

# China's Sloping Land Conversion Program: Institutional Innovation or Business as Usual?

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## Abstract

China's Sloping Land Conversion Program (SLCP) is the largest land retirement program in the developing world, with the goal of converting 14.67 million hectares of cropland to forests by 2010 (4.4 million of which is on land with slopes greater than 25 degrees) and an additional "soft" goal of afforesting a roughly equal area of wasteland by 2010 (WWF, 2003; SFA, 2003). Pending successful completion it could represent a 10-20% increase in China's national forest area and a 10% decrease in current cultivated area (Hyde, Belcher and Xu, 2003; ZGTJNJ, 2001). The program is currently being implemented in more than 2000 counties across 25 provinces in China – a wide area containing huge ecological and economic heterogeneity – and involves the participation of tens of millions of rural households. It has a total budget of RMB 337 billion (over US\$40 billion), around RMB 50 billion of which has been spent so far, and over 7.2 million hectares of cropland has been retired by the end of 2003 (Uchida *et al.*, 2002; Xu and Cao, 2001; Tao, Xu and Xu, 2004). This case study draws upon past research of the program during its pilot phase (1999-2001) as well as a 2003 household and village-level survey conducted by the Center for Chinese Agricultural Policy, CAS, to examine program design, implementation and outcomes to date. Overall, significant problems are observed in design and implementation in terms of the program's predominantly top-down approach and lack of true conditionality, differentiation and mechanisms to ensure permanence. These results suggest that SLCP needs to be redesigned to allow for greater autonomy on the part of rural households, greater local innovation and input, and utilization of market-based mechanisms to improve cost effectiveness and reduce adverse outcomes. Furthermore, policymakers need to recognize that the long-term nature of the environmental services targeted by the program require significant extension of the subsidy lengths, which at present are at most 8 years.

**Keywords:** Payments for Environmental Services Schemes, Afforestation, China.

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## Introduction

Though China's policymakers have long discussed cropland conversion programs, a severe Yellow River drought in 1997 and devastating floods in 1998 in the Yangtze River Basin and Northeast China spurred them to action.<sup>1</sup> Experts generally agree that the severity of the floods were at least partially the result of deforestation in the catchments of rivers in these areas (World Bank 2001; WWF 2003). As such, the central government initiated the Sloping Land Conversion Program in 1999, with particular emphasis on west China. Also known as *Grain for Green*, it is the largest land retirement program in the developing world, with the target of converting around 14.67 million hectares of cropland to forests (4.4 million of which is on land with slopes greater than 25 degrees) and an additional "soft" goal of afforesting a roughly equal area of wasteland by 2010 (WWF, 2003; SFA, 2003). Pending successful completion, it could thus represent a 10-20% increase in China's national forest area and roughly a 10% decrease in current cultivated area (Hyde, Belcher and Xu, 2003; ZGTJNJ, 2001). The program is currently implemented in more than 2000 counties across 25 provinces in China – a wide area containing huge ecological and economic heterogeneity – and involves the participation of tens of millions of rural households. It has a total budget of RMB 337 billion (over US\$40 billion), around RMB 50 billion of which has been spent so far, and over 7.2 million hectares of cropland has been retired by the end of 2003 (Uchida *et al.*, 2002; Xu and Cao, 2001; Tao, Xu and Xu, 2004).

The Sloping Land Conversion Program (SLCP) is distinct from China's other water and soil conservation and forestry programs since it is, on paper, one of the first "payment for

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<sup>1</sup> The Yellow-River experienced an historic 267-day dry-out in 1997 (Xu *et al.*, 2001). The floods during the summer of 1998, which occurred in the Yangtze River Basin and the Songhua and Nen rivers in Northeast China, caused 3,000-4,000 deaths, the loss of around 5 million hectares of crops, and large-scale damage to rural infrastructure (Zhu *et al.*, 2004; CIFOR, 2004).

environmental services” programs in China. Most other large national forestry programs, such as the “Three-Norths” Shelterbelt Program (initiated in the late 1970s) and the Natural Forest Protection Program (initiated in 1998), are directly implemented by either state-owned forest enterprises or by local forest authorities. In contrast, SLCP uses a public payment scheme that directly engages millions of rural households as core agents of project implementation, with the stated principals of voluntarism (SFA, 2003). Thus, insofar as current or future *de facto* program implementation involves decentralized, voluntary grassroots participation, SLCP represents an important departure from “business as usual” in how China manages its forest resources. This case study of SLCP draws from past research of the program during the pilot phase (1999-2001), and uses a 2003 household and village-level survey conducted by the Center for Chinese Agricultural Policy, Chinese Academy of Sciences, to examine program design, implementation and outcomes.<sup>2</sup> It is important to note that in the backdrop of this discussion is significant local variation in implementation of the program. As such, I highlight the key forms of implementation and design, while attempting to outline some of the range variation and its importance, where relevant.

