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**'GRAIN FOR GREEN PROGRAMME' IN CHINA: POLICY
MAKING AND IMPLEMENTATION?**

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Executive Summary

1. The Green for Grain (GFG) programme was implemented by the Chinese government starting in 1999 in order to combat deforestation, ecological degradation, over-cultivation of sloping land and soil erosion. It was also designed to reduce rural poverty and increase rural household income.
2. Initiated in 1999, the GFG programme was launched nationwide since 2002. A sum of 151.36 billion Yuan was poured into the programme.
3. In 2007, however, the major part of the programme was suspended except for afforestation of barren land. By the end of 2008, 8.216 million hectares of cropland had been converted to forestland.
4. The GFG programme was mainly located in those areas which are suffered from soil erosion conditions and desertification, with priority given to the western regions of China where the ecosystem is deemed more fragile in light of the importance of territory ecological security.
5. A research team from the China National Forestry Economics and Development Research Centre found that the GFG did indeed change the rural land use pattern, which increased the proportion of forest and grassland to the total land.
6. The programme has made a positive contribution to over 2.5 million rural households' income growth as the higher governmental subsidies they received were higher than the net profits gained from sloping cropland cultivation, which further enhanced the popularity of such a policy.
7. The positive results however have been accompanied by some adverse impacts, mainly enlarging the rural income disparity.
8. Lower-income households obtained the lowest amount from the subsidy whilst the higher-income ones obtained the highest amount of subsidy. Yet, the former occupied the highest proportion and the latter the lowest.

9. However, it is suggested this can be rectified if the government were to increase the income of the lower income households. This will also help with eradicating impoverished, rural districts. Further, the result of afforestation has led to a decline in the need for rural labour.
10. The impact the GFG programme has on grain production varies depending on the respective geographic locations and hence, the programme should be tailored to the specific needs of those regions.
11. A more complete programme ought to be implemented, eradicating the inherent uncertainty in the current approach. Government subsidies should be equivalent to the net profits from agricultural production.
12. One should look beyond the confines of grain production as the sole determinant of whether or not to continue with the programme and instead, consider ecological, economic and social conditions.
13. In areas where safety and livelihoods are at stake, a reintroduction of the programme will be highly necessary while more attention should be paid to alleviating impoverished households and eradicate income disparity.
14. This can be done by strengthening the participation level of the impoverished households through granting them a stronger voice and through removing the dominant household contract policy from the process of afforestation.

'Grain for Green Programme' in China: Policy making and implementation?

Can LIU* and Bin WU[†]

1. China's Green for Grain Program

1.1 China is a mountainous country, with mountains, plateaus and hilly areas making up about 65% of its total land. Ecological degradation has seriously posed socioeconomic development problems in China. It is estimated that areas affected by desertification cover one third of China's territory. Deserts annually swallow up to 2460 square kilometres of land. The existing area of soil erosion in China is 367 million hectares, which accounts for about 38.2% of the territory. Deforestation and forest degradation have exacerbated soil erosion and the loss of biodiversity.

1.2 In the past, the severity of soil erosion in ecologically fragile areas of China was closely related to the rapid growth of the local population and the expansion of over-cultivation in particular. Over-cultivation refers to the transformation of forestland or grassland to farmland on sloping land of more than 15 degrees. According to estimates by the State Forestry Administration in 1998, a total of 25,799 thousand hectares farmland nation-wide were sloping land, of which land sloping more than 25 degrees, and between 15 degrees and 25 degrees, make up 4,400 thousand hectares and 9,316 thousand hectares respectively.

1.3 Deforestation and over-logging have exacerbated soil erosion and the loss of nutrition and biodiversity. This threatens the safety of more than a hundred million Chinese living in the downstream sections of rivers in the eastern coastal region of China. The increasing severity of ecological and environmental degradation was evidenced in 1998 when flooding of the Yangtze River and Songhua and Neijing River Basins affected 25.8 million hectares of land and the livelihoods of 230 million people, killing more than 3000 people. The direct economic damage was estimated at 248.4 billion Yuan. The event was classified as the century's most extraordinary natural calamity.

