



Grain for Green versus Grain: Conflict between Food Security and Conservation Set-Aside in China

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Summary. — This paper examines the conflict that may exist between conservation and food security. In China, policymakers and scholars are debating whether or not conservation set-aside programs threaten food security. To address the debate, we describe China's conservation set-aside program known as Grain for Green and compare it with similar programs outside of China. We then use data that we collected to measure the production and price impacts of the program on China's grain economy since 1999. Our simulations find that Grain for Green has only a small effect on China's grain production and almost no effect on prices or food imports.
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Key words — food security, conservation set-aside program, Grain for Green, China, Asia

1. INTRODUCTION

Do environmental set-aside programs threaten food security? This is the question that is at the center of a debate among policymakers and scholars in China. While the leaders in most developing countries are concerned about degradation of natural resources as a result of efforts to enhance food security (e.g., Mink, 1993; Scherr & Yadav, 1996), the leaders in China are concerned about the opposite. In fact, China's leaders are blaming its conservation set-aside program, popularly titled Grain for Green, as one of the main causes for the recent surge in grain prices and rising food imports (Ministry of Land and Resources, 2004). By setting aside more than seven million hectares, Grain for Green, the developing world's largest cultivated land set-aside program, was designed to curtail soil erosion in China's major river basins. The main goal of leaders was to reduce the rising incidence of floods that were thought to be caused by the increased siltation build-up in the country's river system (Zuo, 2002). But, while at one time Grain for Green was the cornerstone of China's battle against floods and the possible consequences that poor water conservancy was having on the country's

agricultural production and rural economy, it is now being blamed as the source of the unprecedented fall in China's domestic grain production. In fact, the belief in China that land conservation is contributing in a major way to the deterioration of its food security is so strong that the leadership severely curtailed the progress of the program in 2004.

Surprisingly, despite the importance of such an idea, to our knowledge there is very little work that is currently trying to quantify the impact of Grain for Green on China's grain economy. Because of the magnitude of the decision that is being considered inside China, it is important to understand how Grain for Green has affected the country's grain production. While a recent study by Feng, Yang, Zhang, Zhang, and Li (2005) simulated the impact of Grain for Green on China's grain supply, it does not take account of the changes in farmer production behavior on the remaining cultivated land, including responses to price changes, and also does not examine by crop effects.

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The importance of the issue transcends the current debate in China. There are currently many developing countries that are launching and that are being pushed into land conservation programs. Given the level of poverty that exists in many developing countries as well as the role that food plays in their political economy, it is important to study relationship between environmental programs and food security.

In this paper, our overall goal is to carefully measure the production impacts of the implementation of China's Grain for Green program since the pilot program began in 1999 in order to help illuminate some of the basic questions that are being debated in China. While the prominence of food security in China's national politics and its approach to land set-aside are unique, we believe that there are also lessons for other developing countries. To meet the goal, we first introduce China's Grain for Green program and attempt to put it into context by reviewing the literature on the implementation of conservation set-aside programs in other countries. In particular, we are interested in understanding how similar programs in other countries have affected crop prices and productivity. Next, we create a framework for studying the impact of Grain for Green in China using CAPSIM, a policy simulation model of China's food economy. In carrying out the analysis, we rely on data that have been collected by ourselves during a number of periods of fieldwork since 2000. Finally, we examine the results of the analysis and attempt to draw lessons for China and other developing countries.

2. CHINA'S GRAIN FOR GREEN PROGRAM

The Grain for Green program (also known as Sloped Land Conversion Program) was implemented in 1999 by China's government as a cropland set-aside program to increase forest cover and prevent soil erosion on sloped cropland.¹ When available in the community, farmers set aside all or part of certain types of land and plant seedlings to grow trees. In return, the government compensates the participants with in-kind grain allocations, cash payments, and free seedlings. In PPP terms, the average first year compensation amounts to a payment that is more than 15 times the average per hectare rental payment under the

Conservation Retirement Program (CRP) in the United States (Uchida, Xu, & Rozelle, 2005).

Grain for Green is one of the world's largest conservation projects, covering vast tracts of China. Starting with a pilot program, officials expanded the program to 20 provinces by the end of 2001 (Zuo, 2002). During the initial period of the program (1999–2001) farmers converted 1.2 million hectares of cropland into forest and pasture land (Xu & Cao, 2002—Table 1, rows 1–3). During 2001–03, the pace of conversion accelerated (rows 4 and 5). By 2003, the program had converted in accumulated terms 7.19 million hectares of cropland and farmers had afforested 4.92 million hectares of barren land (row 6). By the end of the program in 2010, leaders (at least originally) planned to set aside nearly 15 million hectares of cropland, affecting 40–60 million rural households.

Since the main objective of China's program is to restore the country's forests and grasslands to prevent soil erosion, program designers have made the steepness of the slope one of the main criteria on which plots are selected for inclusion into the Grain for Green program. The steepness criterion means that the program in Southwest China targets land with 25 degrees of slope or more for participation. In Northwest China, the program targets land with 15 degrees of slope or more. China's site selection criterion is much simpler than those used by other cropland set-aside programs, such as the CRP. Uchida *et al.* (2005) show that although there are some targeting problems, to a remarkable degree, program officials are setting aside cultivated land that is mostly steep.

Table 1. *Total area of converted cropland and area of afforested barren land in the Grain for Green program in China, 1999–2003 (million hectares)*

Year	Converted cropland (all crops)	Afforestation on barren land	Total
1999	0.38	0.15	0.53
2000	0.40	0.07	0.47
2001	0.42	0.47	0.89
2002	2.65	0.56	3.21
2003	3.33	3.67	7.00
Total	7.19	4.92	12.1

Data source: SFA.

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