## **1. Services and actors**

The SLCP was initiated by the central government in 1999 with the stated environmental goals of reducing water and soil erosion and increasing China’s forest cover and area by retiring steeply sloping and marginal lands from agricultural production. Soil erosion is one of China’s most urgent environmental problems (Huang, 2000). An estimated 2 billion tons of silt is released into the Yangtze and the middle and upper reaches of the Yellow River annually, with around 65% of this coming from deforestation and sloping cropland. Data

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<sup>2</sup> The survey includes data on 360 households and 36 villages.

suggests that west China, with 70% of the approximately 6.07 million ha of agricultural land with slopes greater than 25 degrees, contributes the majority of this (SFA, 2003; WWF, 2003).

Using the terminology of Wunder (2005), the program is a *public scheme*: it is primarily paid for by the central government, with program funds managed by the Ministry of Finance. Insofar as program-targeted environmental services exclusively benefit domestic recipients, the program buyer thus fully represents, in theory, its beneficiaries. However, if completed successfully, the SLCP's future benefits could extend well beyond China's borders; it could result in an increase in current forest area by upwards of 10-20%, have a large impact on domestic timber supply and thus – given China's large and growing footprint in international timber markets – on pressures on the world's forests (Hyde *et al.*, 2002; Sun *et al.*, 2004; Zhu *et al.*, 2004).

In recognition of the need for the program to be incentive-compatible for participants, SLCP also has the stated goals of poverty alleviation and assisting farm households to shift to more sustainable structures of production (SFA, 2003). The program also incorporates the goal – long held by the central government – of afforesting and restoring barren and degraded wasteland and mountainous areas. During the pilot phase, this goal was an explicit requirement of participation, so that farmers retiring cropland were also required to afforest a certain amount of wasteland, often more than the amount of retired cropland, though this appears to have varied significantly by locale (Xu and Cao, 2001; Zuo, 2001). Given protests by participants of the significant labor requirements of this stipulation, the central government has since downgraded this to an optional, though encouraged, goal.

Added to this, Xu *et al.* (2005) argues that an additional hidden aim of the program has been to subsidize the ailing State Grain Bureau. This is one of the more troubling aspects of SLCP, since it appears to have adversely influenced design and implementation. Specifically, the high grain subsidy that is part of program payments (discussed later in the paper) and the purchase of program grain from national stockpiles at RMB 0.4/kg above market prices appear to be program characteristics deliberately introduced to aid the State Grain Bureau, having resulted in a 24.55 million ton draw-down of stocks and an implicit RMB 9.8 billion subsidy by the end of 2003.<sup>3</sup> This, furthermore, could in part have facilitated fast expansion of the program after the pilot phase.

Though significant regional variation exists, environmental service sellers have generally been selected based on whether or not their land falls into program targeted area. As detailed in Zuo (2001), targeting of areas to retire has generally been conducted via a top-down approach, starting with retirement quotas that are distributed from the central government to the provinces, followed by subsequent distribution down through counties, townships and finally to participating villages. As can be seen in Table 1 below, significant variation exists in the 2003 survey sample villages in terms of the degree to which various levels of government are involved in selection of areas to retire and of what to plant on retired land. The selection process is strongly influenced by China's structure of rural government, since only households in participating villages are able to enter the program, and as with many policies in rural China the onus of actual implementation falls to village and township

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<sup>3</sup> The backdrop to this is the central government's failed grain policy during the 1990s, which involved large-scaled grain procurements at above-market prices and a subsequent failed attempt at recentralizing grain markets. This resulted, by 1999, in a State Grain Bureau burdened by severe financial stress and stocks of aging and unsold grain estimated to be equal to China's annual production (Lu, 1998 & 1999).

government, with these serving as the key mediators between the central government and rural households.

**[Table 1]**

Program compliance is defined in terms of the quality, type and survival rates of the trees/grasses planted on the enrolled land, with survival rates being adjusted for regional conditions. During the pilot phase, the stipulated survival rate for the southwestern region was 85% and for the north was 70%. Based on discussions with SFA officials, this has since been revised to a nationwide standard of 75% during full-scale implementation, though *de facto* standards appear subject to significant local interpretation.<sup>4</sup> An additional stipulation during the pilot phase has been that, in conjunction with retirement of cropland, a set proportion of wasteland must also be afforested, though with no survival rate conditions. According the SLCP plan, total retirement of cropland to afforested wasteland is 1:1.2 overall for 2001-2005, with this varying from 1:1 for the Yangtze River Basin region to 1:1.4 for the Yellow River Basin region. For 2006-2010, this increases to 1:1.4 overall, varying from 1:1.2 for the Yangtze River Basin region to 1:1.6 for the Yellow River Basin region (SFA, 2003).<sup>5</sup> Compliance is monitored via a series of inspections conducted by various levels of government. These generally involve frequent inspections by village officials to ensure correct implementation, followed by formal evaluation by township and county governments to determine whether land passes inspection. As shown in Table 1 above, inspection and verification involved both county and township government in all villages in the 2003 survey. Random inspections by county or higher-level government and inspections by SFA officials

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<sup>4</sup> Informal discussions with SFA officials, in fact, have revealed that these current survival rate standards, and other criteria used by the SFA's SLCP Office to categorize program forested area, conflict with those of the SFA's Department of Silviculture and Department of Forest Resources, the two entities generally responsible for managing China's afforestation initiatives.