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- 1.4 Furthermore, the year of 1997 saw the eruption of Southeast Asian financial crisis, which further affected global economic growth. Although China's economy was largely unaffected, Chinese exports did drop. The government therefore had to, by means of expanding its internal demand policies, accelerate China's economic expansion.
- 1.5 Since 1994, the Chinese government has adopted a dual-track tax system which divides financial revenues into central and local government taxes. This has resulted in a significant increase of 20% annual growth in the central government's revenue. This has provided a sound financial base for the GFG programme.
- 1.6 China's grain output in 1998 stood at 512 million tonnes, the highest since 1949, having risen 3.67% from 1997. The country's export of grain stood at 19 million tonnes, with the average price decreasing 4.61% from 1997. Sufficiency of the grain stock has therefore offered a fairly solid foundation on which the Chinese government could implement its policy of farmland conversion to forest and grassland, otherwise known as the "Grain for green programme" (or GFG).
- 1.7 The GFG programme should be understood against the background of a broad effort by the Chinese government to protect and improve its ecological environment. Since the founding of the People's Republic of China, especially the economic reform since 1978, the Chinese government has initiated many afforestation or reforestation programmes targeted at its ecological fragile areas. Since 1998, six Priority Forestry Programmes¹, have been launched, including the GFG. The importance of the GFG can be seen from the amount of total investment spent on it.
- 1.8 Of the total investment of 283.99 billion Yuan on the six Priority Forestry Programmes from 1998 to 2008, the GFG accounted for 151.36 billion Yuan, or 53.3% of the total. Compared with other Priority Forestry Programmes, more importantly, the latter has successfully attracted the participation of over a million rural households and made a positive impact on local economic development and rural income growth. According to the State Forestry Administration, there are 26,840,778 rural households participating in the GFG. Furthermore, the central government has been the main investor of the

¹ Other five forestation programmes include: Natural Forest Protection Program (NFPP), the Desertification Combating Program around Beijing and Tianjin (DCBT), and the Wildlife Conservation and the Nature Reserve Development Program (WCNR).

GFG, with the state's share of the total ranging from 79% to 100% between 1999 to 2008 (see table 1).

1.9 The GFG programme is mainly located in ecological fragile areas of China where over-cultivation on sloping land, ecological degradation and soil erosion are intertwined with mass rural poverty. In this regard, GFG offers a good case to reveal the dynamics of and constraints on sustainable development and poverty alleviation in rural China.

Table 1: Total Investment on GFG programme and the Share of PFPs

Year	The total investment (Million Yuan)	% of the state investment	% of the six PFPs
1999	33.6	100	4.41
2000	154.1	95.16	13.93
2001	314.5	78.99	17.52
2002	1,106.1	95.97	43.24
2003	2,085.6	92.35	62.46
2004	2,142.9	89.63	61.05
2005	2,404.1	90.93	66.48
2006	2,321.4	95.83	65.70
2007	2,084.1	91.91	59.88
2008	2,489.7	88.77	56.94

1.10 This paper will be organised as follows. The next section summarises the progress and achievements of the programme. Part three highlights major impacts on land use, rural income growth and distribution by use based on case studies of 3375 sample households, while part four deals with major constraints or limitations including grain production, prohibition of animal husbandry open feeding, etc. This paper ends with conclusions and policy implications for the next step of the GFG programme and other government intervention projects in China.

2. Process of the GFG Programme

2.1 Since 1949 and in particular, in the 1990s, the Chinese government produced several legislations to prohibit cultivation on sloping land in ecologically fragile areas. In 1991,

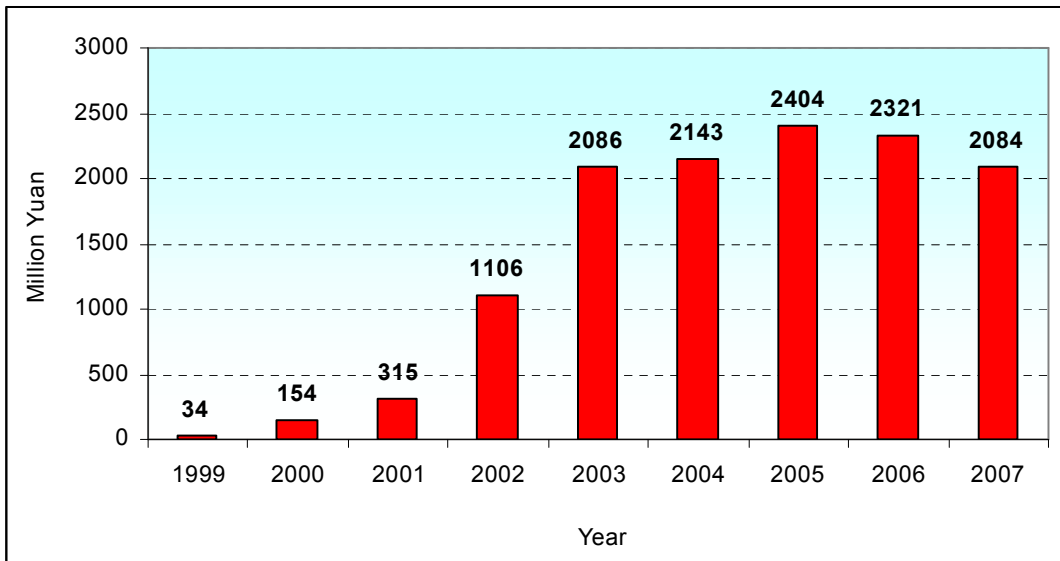
the Water and Soil Conservation Law was issued, which banned any form of cultivation on sloping land above 25 degrees. Since the serious flood in 1998, the Chinese government decided to initiate the GFG programme in three provinces -- Sichuan, Shaanxi and Gansu -- in 1999. In 2002, the programme was formally launched nationwide. In practice, the ratio of afforestation on converted farmland to that on barren land is 1:1. In 2005, the State Council of China had added to the objectives of the GFG programme rural poverty reduction and increase of rural households' income.

