plan of the People's Republic of China on National Economy and Social Development, in which the CCFGP was included.

In November 2001, the Central Economic Conference (PRC 2001b) stated that the CCFGP is an important approach to adjusting the nation's agricultural structure and to increasing the incomes of farmers. Because of these features, the Conference directed that the scope of the programme should be expanded and the progress of tree planting on barren mountains and lands should be speeded up.

In January 1, 2002, the CCFGP was formally launched. The scope of the programme was expanded to encompass 25 provinces (autonomous regions or municipalities directly under the Central Government) and the Construction Group in the Xinjiang Autonomous Region. After pilot work of more than two years and the successful initial implementation of the Programme, the State Council issued the "Advice on Improving Policies on Conversion of Cropland to Forest". This document provided some suggestions for improving the CCFGP (State Council 2002a). The "Regulations on the Implementation of the Conversion of Cropland to Forest and Grassland" approved by the State Council in December 2002 provided a legal framework for the implementation of the Programme (State Council 2002b).

2. Programme details

2.1 Structure

There are several types of land eligible for conversion under the CCFGP. First there is land that has severe water-induced soil erosion. Second, steep slope land where degradation threatens the condition of rivers can be converted. Third, lands where desertification threatens are eligible. Fourth, there is land that is of ecological significance yet with low grain yield (State Council 2002b). The process by which land enters into the Programme is one whereby farmers nominate areas they wish to be included. Farmers' applications are vetted according to eligibility under the four categories by the local County Forest Bureau officials.

The main feature of the CCFGP is that the Chinese Government provides free grain and cash payments for participating farmers. The annual grain (that is, unprocessed grain for human consumption) payment made to participants in the Yangtze River Basin and other southern regions is 150 kg per annum per mu of converted land. In the northern regions and in the Yellow River Basin, the payment amounts to 100 kg per annum per mu. The amount of the cash payment is 20 yuan per annum, per mu of cropland converted. The payment of grain and cash for the conversion of cropland to grassland is made for two years whilst for the conversion of cropland to forests comprising commercial species the period of payment is five years, and where forest plantings are defined as being for ecological benefit payments will be made for eight years. The Government considers the payment of grain to be valued at 1.4 yuan per kg. Funds for the CCFGP are provided by the Central Government (State Council 2002a).

The definition of forestry plantings as either for commercial or for ecological protection purposes are set out in the *Technical Measures of the Conversion of*

Cropland to Forest and Grassland Programme (SFA 2001). The definition primarily rests on differences in planting densities in different areas. Tree species used for ecological plantings may also yield commercial gain in order to increase the income available to farmers. However, the density of plantings necessary to qualify as for ecological purposes is higher than commercial densities.

A further component of the CCFGP is the reforestation of land that previously was not used for agricultural production. After farmers have achieved the conversion of existing cropland to forest and grassland, the governments of the counties, villages and towns organize farmers to plant trees in these so-called "barren lands". Again, the species used in the planting of the non-agricultural lands may have commercial value even though they are designated as providing ecological benefits.

The CCFGP focuses on planting trees for ecological benefit, with the proportion of the forest planted for ecological benefit (including plantings on non-agricultural or "barren" lands), being no less than 80% in each county (State Council 2002a).

The Provincial Governments, using funds supplied by the Central Government, provide farmers participating in the CCFGP with saplings to the value of 50 yuan per mu. The grain and cash subsidies are not available for the conversion of steep sloping croplands that have not been contracted out to farmer households or are fallow. However such lands can be afforested as non-agricultural land and will be subsidised with saplings to the value of 50 yuan per mu (State Council 2002a).

Another feature of the CCFGP relates to the payment of agricultural tax. If the payment of grain made under the CCFGP is greater than the average grain output from croplands that have been converted and are subject to the agricultural tax, then the extent of the grain payment is reduced by the amount of the agricultural tax. Otherwise, the government reduces the extent of the agricultural tax on a pro rata basis. The average grain output is computed by taking the average of the outputs of the five years prior to the conversion of the croplands. If the cropland converted is originally non-taxable, the government does not deduct agricultural tax from the amount of grain provided under the CCFGP (State Council 2002a). Whilst this feature is listed in the *Advice on Improving Policies Concerning the Conversion of Cropland to Forest and Grassland Programme*, it has not been implemented due to operational complexities. The Central Government also provides payments to the counties, which have responsibility for implementing the programme and also have a reduction in the amount of agricultural tax revenue they collect (State Council 2002a).