<sup>5</sup> Zuo (2001) finds that in Inner Mongolia the stipulated proportion of cropland to wasteland afforestation was 1:3 in 2000, and 1:2 in 2001.

are also conducted in some cases (Zuo, 2001; Xu and Cao, 2001).

Zuo (2001) notes that during the pilot phase officials tended to focus on retiring contiguous swaths of land to convert to forests, and generally took into account ecological conservation, watershed services and the types of vegetation appropriate for local conditions when delineating areas for program enrollment. However, case studies during the pilot phase also found that most village and township governments have preferred the easier-to-implement method of simply targeting all steeply sloping cropland in the township rather than conducting targeting based on the conditions of entire catchments, and that in some cases plots closer to roads have been targeted to “showcase” implementation to higher-level authorities (Zuo, 2001; Xu and Cao, 2001). Xu *et al.* (2005) finds that targeting in the 2003 survey sample has generally been determined by plot slope and land quality. However, also evident is that a significant portion of high-quality low-sloping land has also been enrolled under the program in some regions, while high-sloping low-quality land remains in cultivation (Xu *et al.*, 2004).

Since the program plan makes significant allowances for diversity in local implementation, the degree to which compliance and outcomes are linked appears to be strongly contextual. Overall, sanction mechanisms for non-compliance do not appear to be credible, indicating that the program is not truly conditional. As Table 2 below indicates, survival rates of planted trees in many of the townships in the sample fell below those stipulated for subsidy delivery. Furthermore, survey results indicate that low survival rates have generally not resulted in

significant withholding of subsidies.<sup>6</sup> As Zuo (2001) and others have observed during the pilot phase, the main reason for this would appear to be that the dual goals of environmental amelioration and poverty reduction place local leaders in a dilemma; withholding subsidies based on low survival rates can significantly dampen enthusiasm for the program and potentially harm participant welfare, while delivery without adhering to some indicators of compliance encourages poor implementation. Equally troubling is that the evaluation regime predominantly focuses on the direct indicators of implementation – area retired, number of trees planted, survival rates, whether or not funds have been disbursed – and has not looked at the broader picture of the degree to which the program is achieving its environmental goals (Zuo, 2001). Finally, that the program is not truly conditional can be seen in the short length of the subsidy period given the long-term environmental outcomes being targeted (discussed below).

## [Table 2]

### **2. Implementation**

Under SLCP, the State Forestry Administration plans to convert around 14.67 million hectares of cropland, 4.4 million of which is estimated to be on land with slopes of 25 degrees or above (SFA, 2003; WWF, 2003).<sup>7</sup> The plan stipulates that retirement of cropland is to take place until 2010, with the subsidy period extending to 2017. The pilot phase was conducted from 1999-2001, followed by full-scale implementation. The pilot phase began with initial implementation in Shaanxi and Gansu provinces, located at the middle and upper

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<sup>6</sup> As will be seen later, the minimum average shortfall (RMB 480/ha) was found in Chaotian County, Sichuan Province, the county with the second lowest average survival rates of program planted trees in the sample. On the other hand, Yanchuan County in Shaanxi Province has the highest average survival rates in the sample, and yet also has the highest average shortfall in subsidies delivered.

<sup>7</sup> The program also has an additional a “soft” target of afforesting a roughly equivalent amount of denuded mountainous area and wasteland. However, in reality this simply represents a continuation of a longstanding policy.

reaches of the Yellow River Basin, and Sichuan Province, located at the upper reaches of the Yangtze River Basin. By the end of the pilot, SLCP was being implemented in about 27,000 villages across 400 counties in 20 provinces, a total of 1.2 million hectares of cropland had been converted and 0.47 million hectares of barren land afforested (Xu *et al.* 2004; Uchida, Xu and Rozelle 2004). According to internal government reports, upon full implementation in 2002 SLCP was extended to a total of 1897 counties across 25 provinces, and by the end of 2003 the program encompassed over 2000 counties, had converted 7.2 million hectares of cropland and had afforested 4.92 million hectares of barren land (Xu *et al.* 2004).

During the pilot phase an average of 408,000 hectares of cropland was converted per year. Upon full implantation, however, this jumped to 2.9 million hectares per year during 2002-2003, a more than sixfold increase. The number of enrolled counties also jumped significantly, by 374% between the end of 2001 and the end of 2002. Fifteen million farmers entered the program in just the first five years, and leaders have estimated that upon completion it will affect 40-60 million rural households (Uchida *et al.*, 2004; Xu *et al.*, 2004). Zhang *et al.* (2005) finds in a survey of investment projects during 1998-2003 in 2459 sample villages across 6 provinces in China that SLCP is the second most common project being implemented, behind road and bridge investments, at the village level.