2.2 For the purpose of ecological restoration, 80% of converted land had to be planted and covered by ecological forest. As compensation, the central government provided eight years of subsidies to participant households for ecological forest, five years for economic forest and two years for grassland. The annual cash subsidy is 300 Yuan per hectare, and the annual grain subsidy is 1500 kilogramme per hectare in the Yellow River Basin and 2250 kilogramme per hectare in the Yangtze River. In 2007, the State Council of China decided another round of subsidy for the GFG programme. This time, the annual grain subsidy was 750 kilogram per hectare and 1125 kilogrammes per hectare in the Yellow River Basin and Yangtze River Basin respectively. It is worth noting that the subsidy allowance for the GFG has been revised. Before 2004, this allowance was in grain, after 2004, the policy of the grain subsidy was to pay a cash allowance (the conversion rate of grain to cash is 1 kilogramme = 1.4 Yuan).

2.3 Afforestation on converted sloping farmland under the GFG programme has been almost suspended since August 2007 as the Chinese government worries about food security, but afforestation on barren land of GFG programme is still under way. The central government has established a "red line" (or bottom line) for farmland nationwide of not less than 123 million hectares in total. The continuity of the GFG would contribute to the decline of national farmland towards the "red line."

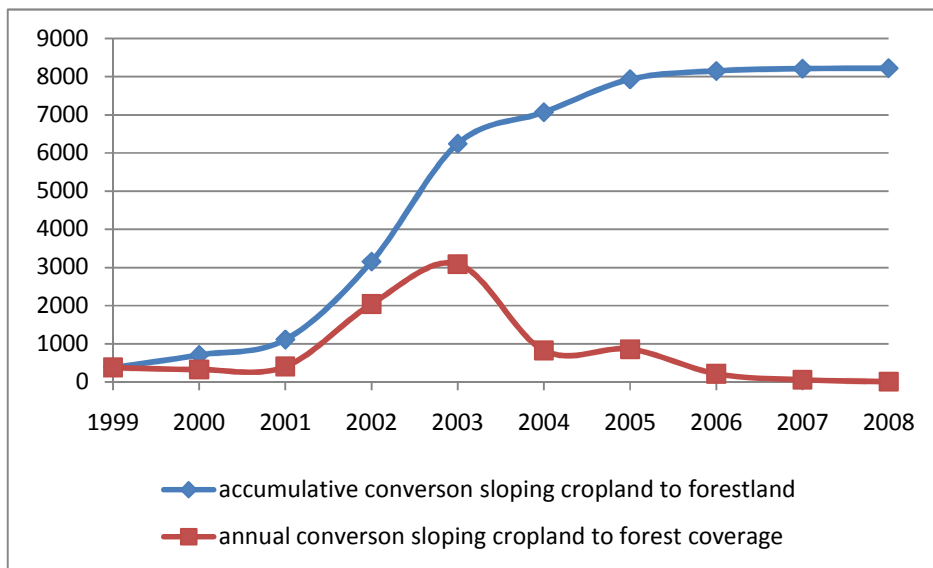
2.4 From the beginning of the programme in 1999 to the end in 2008, the sum of government investment amounted to 151.36 billion Yuan, of which 144.95 billion Yuan or 95.77% was paid to rural households directly. By the end of 2008, there were 26,840,778 households involved in the GFG programme spread over 25 different provinces. Figure 1 illustrates state investment on the GFG programme in the last decade.