The person who contracts with the village to convert croplands to forest and grassland owns the related use rights. In other words, the farmers who plant trees or grass under the CCGFP in either converted croplands or non-agricultural lands hold the property rights to the trees or grass. The County Government (or a higher authority) issues the tenure certificate after the registration of the land use change as well as the ownership certificate of the trees or grass. The duration of the tenure extends to 70 years (State Council 2002b). Furthermore, the use rights associated with CCFGP plantings can be inherited and/or transferred. At the end of the 70 years, the farmer has the option of continuing the contract over the land.

The Central Government's obligation under the CCFGP is to provide funding for the implementation of the programme, including programme planning, task design and technological support. Local governments undertake the tasks of monitoring and assessment of plantings as well as accepting the funds supplied by the Central Government. The payment of cash and grain is made to farmers only if they pass an annual inspection carried out by the local project implementation office.

Each province has established differing delivery processes for saplings, cash and grain with measures put in place to ensure that payments of cash and grain and the provision of seedlings are only made to bona fide participants of the CCFGP.

2.2 Goals

The duration of the programme is from 2001 to 2010. The programme includes two stages: the first is from 2001 to 2005 and the second is from 2006 to 2010. Whilst 2010 (currently) marks the official cessation of the CCFGP, conversions of lands undertaken in 2010 will continue to attract payment of cash and grain for the eligible period of up to eight years for ecological plantings.

The immediate goals of the CCFGP for the period of the 10th Five Year Plan (from 2001 to 2005), are to assure the conversion from cropping of steep sloping farmlands that are the source of the most severe soil erosion, and to extend the area of afforestation in areas not currently in agricultural production that are suitable for growing trees. The area of forest converted from cropland is planned to be 170 million mu, and the area of afforestation of non-agricultural land is planned to be 200 million mu (including areas planted during the pilot phase from 1999 to 2000). This increase of 370 million mu in forest and grass coverage represents an increase of 3.5 per cent in the project region. The area of land protected from soil erosion is projected under the Plan to reach about 1,000 million mu and the area of land protected from desertification and wind erosion is predicted to be 1,180 million mu. Hence, the initial goals are addressing the protection of fragile environments in the CCFGP regions (PTFDSSD 2003).

The long-term goals of the CCFGP address the period to the end of 2010. By then the area of forest converted from cropland is planned to reach 220 million mu, and the targeted area of afforestation in non-agricultural land is 260 million mu. In general, the goal is to convert all steep sloping farmlands into forest, and to protect all the cropland currently facing severe desertification. This net increase of forest or grass vegetation of 480 million mu amounts to an increases of 4.5 per cent in the project regions. The land protected from soil erosion is planned to reach 1.3 billion mu and the land protected from desertification and wind erosion is projected to reach 1.54 billion mu (PTFDSSD 2003).

The Chinese Government sees the CCFGP as having other goals. Since the implementation of economic reforms, the Chinese economy, especially in the eastern region along the coast, has increased dramatically. Western areas have not grown with the same vigour. The CCFGP is seen as providing a vehicle to increase the well being of the poorer farm-based workers in the less productive of the west (CCICED 2000).

Further goals of the Programme are to optimise the allocation of production factors, adjust rural industrial structure, and promote local economic development. The Programme aims to develop alternative production activities with comparative advantages, which are environmental benign and also have market potential (PTFDSSD 2003).

The CCFGP also embodies social goals. By taking land out of cropping and converting it to lower labour input grazing and agro-forestry systems, the rural labour force is anticipated to fall. This will free labour for re-training and redeployment to city based employment and facilitate the inter-generational shift from rural to urban locations (PTFDSSD 2003).

3. Outcomes to date

From 1999 to 2002, the Programme was conducted in 25 provinces (autonomous regions, or municipalities) and 1580 counties. The total area of afforestation was 6.49 million hectares including 3.02 million hectares of the conversion of cropland to forest, and 3.47 million hectares of afforestation in non-agricultural land. Table 1 displays the composition of the conversions to forest.

Table 1: Cumulative areas of land converted by type of land

Year	Cropland converted (,000 ha)	Non-agricultural land converted (,000 ha)	Total land converted (,000 ha)
2000	328	356	684
2001	405	485	890
2002	2,284	2,627	4,911

The payments made to participating farmers in 1999-2001 amounted to 3.57 million tons of grain and RMB 590 million yuan in cash. Funds for saplings were provided to Provincial Forestry Departments and amounted to RMB 6.39 billion yuan.

Since 1999, the CCGFP has involved more than 100,000 villages, more than 15 million farmer household, and more than 60 million people. The Programme has become the biggest participatory forestry development programme in China. According to a survey of the social economic impacts of the CCFGP in 57 counties conducted in 2002 (SFA 2002), the seeded area and total crop output decreased respectively by 15 per cent and 16 per cent compared to 1998. Over the same period the annual average increase in aggregate output was 6.42 per cent. In the total output value of agriculture, forestry, animal husbandry, and fishery, the proportion of agricultural output value decreased by eight per cent, whilst the proportion of animal husbandry output increased by eight per cent, and the proportion of forestry output increased by two per cent.