Overall, SLCP is envisioned by policy makers as being complementary to its other forest sector policies, which are generally more command-and-control in nature. China's central government has long promoted forest and watershed protection/restoration projects. Under the current policy regime, approved by China's State Council in 2000, SLCP is one of the State Forestry Administration's six major forestry programs (which are a consolidation of a

previous ten programs). The other programs are the Natural Forest Protection Program (aimed at the state forestry sector), the Key Shelterbelt Development Program in north China and the middle and lower reaches of the Yangtze River (aimed at combating desertification and protecting watersheds and coastal regions), the Beijing and Tianjin Sandstorm Source Control Program, the Wildlife Conservation and Nature Reserve Development Program, and the Fast-Growing High-Yield Plantation Development Program (SFA, 2005; Zhu *et al.*, 2004).

The only comparable program to SLCP is the participatory small watershed management engaged in by the Department of Water and Soil Conservation, Ministry of Water Resources, for the past 20 or more years. Similar to SLCP, this has involved the participation of rural households in a framework of integrated watershed management including afforestation/reforestation activities, small dam construction and terracing of land to reduce water erosion. SLCP, thus, represents an important shift of responsibilities for watershed management and restoration from the Ministry of Water Resources to the State Forestry Administration (SFA).

Subsidies for the program have until now been both in cash and in kind. The program stipulates that farmers who convert degraded and highly sloping cropland back to either “ecological forests” (defined by the State Forestry Administration as timber-producing forests), “economic forests” (orchards, or forests with medicinal value) or grassland will be compensated with 1) an annual in-kind subsidy of grain, 2) a cash subsidy, and 3) free seedlings, provided to the farmer at the beginning of the planting period. No formal pre-program analysis of participant opportunity cost was conducted; consideration of

opportunity cost only comes into play in the regional differentiation of the in-kind subsidy. Specifically, based on estimates of average regional grain yields, the annual grain subsidy is set at 2250 kg/ha in the Yangtze River Basin, and 1500 kg/ha in the Yellow River Basin. The cash subsidy is RMB 300/ha of eligible land (US\$36/ha) per year. Both grain and cash subsidies are for 8 years if ecological forests are planted and for 5 years or 2 years if economic forests or grasses are planted, respectively (Xu *et al.*, 2004). As of last year, however, the subsidy structure has generally shifted to provision of seedlings and payments made wholly in cash.<sup>8</sup> Seedling provision for afforestation of cropland and barren wasteland is RMB 750 per hectare (~US\$91). The SLCP plan also states that funds are to be earmarked to provide technical assistance for implementation, with these being determined case by case. Finally, all income derived from the forests and grasslands planted as part of SLCP is to be exempt from taxation (SFA, 2003).

Program payments are quite generous, even by international standards, and over the long term rural households in the localities where SLCP is being implemented will be some of the direct beneficiaries (in addition to the downstream recipients of watershed services) of the future environmental services provided by the program.<sup>9</sup> However, significant questions exist regarding whether or not the program has benefited participants in the short term. Uchida, Xu and Rozelle (2004) present evidence that compensation standards do not adequately account for regional and inter-household production variability, resulting in shortfalls in compensation to participant households in a number of cases. Results from the

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<sup>8</sup> This is due in no small part to the significant draw-down of State Grain Bureau stocks for program subsidies. Generally, the in-kind portion of the subsidy scheme has been monetized using current grain prices of around RMB 1.4/kg.

<sup>9</sup> In monetary terms, annual compensation per hectare in the Yellow River and Yangtze River basins are around 1.9 times and 2.7 times, respectively, average rental payments of the US Conservation Reserve Program, which Heimlich (2003) estimates for 2000 to be US\$45.62/acre/year.

2003 survey data support this. As detailed in Table 3 below, SLCP compensation standards are significantly below 1999 (pre-SLCP) net income of enrolled plots for many participants. In Gansu, this is the case for almost 50% of the participants in the sample, for a total shortfall of RMB 13,139, or an average at the household level of roughly 4% of 1999 net income. Calculation based on all participants in the Gansu sample, in fact, finds a total net loss of RMB 1,525. In Sichuan, compensation standards fell below 1999 net income from enrolled plots for around 29% of participants in the sample, for a total shortfall of RMB 19,439, and in Shaanxi standards were below pre-program income for almost 7% of participants, comprising an average shortfall equal to almost 45% of average 1999 net household income for these households.

**[Table 3]**

More troubling is evidence of significant shortfalls in subsidies actually delivered. Zuo (2001) finds several instances during the pilot phase where full compensation did not reach participating farmers. Xu and Cao (2001) find that in a group of 1026 households, fully 49.5% had received only partial compensation, 8.5% had received only grain and 17.6% had received no compensation at the time of the survey. Fieldwork for the 2003 survey and another survey in Hunan Province also found serious diversion of funds slated for farmer compensation. Uchida, Xu and Rozelle (2004) find that around 24% and 77% of their sample households in Ningxia and Guizhou provinces, respectively, received payments less than pre-program net revenue from the plots. As detailed in Table 4 below, significant shortfalls in compensation received were also observed in the 2003. Furthermore, these shortfalls do not appear to be the results of program lag time or sanctions due to poor implementation, since the maximum average shortfall (RMB 1507.5/ha) was in Yanchuan County, Shaanxi Province, where implementation generally started earliest in the sample and where average survival

rates in the sample were highest, while the minimum (RMB 480/ha) was found in Chaotian County, Sichuan Province, the county with the second lowest average survival rates of program planted trees in the sample.