Figure 1 Total investment on GFG Programme (million Yuan)



2.5 By the end of 2008, the GFG programme has resulted in afforested areas covering 8.216 million hectares. Figure 2 shows the annual afforested area experiencing a rapid increase from only 0.38 million hectares in 1999 to a peak of 3.08 million hectares in 2003; a rapid decline has followed since 2004.

Figure 2: the Annual Afforested Area under Farmland Conversion to Forestland of the GFG Programme (000' hectares)



2.6 Turning to the details of the GFG programme, the planned area for conversion of sloping cropland to forestland was based upon the distribution of sloping cropland and the area of desertified land. The original objective of the GFG Programme nationwide was 14.67 million hectares from 2001 to 2010. Further to regional considerations, the priority of the Programme has been placed on the western areas of China (including Chongqing, Sichuan, Guizhou, Yunan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang provinces, municipality or autonomous regions) where the ecosystems are fragile.

2.7 According to the original plan of the GFG programme, 14.67 million hectare cropland was to be converted to forestland. By the end of 2008, only 8.22 million hectares had been converted to forestland, or 56.02% of the planned area (see table 1). Of the total, 1.99 million hectares, 5.19 million hectares and 7.49 million hectares of sloping cropland in the West, central China (including Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hunan and Hubei provinces or autonomous regions) and the East of China (including Beijing, Tianjing, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Shandong, Guangdong, Guangxi and Hainan provinces or municipalities) were to be converted to forestland. In reality, only 0.74 million hectares, 2.93 million hectares and 4.54 million hectares in the West, the Centre and the East of China had been converted respectively, or 37.40%, 60.64% and 56.50% by the end of 2008 respectively (see table 1).

Table 1: Planned and completed conversion cropland areas under GFG programme by region (million ha)

Region	Planned	Completed	Completed/planned (%)
Total	14.67	8.22	56.02
the East	1.99	0.74	37.40
the Western	7.49	4.54	60.64
the Center	5.19	2.93	56.50