There is some evidence that the CCFGP has increased the net incomes of farmers. According to the 2002 rapid assessment survey (SFA 2002), from 1999 to 2002, the payments received by farmers under the Programme (including the money equivalent of the grain subsidies) amounted to RMB241.37 yuan per capita. The contribution of these payments to net income per capita of farmers participating in the programme was, on average, 14 per cent, with the contribution to the net income per capita of farmer households reaching up to 31 per cent for low income households. The programme has also provided rural employment opportunities. For instance, a programme payment of RMB100 yuan can pay for up to four days of afforestation employment. In addition, the implementation of the Programme has seen a transfer of rural labour from agricultural production to seedling raising, planting and management. The number of farmers going off-farm for employment has also increased. In the Programme regions, the proportion of the farm labour force engaging in rural cultivation decreased by an average of five per cent, and the number of farmers employed off-farm increased by 15 per cent.

Such has been the take-up of the CCFGP in the last two years that the Central Government has taken action to reduce the rate at which crop and non-agricultural lands are being converted, particularly to forestry. The Government has however agreed to maintain the overall scale of the Programme up until 2010.

4. Unresolved issues

A number of key issues remain unresolved in regard to the potential of the CCFGP to provide improvements in net social well being for those people directly involved in its application and for the broader Chinese community. These issues focus on the sustainability, cost-effectiveness and the social costs and benefits analysis of the CCFGP. Few studies have so far been conducted into these issues. In the following sub-section, some initial analysis of the unresolved issues is undertaken.

4.1 Sustainability of the Programme

Questions remain regarding the long-term sustainability of the land use changes brought about through the introduction of the CCFGP. The primary issue involved is whether or not the Programme will result in improvements to the livelihoods of the farmers involved. For instance, if farmer livelihoods are reduced as a result of the land use changes – once the payments of grain and cash cease – then it could be expected that farmers will revert to their prior land management strategies.

One of the few studies of the Programme has considered its sustainability. Uchida *et al* (2004) used information gathered from a household survey of Programme participants in Ningxia Autonomous region and Guizhou Province to investigate if farmers are economically better off under the Program in the short run and in the long term. They question the sustainability of the Programme. That conclusion is based on

an analysis of changes in livestock activities, off-farm employment and non-agricultural activities brought about by the Programme (Uchida *et al* 2004).

One factor that is key to any comparison of farmer livelihoods post CCFGP is the level of prices that can be expected by farmers for their CCFGP induced production. Given the scale of plantings of forest trees with commercial value – both in economic and ecological plantings – it can be anticipated that the increase in supply will have a downward impact on market prices. In turn, such price falls will impact on incomes.

The degree to which farmers have taken up the CCFGP gives a strong indication that the extent of the grain and cash payments exceed the likely returns from cropping the converted land. The Western China Forest Grassland Task Force (2003) reports that some farmers are now effectively dependent for their livelihoods on the grain and cash payments. This indicates that whilst the land uses undertaken prior to CCFGP were unsustainable, the new regime of dependency is also unsustainable.

Grain price impacts may also be important unintended consequences of the Programme. Without the government being a buyer in grain markets to supply the CCFGP requirements once the Programme is finished, downward pressures would be felt on the prices of grains in national markets. Hence, with the completion of payments under the Programme, income levels of grain growers may be put under pressure. The CCFGP therefore represents an 'artificial' support in national grain markets that sends price signals to grain growers that there is more real demand for their products than is actually the case.

On the other hand, recent statistics show that there was a sharp decrease in grain production during 1999 to 2003, largely due to the reduction in cropland area brought about because of the Programme. With the decrease of domestic grain production, upward pressure on prices could be expected. This would be a perverse incentive for Programme participants to revert to prior land use practices, if off-farm employment opportunities are not made available to them.

Other forces may work to reduce grain prices at the local level. Such are the levels of cropland conversion in some areas that grain payments are in excess of the capacity of the recipients to consume them. The result is that recipients place their excess grain onto local markets causing local prices to fall with all the consequences that brings including lower incomes for grain growers and disincentives to produce.

This distinction between local and national markets requires trading friction between areas. The extent to which either impact is occurring requires further investigation. However it is clear that national grain prices have risen since the inception of the Programme. This has a clear impact on the cost of implementing the CCFGP and may be one reason why the Central Government has sought to slow down the rate at which conversion is proceeding.