**[Table 4]**

These shortfalls could in part symptomatic of one of the key obstacles to implementation: poor program budgeting. Shortfalls in some cases have been due to deductions by village government to either pay laborers to plant trees on the farmer's converted land, to cover the costs of seedlings, to pay for other administrative costs, or to pay back-taxes owed by the farmer. In other cases, shortfalls are the result of plots that have been converted but have not yet been fully certified under SLCP (Zuo, 2001; Xu and Cao, 2001). Program coordination, inspection and compensation delivery for millions of plots is burdensome and costly for local governments, and yet the SLCP plan dictates that local governments bear their own implementation costs. The central government has allocated some administrative fees to provincial governments for SLCP implementation since 2002, but these have been insufficient and are often in large part diverted by higher levels before reaching the townships. This is in part due to the greater administrative needs – and therefore shortfalls in required administrative funds – created by the fast expansion of the program, which has in turn led to problems in implementation and subsidy delivery. Examples of this include two different townships in a key project county in Shaanxi Province; in one, half of the participating plots were not inspected and compensated on time. In the other, many participating plots had yet to be inspected even three years after they had entered SLCP, and though the county government recruited 30 additional staff to deal with these problems, manpower has still been far short of that required to inspect some 67 thousand hectares of converted land (Xu *et al.*, 2004).

Anecdotal evidence also suggests that some diversion of funds has been due to rent-seeking opportunities implicit in program design. Though the central government settled on the simplified, two-tier compensation scheme in part to prevent local officials from exploiting their informational advantage by exaggerating estimates of the forgone incomes of converted land so as to inflate their subsidies, local governments have nonetheless found other ways to milk the system by focusing their efforts on increasing their land conversion quotas, either through direct negotiation, or by first overreaching their land conversion quotas and then bargaining for more subsidies.<sup>10</sup> Xu *et al.* (2005), for example, find evidence that villages with connections to local forest bureaus have been able to enroll more land. Such behavior has existed since the beginning of the program, when the three pilot provinces of Sichuan, Shaanxi and Gansu overshot their quotas by more than 100% within 3-4 months. This continued through 2000, when 312 counties initiated land conversions on their own initiative, despite the fact that the central government's plan was to implement the pilot program in only 174 counties. To date, the State Forestry Administration continues to receive numerous requests from local governments asking for higher land conversion quotas.

Perhaps one of the most problematic aspects of implementation has been its primarily top-down approach. As detailed in Table 5 below, only 43% of participants in the 2003 survey indicated that villagers had been consulted by higher level authorities regarding program design and implementation before their village started SLCP. Furthermore, only around 53% of surveyed households felt that they could choose whether or not to participate (61.7% of the

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<sup>10</sup> This type of behavior is a continuing and significant issue in China's local public finance and governance system. It is due, in part, to significant shortfalls in local government finances, especially in less developed regions, due to lack of tax compliance and the decentralization of rural public finances (Wong, 2000).

participants and only 25.9% of non-participants).<sup>11</sup> This ranges from 65.8% of households in Shaanxi, to 45.5% in Sichuan, to only 31% in Gansu Province. Participants felt they had even less choice in terms of how to adjust their structure of production. Only 36% said they could choose what kinds of trees to plant on their enrolled land. And only 34.5% and 29.9% of participant households felt that they could choose which areas and which plots, respectively, to retire. In Gansu Province, these numbers were only 15% and 13%, respectively.

### [Table 5]

These results not only run counter to the program's stated principals of volunteerism, but also suggest that the program is not obtaining the efficiency gains promised by payment for environmental services (PES) programs over traditional command-and-control approaches via use of a market-based, voluntary mechanism of participation (Pagiola *et al.*, 2002). In the case of SLCP, since no bidding mechanism exists to optimally match payer benefits with participant costs, participation should, at minimum, be voluntary. This would improve cost effectiveness by ensuring that households with the lowest opportunity costs participate, and would minimize the possibility that some participants are being compensated less than their opportunity cost. As discussed above, evidence exists that this second, adverse outcome has already occurred.

### 3. Additionality and baseline establishment:

SLCP does indeed provide *de facto* additionality in terms of carbon sequestration, ecosystem services and timber supply, since without it farmers would not have retired the targeted cropland. However, the long-term extent of this is unclear, since it remains to be seen what share of afforested wasteland is viable and what share of retired cropland will be returned to

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<sup>11</sup> These numbers do not change significantly when controlling for eligibility in terms of having sloping land. Fully 88% of the sample has land with slope > 15°, and 76.5% has land with slope > 25°.

cultivation after subsidies stop. As a rough gauge of this, Table 6 below presents the responses of program participants in the 2003 survey to the question of what they will most likely do after the subsidy period ends. Taken at face value, this suggests that at least a fifth of retired cropland (and more than a third in Sichuan Province) will be returned to cultivation upon subsidy period end. This is troubling given the significant expenditures already made on SLCP.