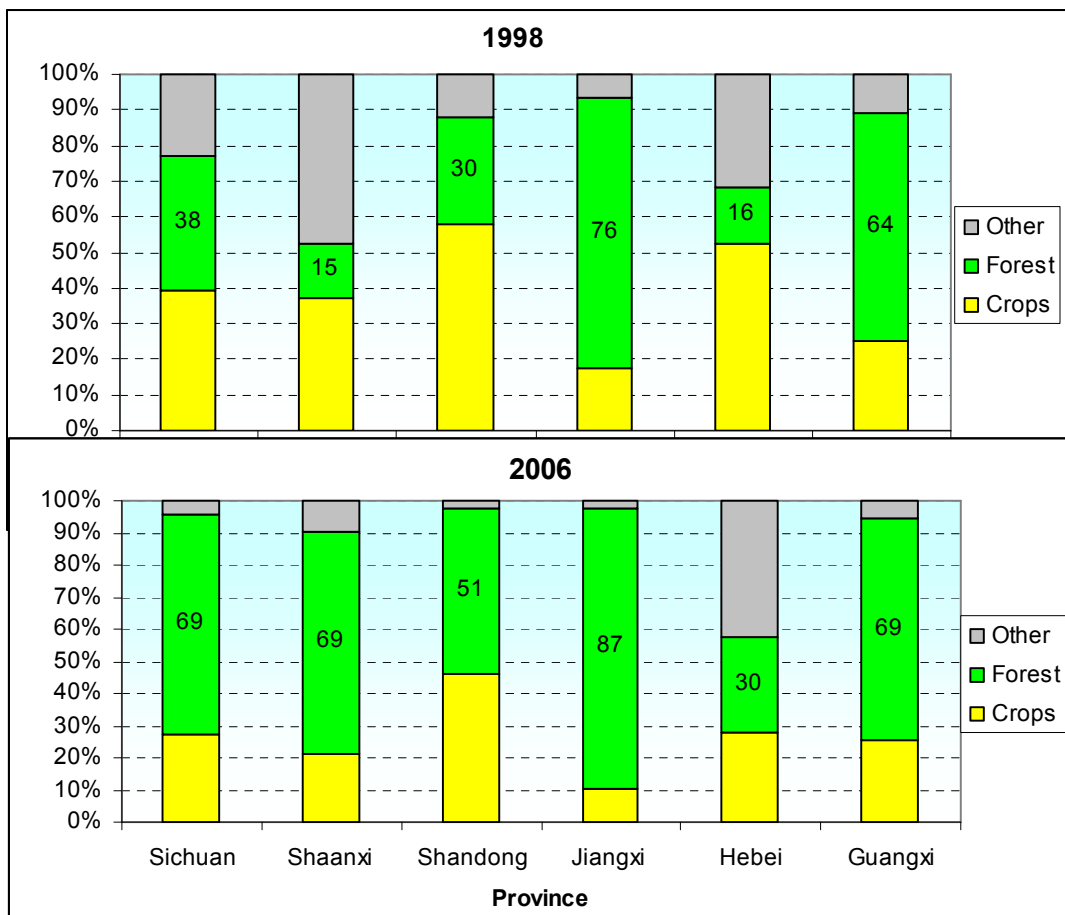
3. The impact of the GFG Programme

3.1 To learn about the progress and consequences of the GFG programme, a large scale survey, sponsored by the Asian Development Bank together with the Ministry of Finance of China, was conducted by the research team of the China National Forestry

Economics and Development Research Centre, in 2004. The longitudinal survey covered a total of 3375 rural households in 216 administrative villages, 72 townships in 15 counties and 6 provinces, which covered Shandong, Guangxi, Hebei, Shaanxi, Jiangxi, and Sichuan provinces. The panel dataset covered 12 years (1995-2006). The rest of this paper will describe the results from the survey in order to assess the impact of the GFG on grain production, rural households' income and land use pattern.

3.2 The most important aim of the GFG programme was to adjust land use pattern to increase the proportion of forest and grass land out of total land. So far, a sum of 8.22 million hectares of sloping farmland has been returned to forest or grassland, accounting for 6.75% of the national arable land. Based upon our sample household survey information, Figure 3 illustrates the change in the sample household land use from 1998 to 2006 in six surveyed province. It shows a big increase in forested land in Shaanxi (54%), Sichuan (31%), and Shandong (21%) respectively.

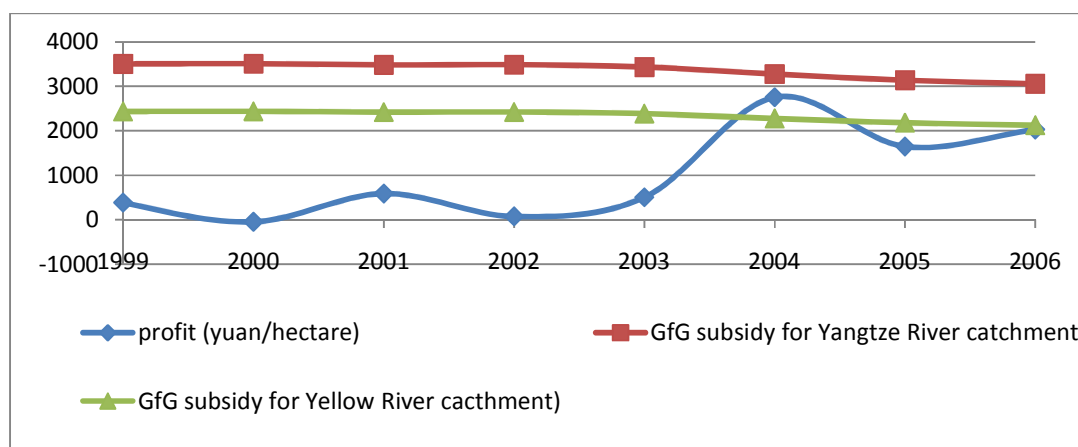
Figure 3: Land use change by case study provinces



3.3 The GFG has received universal appraisal as it has made a positive contribution to rural households' income growth. In particular, rural households who participated in the GFG gained higher net revenue from the government subsidy than from grain production on sloping cropland. Figure 4 illustrates the fluctuation of profits of grain production over nine years and government subsidies for converting farmland to forestland in the Yangtze River Basin and the Yellow River Basin of China respectively. It shows that apart from 2004 when the profits of grain production surpassed the forestation subsidy in the Yellow River Basin, government subsidy for conversion has been higher and has also generated a more stable income compared with grain production.

3.4 Chinese rural households are economically minded and as a result of participating in the GFG, they have received a higher cash and grain subsidy compared with revenue gained from previous grain production on sloping land; consequently, a great deal of zeal has been generated among peasants for participating in this Programme.