The CCFGP's goal of facilitating rural adjustment – that is to move people away from areas where long run sustainable agricultural systems will not be able to generate employment prospects from the population densities currently living in those areas – is also up for debate. A critical factor in this issue is the capacity of the rest of the Chinese economy to absorb labour freed from unsustainable rural enterprises. This will depend on, amongst factors, the continued growth of the Chinese economy and the capacity of the training system to re-skill those moving from rural areas to the cities. Whilst there is already a strong trend for younger people to make the move from their rural roots, the CCFGP will require an acceleration of this trend.

4.2 Cost-effectiveness of the Programme

Only anecdotal evidence is available as to the extent of the environmental impacts of the CCFGP. However, there is concern that the targeting of the Programme has been poorly directed to achieve the degree of environmental benefits hoped for at the Programme's inception. For instance, farmers' proposals to convert land have been assessed only on broad ecological criteria. Put simply, the environmental returns on the investment in CCFGP may be lower than could have been possible because of poor strategic targeting.

Furthermore, the cost effectiveness of achieving the environmental outcomes is also in doubt. By weighing the environmental benefits (using steepness of slopes as a proxy) of the Programme against the opportunity costs of retiring the cropland, Uchida *et al* found that the Programme fails to target systematically plots with higher slopes and lower opportunity cost, therefore undermines the cost-effectiveness of the Programme (2004). There is no mechanism within the Programme to ensure that the lowest cost suppliers are the ones who are supported to convert. This is because the "exchange rate" between conversion and grain/cash is varied only between two levels across all of China.

A good example of the issues involved here is the predominance of conversion to forestry rather than grassland. With the grain/cash payments made for conversion to grassland being made for two years compared to eight for conversion to forest, the choice is clear for most farmers. This means that areas that would have been - in both ecological and economic efficiency terms – better suited for conversion to grassland have been converted to forestry.

4.3 Social costs and benefits of the Programme

The balance of the social costs and benefits of the CCFGP is not clear. The monetary costs of the Programme are significant given the scale of the land use changes being initiated. The expected benefits of the Programme have not been estimated – and are difficult to do so given that many of them relate to environmental improvements. First,

the extent of the environmental improvements to flow from the CCFGP is uncertain. The scale of the changes underway makes previous experience of dubious worth in predicting the future ecological response. Second, the magnitude of the value that the Chinese people put on the environmental improvements is unknown. Environmental improvements are, in general, normal goods in so far as increasing values are associated with increasing incomes. Whether or not there is sufficient wealth held within the Chinese populace to see the development of non-use values for environmental improvements is yet to be determined. So too is the magnitude of the values held by people directly experiencing the environmental improvements such as less dust in the air and less sediments in rivers.

4.4 Other problems

There may also be some unexpected negative consequences of the CCFGP that have yet to be considered. For instance, conversion of cropland and non-agricultural lands on such a scale as being undertaken under the CCFGP will have impacts on the hydrology of both the Yellow and Yantze Rivers. Falling rates of runoff in the catchments caused by higher vegetative cover and minor engineering works (including the 'scaling' of slopes to trap water around the base of each tree, through to the construction of small dams in badly eroded gullies) will reduce flows downstream. This in turn will have consequences for downstream users who will find their supplies for irrigation, industry and domestic purposes curtailed. Costs will result. Modelling of these impacts and their valuation has yet to be undertaken.

5.Conclusions

The implementation of the CCFGP continues to involve large-scale conversion of land from annual cropping to agro-forestry and grazing. Large tracts of land previously designated as "barren" have also been converted. The majority of conversions have been to forestry, with much of that designated as being for 'ecological' purposes even though farmers have mostly chosen to plant 'ecological' trees that will yield financial returns from the sale of fruit or timber.

Whether or not the CCFGP has been in the best interests of the whole Chinese nation is still to be determined. Concerns regarding the sustainability of farmers' livelihoods after the cessation of the cash/grain payments have been raised. Questions regarding the balance of benefits and costs arising from the Programme also remain open, particularly given the prospects of a number of unintended consequences.

Furthermore, the environmental and economic efficiency of the institutional settings established under the CCFGP are of concern. The 'broad brush' approach taken in the Programme to the setting of the payment rates and the ways in which farmers' applications for support mean that targeting of conversion actions is relatively imprecise and the cost effectiveness of achieving environmental improvements is low.

The goal of the ACIAR funded research project “Land Use Changes in the North West provinces of China” aims to address these three issues.

In the first phase of the project, household surveys will shed light on the question of livelihood impacts. In the second stage, the household analysis will be put into the framework of a benefit cost analysis including estimates of the environmental benefits likely to flow from the CCFGP. Finally an institutional economics analysis will be used to analyse the existing policy and make suggestions as to how improvements may be made.

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