[Table 6]

**4. Permanence, accounting and leakage:**

The only aspect of SLCP design that encourages permanence is the tax exempt status given to farmers on income earned from trees and grassland planted under the program. However, the short lengths of program subsidy periods likely more than offset any positive effects of this tax break. Furthermore, there is nothing in the program design to prevent or reduce leakage. However, to date no research has examined whether or not, and to what degree leakage has occurred.

**5. Differentiation:**

In general, SLCP has been designed with little substantive differentiation. Apart from the two regional regimes and three subsidy lengths detailed above, program stipulations include little else that allows for differentiation across targeted areas and participants such as, for example, bidding mechanisms or a more varied menu of contract choices. Though participant opportunity cost and the provision of environmental services is somewhat implicit in the program's emphasis on sloping and degraded cropland, subsidies do not change based on indicators of environmental services provided such as, for example, plot slope. Implementation to date, furthermore, brings into question the program's stated regional focus on the important Yellow and Yangtze River basins, since by the end of 2003 SLCP was being

implemented in over 2000 counties across 25 provinces.

The degree to which targeting has raised administrative costs appears to depend crucially on local implementation. Xu *et al.* (2005) finds, however, that plot slope and land quality have been important factors in the targeting of plots, and that larger plots are preferentially chosen for retirement. This, combined with emphasis by local governments on retiring contiguous swaths of land, suggests that the targeting mechanism has potentially reduced transaction costs. At the same time, however, such costs could likely be further reduced by allowing for greater autonomy on the part of households in choosing whether or not to participate. Beyond that, introduction of more market-based mechanisms to better align ES provider costs with ES buyer benefits could help to reduce overall program costs and ensure that participants are not being adversely affected by the program.

## **6. Participation of disadvantaged groups:**

In the context of China, where the huge inequalities in rural land distribution seen elsewhere are nonexistent, targeting of small landholders has not been an issue in program design. Uchida *et al.* (2004) and Xu *et al.* (2005) also find little evidence in the 2003 survey that poorer households within the areas where SLCP is being implemented are being predominantly targeted. That said, program emphasis on remote regions with high proportions of sloping and degraded land implicitly targets the poorer rural households in China. For example, four of the six counties in the 2003 survey are nationally designated poor counties. It is likely too early to say what the long-term impact of the program will be on participants and rural households in the locales where SLCP is being implemented. However, both Uchida *et al.* (2004) and Xu *et al.* (2005) – using standard program evaluation

methodologies to examine SLCP impact on participant income using the 2003 survey – find impact on household per capita income to be insignificant, though also find weak evidence that the program has induced participants to shift agricultural production from cropping towards husbandry and other agricultural activities.

Overall, the stated dual goals of poverty alleviation could be adversely affecting the program's environmental efficiency, since it could be allowing local leaders to selectively deemphasize the program's environmental goals when these prove difficult to obtain. In fact, the low survival rate of planted trees and fast rate of expansion with insufficient monitoring and evaluation suggest that if problems in design and implementation are not sufficiently addressed, the program will simply result in a one-off transfer to participants, with few substantive environmental outcomes. It is unclear what side benefits, if any, have resulted from SLCP. Though it is possible that implementation of SLCP has served to stimulate greater discussion at the local level of how best to deal with local resource degradation, such implementation has also been costly and time-consuming for local government.

## **7. Next steps**

At present, the State Forestry Administration appears to be committed towards continuing implementation and expanding enrolled area to eventually reach the goal of 14.67 million hectares as stated in the 2003 plan. SLCP officials, however, have also had to continually adjust program design in response to complaints made by local leaders, forestry officials and participant households.<sup>12</sup> Local forestry authorities have complained about the heavy burden of implementation and monitoring, rural households that have not received subsidies owed

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<sup>12</sup> This includes 1) changing afforestation of wasteland from a required goal during the pilot phase to an optional goal during full implementation, and 2) starting in 2002 to allocate funds to local governments to defray implementation costs.

have been disgruntle, and results from the 2003 survey indicate that many participants feel that the subsidy period is too short. Overall, these issues appear to be the result of insufficient use of the pilot phase to identify and rectify problems in design and implementation, problems that fast-paced expansion has likely only served to exacerbate. However, the government has indicated that it plans to improve the quality of implementation and design. An example of this is a plan to establish processing facilities so that timber from SLCP-planted forests will be a viable source of income for participating households.

Overall, one of the most troubling aspects of SLCP is that, although on paper a PES scheme, in practice it appears to be just another top-down, campaign-style program with little input from local communities and households. The importance of farm households as the key long-term actors in implementation makes participant willingness and choice key conditions to program success. This could also help to reduce the likelihood of the adverse outcomes regarding participant compensation already observed. Introduction of more market-based mechanisms of implementation, such as bidding for contracts, could also significantly improve program cost effectiveness. In absence of such innovations, the program's lack of significant impact on participant income, and especially in non-cropping income found so far suggests that those households that originally did not wish to participate, or who are not being adequately compensated for their opportunity costs of participation, will simply return land to cultivation upon subsidy period end. And results from the survey indicate that this is not a small share of participants.