Figure 4: Comparison of the profits of grain production and GFG subsidy



3.5 Rural households' participation in the GFG Programme will not only enable them to obtain higher net revenue from government subsidy compared with grain production, but also lead to a decline in the labour demand for land-based activities. This is because the GFG requires much fewer labour inputs than grain production so that rural households can reallocate their labour to off-farm activities or rural-urban migration.

3.6 The allocation of GFG area among rural households is uneven due to different cropland conditions and also variable access to government projects. Figure 5 shows among

sample households in six surveyed provinces the uneven distribution of areas of sloping cropland conversion to forestland. It shows Shaanxi at the top of the six sampled provinces, where on average each household has converted 14 *mu* of sloping cropland to forestland, and has received about 2240 Yuan government subsidy in 2006. By contrast, Hebei Province has less than 12% of sampled households involved in the project.

3.7 The sample taken of these rural households is based on per capita annual income ranked from the highest to the lowest and is divided into five income groups. Figure 6 shows that higher income groups received more subsidies from the government. Consequently, the GFG programme has enlarged the income disparity amongst sample households.

Figure 5: Uneven converted cropland area distribution of GFG by sample Provinces
(mu/household, 1 hectare =15 mu)

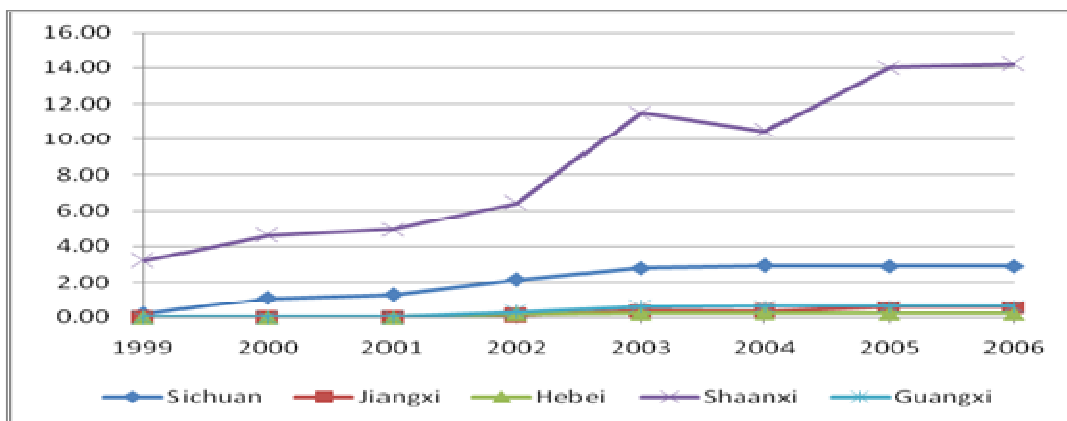
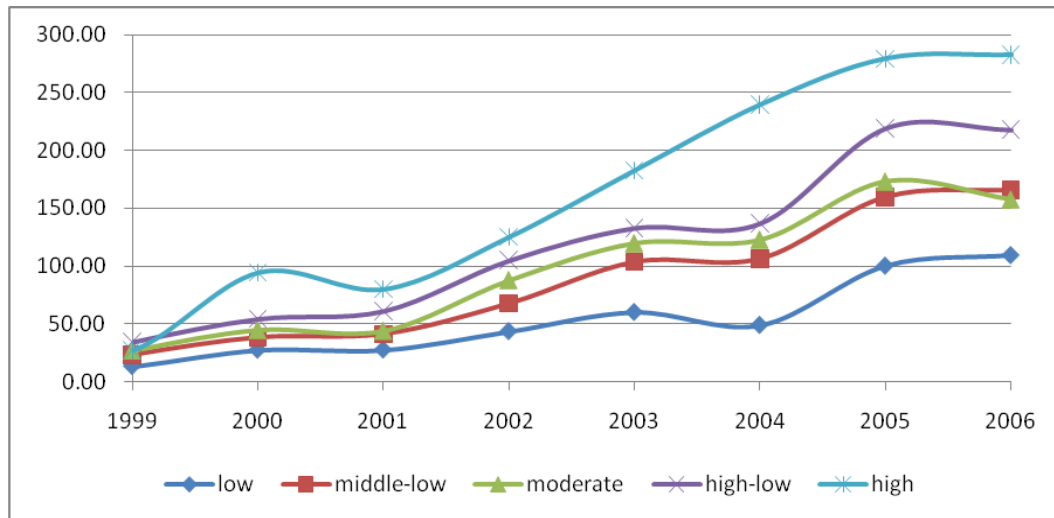