Finally, the short subsidy periods of the program raise concerns that the government does not take seriously the permanence of the environmental services provided by SLCP. Though the

5-year subsidy period might give participants enough time to establish sustainable, income-generating orchards, the 8-year period for “ecological forests” (i.e. timber forests) is far too short. Most trees planted on converted land are ecological in nature (i.e. are not orchard trees) with limited potential economic returns in terms of their value for timber. Furthermore, the survival rates of the planted trees in ecologically fragile regions are quite low, and their required maturation period is far beyond the 8-year compensation period.

Overall, to realize these possibilities, officials need to significantly scale back program expansion and profoundly reexamining program design and implementation. Though the government’s growing largesse towards environmental initiatives is encouraging, large-scale campaign-style programs are not the way to reverse adverse environmental outcomes stemming from a complex combination of factors. To capture the benefits in cost and outcomes promised by PES schemes over China’s more traditional, top-down approaches, the government should respect the principals of volunteerism stated in its original plan. Otherwise, SLCP could end up being an expensive, wasted opportunity.

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**Table 1** SLCP Implementation in 2003 Survey Villages

<b>Question to Village Leader</b>	<b>Total (n=36)</b>	<b>Shaanxi (n=12)</b>	<b>Gansu (n=12)</b>	<b>Sichuan (n=12)</b>
<i>Who decides how much land area should be retired?</i>				
Province	0%	0%	0%	0%
County	25%	25%	25%	25%
Township	50%	8.3%	58.3%	83.3%
Village	13.9%	16.7%	25%	0%
Village Small Groups	0%	0%	0%	0%
Households	22.2%	50%	8.3%	8.3%
Other	0%	0%	0%	0%
<i>Who decides which plots to retire?</i>				
Province	0%	0%	0%	0%
County	16.7%	16.7%	0%	33.3%
Township	52.8%	16.7%	58.3%	83.3%
Village	36.1%	33.3%	58.3%	16.7%
Village Small Groups	2.8%	0%	8.3%	0%
Households	16.7%	41.7%	8.3%	0%
Other	0%	0%	0%	0%
<i>Who decides what to plant on retired land?</i>				
Province	0%	0%	0%	0%
County	66.7%	41.7%	58.3%	100%
Township	19.4%	16.7%	41.7%	0%
Village	5.6%	8.3%	8.3%	0%
Village Small Groups	0%	0%	0%	0%
Households	11.1%	33.3%	0%	0%
Other	2.8%	0%	8.3%	0%
<i>Who conducts inspections and verifications?</i>				
County	100%	100%	100%	100%
Township	100%	100%	100%	100%
Village	2.8%	8.3%	0%	0%
Other	97.2%	91.7%	100%	100%
<i>Share of villages that ...</i>				
<i>...distribute SLCP quotas to households.</i>	61.1%	25%	58.3%	100%
<i>...distribute SLCP quotas to village small groups.</i>	60%	27.3%	50%	100%
<i>...are allocated SLCP quotas by township government.</i>	75%	41.7%	83.3%	100%

Source: 2003 Survey Data.

**Table 2:** Average Survival Rate of Trees Planted Under SLCP (%), 2003 Survey.

Province	County	Township	Govt. Standard	Inspections		
				1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
Shaanxi	Yanchuan	Yanshuiguan	70%	94.2%	93.6%	98%
		Majiahe		72.9%	95.8%	96.4%
		Yuju		79%	83.2%	95%
	Liquan	Yanxia		56.3%	86.8%	81.1%
		Jianling		78.8%	47.9%	39.4%
		Chigan		100%	46.7%	52.1%
Gansu	Jingning	Zhigan	70%	70%	69%	66%
		Gangou		80%	76.6%	71%
		Lingzhi		-	75.7%	77.7%
	Linxia	Zhangzigou		56.3%	46.7%	65%
		Tiezhai		90%	61.1%	75.8%
		Hexi		87.5%	69.5%	64%
Sichuan	Chaotian Area	Datan	85%	82%	61.5%	67.3%
		Zhongzi		70%	48.7%	77%
		Shahe		92.5%	74.1%	40.4%
	Li	Shangmeng		100%	79.6%	76.1%
		Puxi		74.9%	80.7%	84.8%
		Guergo		70%	74.1%	77%

Source: 2003 Survey Data.

**TABLE 3** Participant 1999 Net Income from Enrolled Land Versus SLCP Compensation Standards

		Net Losing Households	Net Gaining Households	All Participants
<b>Shaanxi</b> (n = 103)	Number of Households	7	96	103
	Total 1999 Net Income from Enrolled Land (RMB)	322	12	34
	Total Converted Land Area (Ha)	5.13	68.13	73.27
	Compensation Standard - 1999 Net Income (RMB)	-14,778	120,478	105,700
<b>Gansu</b> (n = 85)	Number of Households	40	45	85
	Total 1999 Net Income from Enrolled Land (RMB)	239	65	135
	Total Converted Land Area (Ha)	8.07	11.93	20
	Compensation - 1999 Net Income (RMB)	-13,139	11,614	-1,525
<b>Sichuan</b> (n = 76)	Number of Households	22	54	76
	Total 1999 Net Income from Enrolled Land (RMB)	364	70	164
	Total Converted Land Area (Ha)	7.27	15.47	22.73
	Compensation - 1999 Net Income (RMB)	-19,439	26,657	7,218

Source: Xu et al., 2005.