Figure 6: Growth of government subsidies from GFG programme by income group (Yuan per household)

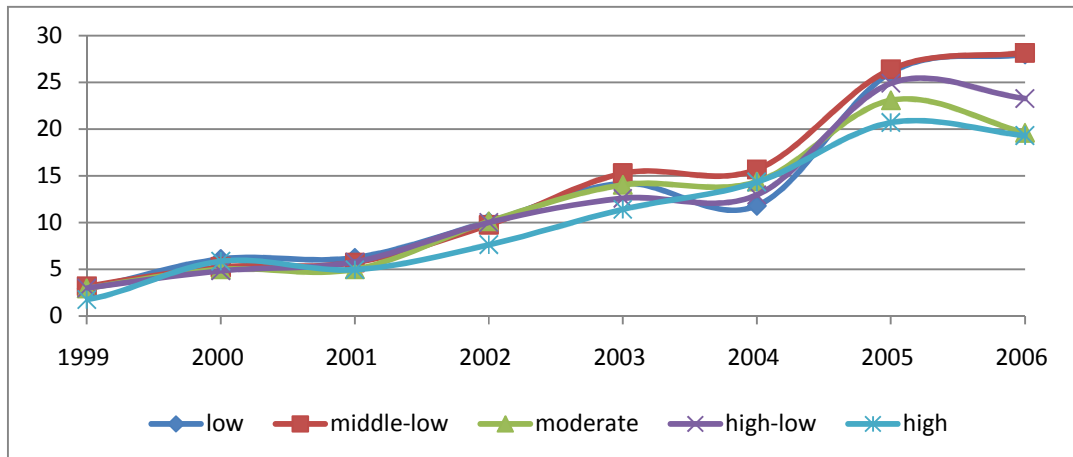


3.8 The increase in income inequality between the recipients of the government subsidy from the GFG programme is related to government policies which allow households that are more able to manage converted cropland to enjoy greater advantages than those who are less able to manage converted cropland in the implementation of the GFG programme.

3.9 With respect to the proportion of government subsidy in the total household income, however, Figure 7 shows a totally different direction compared with Figure 6. Those households receiving a proportionally low income from the GFG programme subsidy make up the highest proportion. Similarly, rural households receiving the highest income from the GFG programme subsidy made up the lowest proportion.

3.10 It seems that the priority of the project participants should be given to the lower income stratum according to Figures 6 and 7. Not only would it be beneficial to poverty alleviation; it is also one of the important objectives of the GFG programme.

Figure 7: Proportion of government subsidy in sample household income (%)



4. GFG programme and grain production in China

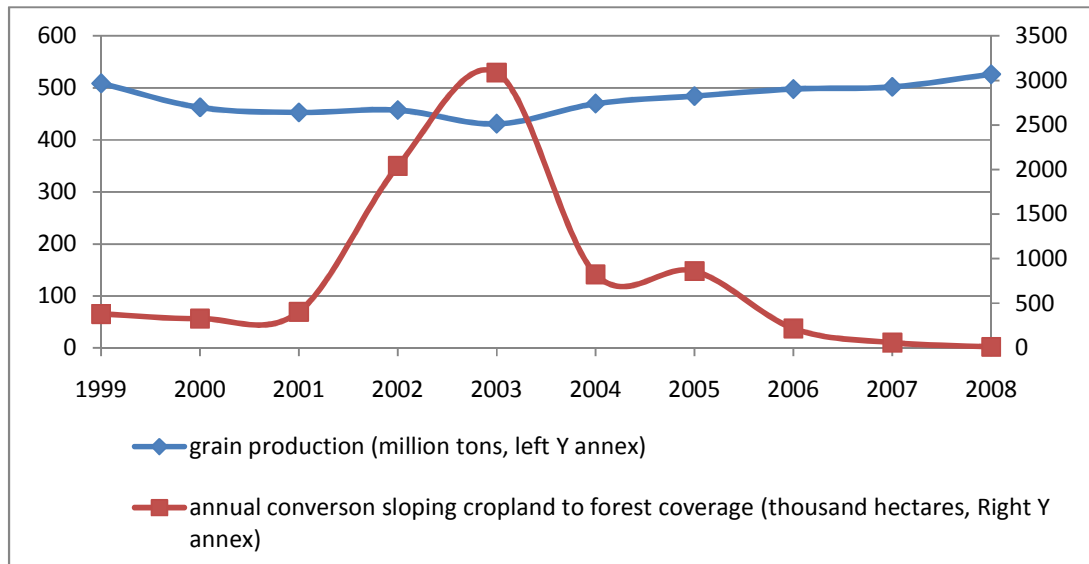
4.1 One of the important driving factors of the GFG programme was the high levels of grain production and stock. The decision to launch the Programme arose in 1998 when China's grain output was at a historical high of 512.3 million tons. Since then, the grain output has fallen continuously, reaching its lowest point at 430.7 million tons in 2003, 15.93% less than the peak output in 1998.

4.2 Worried about food security, the Chinese government has clearly begun to slow the process of converting sloping cropland to forestland and reduce areas that needed to undergo GFG programme since 2003. It has almost ceased converting sloping cropland conversion to forestland in 2007, when the price of grain dramatically soared. Figure 8 shows the correlation between changes in annual sloping cropland conversion to forestland area and grain production in China.

4.3 The key objective of launching the GFG Programme, however, was to improve the ecological environment and in particular, to reduce soil erosion and desertified expansion. While the GFG programme may have had a negative impact on grain production nationwide, its impact varies greatly between geographic locations. It is certainly a big influence in the eastern parts of China where the area of land is smaller and population is bigger, which are key considerations of the GFG programme. The programme has less or no significant impact on grain production in the western part of

China, especially in the northwestern part of China (Qinghai, Xinjiang, Shaanxi, Ningxia and Gansu provinces).

Figure 8 China's grain output and annual converted GFG area by year



4.4 By contrast, the GFG programme has less impact on the grain production in the western region where there is a large share of sloping farmland shown in Table 1 but a small share of grain production (about 18-23% of national grain production). Therefore, the implementation of the forestation programme in the western regions of China has a very small influence on China's total grain production.

5. Toward a More Comprehensive, Participatory, and Empowering Programme

5.1 This paper has attempted to outline China's "Grain for Grain" (GFG) Programme and to reveal its impact on grain production and rural households' income. We have also tried to identify key factors behind government decision making. In light of our analysis, we would like to draw the following conclusions and policy recommendations.

5.2 Firstly, it is necessary to formulate a comprehensive and operational GFG programme. The GFG programme from the beginning was not a comprehensive conception. In other words, the programme was more likely to have been a flexible strategy that needed to be constantly revised throughout implementation. The government, through its direct control of the speed of programme implementation, gave participants and

various other interested individuals a considerable amount of uncertainty. The practice of the programme has already made many people anxious.

5.3 At the initial stages of the process, rural households did not wish to participate in this process. The reason was that they had been worried that the relevant government agencies would not pay them the subsidies. Local governments, in order to complete plans drawn by their superiors, probably had to mobilise village cadres and communist party members to implement the government plan. Once rural householders and local governments recognised the net revenue from implementing the programme, they probably competed with one another or persuaded the central government with regards to the targets set by the GFG programme.

5.4 The current standard of the government subsidy is higher than the real loss from managing the original sloping cropland. In principle, the government subsidy allowance should be more or less equal to the net profits from agricultural production in order to reduce the cost of the government burden and to increase the sustainability of the programme. In this regard, we consider learning from the US' Conservation Reserve Program in which individual farmers submit applications to convert sloping farmland to forest by themselves before the government decides whether they are entitled to be sponsored and how much it is then prepared to subsidise. Instead of the simplified division between the Yellow River Basin and the Yangtze River Basin in the setting the amount of subsidy, it may be worthwhile to consider a set of subsidies standards based upon a division of ecological zones.

5.5 It is necessary to continue with the GFG programme. The question of whether or not to continue cannot be answered by looking simply at grain production output as a single factor. The core objective of GFG is to reduce soil erosion, to improve the ecological environment in ecological fragile regions and to raise the level of homeland security. Therefore, it is necessary to restore the GFG programme in West China not only because it will have little impact on China's grain production and food security, but also because it will greatly aid ecological restoration and poverty alleviation in this region.

5.6 The emphasis of the GFG programme should be given to impoverished households as they receive a much lower income from the programme than rich households. Given

the fact that the rural poor is more dependent upon the income from the land, a moderate increase in the participation level of the impoverished households in the GFG programme could effectively raise their incomes and further alleviate rural poverty. This requires the current policy to cease favouring, or encouraging, resource-rich households rather than poor ones to take more responsibility in the programme. We suggest therefore that the government adopts a measure in place to deal with this and to encourage impoverished rural households to participate in the GFG programme and also to express their opinions about project management.