**TABLE 4** Average Shortfalls in Grain and Cash Compensation in Surveyed Areas, 2002

Province	County	Grain (kg / ha) <sup>+</sup>		Cash (RMB / ha)		Total Shortfall (RMB / ha) <sup>++</sup>
		SLCP Standard	Actual Delivery	SLCP Standard	Actual Delivery	
Shaanxi	Yanchuan	1500	232.5	300	60	1507.5
	Liquan	1500	1215	300	90	495
Gansu	Jingning	1500	810	300	255	735
	Linxia	1500	322.5	300	30	1447.5
Sichuan	Chaotian	2250	2025	300	45	480
	Lixian	2250	1927.5	300	195	427.5
<b>Average:</b>		<b>1763</b>	<b>810</b>	<b>300</b>	<b>105</b>	<b>1148</b>

Source: Xu et al., 2005. <sup>+</sup> This is a sum of corn, wheat and rice subsidies. <sup>++</sup> This values grain at the national price of RMB 1/kg.

**Table 5** Farmer autonomy in SLCP participation (n=348)

GROUP	MEASURE OF AUTONOMY	% THAT SAID "YES"			
		ALL	Shaanxi (n=103)	Gansu (n=85)	Sichuan (n=76)
PARTICIPANTS (n=264)	Were the villagers asked their opinion about the project and how it could be best designed prior to the time that the project was implemented?	42.8%	41.7%	41.2%	46.1%
	When your village began SLCP, did your household have autonomy to choose whether or not to participate?	61.7%	72.8%	43.5%	67.1%
	Did you have autonomy in choosing the types of trees to plant?	36.0%	47.6%	34.1%	22.4%
	Did you have autonomy in choosing which areas to retire?	34.5%	53.4%	15.3%	30.3%
	Did you have autonomy in choosing which plots to retire?	29.9%	40.8%	12.9%	34.2%
NON-PARTICIPANTS (n=81)	Could you participate in SLCP if you wanted to?	25.9%	45.5%	29.4%	16.7%

Source: Xu et al., 2005.

**Table 6** Participants' Viewpoints on their Post-SLCP Activities.

Question: "If program subsidies stop after 5-8 years, what do you most likely intend to do?"	% of Participants / % of Retired Area			
	All ( n=264, 115.94 ha )	Shaanxi ( n=103, 73.24 ha )	Gansu ( n=85, 19.97 ha )	Sichuan ( n=76, 22.73 ha )
<b>Promising</b>	<b>57.6% / 54.2%</b>	<b>51.5% / 52.0%</b>	<b>76.5% / 76.9%</b>	<b>44.7% / 41.3%</b>
Allow timber trees / orchard trees to reach maturity for harvesting.	20.8% / 23.7%	24.3% / 26.3%	21.2% / 22.1%	15.8% / 16.8%
Can maintain livelihood with revenue from current activities [non-farm business / aquaculture / livestock / orchards].	36.7% / 30.5%	27.2% / 25.8%	55.3% / 54.8%	29.0% / 24.4%
<b>Ambiguous</b>	<b>20.1% / 25.7%</b>	<b>27.2% / 29.7%</b>	<b>14.1% / 12.2%</b>	<b>17.1% / 24.4%</b>
Continue farming.	0.8% / 0.2%	0.0% / 0.0%	2.4% / 1.1%	0.0% / 0.0%
Find work in the city.	12.5% / 17.0%	17.5% / 18.5%	10.6% / 10.7%	7.9% / 18.0%
Start a new non-agricultural activity.	5.3% / 6.9%	6.8% / 8.9%	1.2% / 0.3%	7.9% / 6.1%
Other (no clarification given).	1.5% / 1.5%	2.9% / 2.3%	0.0% / 0.0%	1.3% / 0.3%
<b>Problematic</b>	<b>22.4% / 20.1%</b>	<b>21.4% / 18.2%</b>	<b>9.4% / 11.0%</b>	<b>38.2% / 34.3%</b>
Don't know.	14.8% / 13.8%	9.7% / 10.4%	8.2% / 10.9%	29.0% / 27.5%
Assume/hope subsidies, of some type, will continue.	1.5% / 0.8%	0.0% / 0.0%	0.0% / 0.0%	5.3% / 4.1%
If not making adequate income, will return plots to cultivation.	1.5% / 0.5%	3.9% / 0.9%	0.0% / 0.0%	0.0% / 0.0%
Return currently retired plots to cultivation.	4.6% / 5.0%	7.8% / 7.0%	1.2% / 0.1%	4.0% / 2.8%

Source: 2003 Survey Data