



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Impact of the *Grain for Green* program on forest cover in China

Guanlong Fu, Muna Shah, and Emi Uchida (Department of Environmental and Natural Resource Economics, University of Rhode Island)

Xiangzheng Deng and Jikun Huang (Center for Chinese Agricultural Policy, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences)

John Gibson (Department of Economics, University of Waikato)

Scott Rozelle (Freeman Spogli Institute for International Studies, Stanford University)

Jintao Xu (Peking University)

Selected Poster prepared for presentation at the Agricultural & Applied Economics Association's
2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013.

Copyright 2011 by [authors]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Corresponding author. Contact Emi Uchida E-mail: emi@uri.edu; Guanlong Fu E-mail: longge126@hotmail.com

Impact of the *Grain for Green* program on forest cover in China

THE
UNIVERSITY
OF RHODE ISLAND

Guanlong Fu, Muna Shah, Emi Uchida (URI)
Xiangzheng Deng, Jikun Huang (CAS, CCAP), John Gibson (U of Waikato)
Scott Rozelle (Stanford U), and Jintao Xu (Peking U)



INTRODUCTION

- Payments for environmental services (PES) have been widely launched in many developing countries (e.g., China, Mexico, and Costa Rica.). Theory indicates, however, that PES may not be effective in achieving environmental protection (Ferraro 2008). Poor administrative program area targeting, asymmetric information and spillover effects can largely offset or mitigate the program impacts.
- Rigorous evaluation of their environmental impact has been limited to few programs with mixed results.
- China's Grain for Green (GFG) program is one of the largest PES programs in the world. It was officially launched in 2002 and implemented to fight the soil runoff caused by deforestation thus to lower the risk of flood in downstream areas. However, whether GFG has successfully achieved its main goal of encouraging reforestation has not been assessed with rigorous estimation strategy

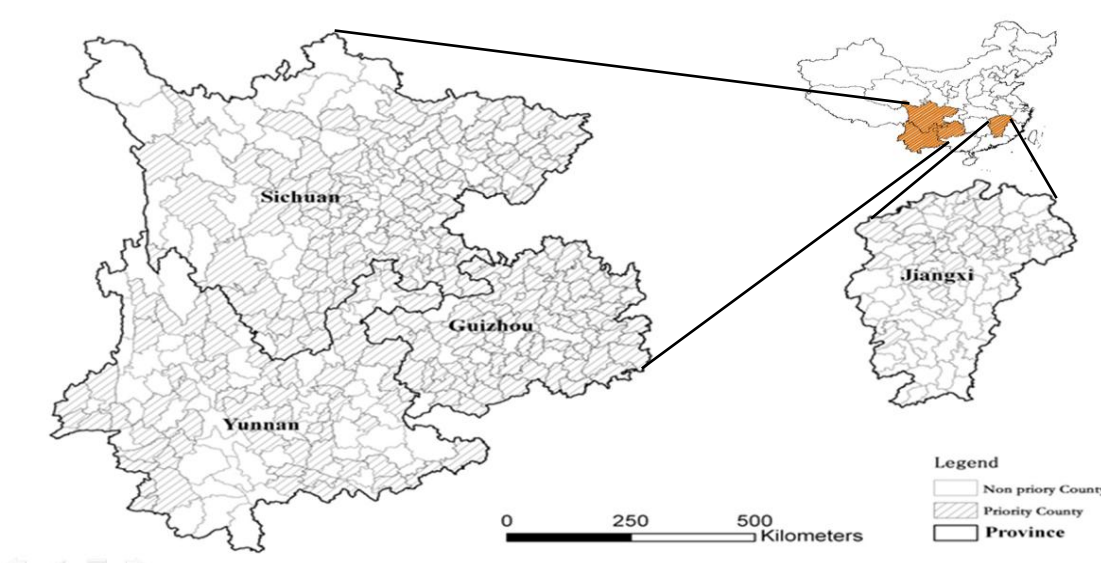
OBJECTIVE

Evaluate the impact of China's Grain for Green program on forest cover and forest structure



STUDY REGION AND DATA

- 409 counties in 4 provinces in China (Sichuan, Yunnan, Guizhou and Jiangxi)



- Outcome Variable: Forest cover in pre-program years (1988, 1995, 2000) and post-program years (2005, 2008);
- Four forest types: Closed canopy, shrub-covered canopy, open canopy and other forests.
- Treatment variable: binary (=1 if the county was designated as a priority county in the GFG program; 0 otherwise).
- Priority counties: 252 out of 409 counties

EMPIRICAL FRAMEWORK

- Identification strategy: Difference-in-differences model for multiple time periods.
- Additional controls: Control for pre-program trend in forest cover, which could potentially determine the Priority designation.
- Reduce the five-year panel to a two period panel: 1995-2000 as the pre-program period and 2005-2008 as the post program period.
- Main model:
$$\Delta Y_{it} = \beta_1 * Priority_{it} + \delta * \Delta X_{it} + T + \Delta Y_{i0} + \alpha_i + \Delta \varepsilon_{it}$$
where ΔY_{it} is the deforestation at each time period; $Priority_{it}$ is equal to 0 for all counties in the pre-program time period (1995-2000) and equal to 1 for the priority counties in the post program time period (2005-2008). ΔX_{it} is the net change of the covariates in each time period. We controlled for α_i , the county specific time trend which does not change over the two time periods.; ΔY_{i0} is the lag term of ΔY_{i1} to control for the pre-program trend.

REFERENCES

- Alix-Garcia, J.M., Shapiro, E.N., and K.R.E. Sims. "Forest Conservation and Slippage: Evidence from Mexico's National Payments for Ecosystem Services Program". Working paper, August 6, 2010.
- Arriagada, R.A., Ferraro, P.J., Pattanayak, S.K., Sills, E.O., and S. Cordero. "Do payments for environmental services reduce deforestation? A farm-level evaluation from Costa Rica." Working Paper, 2009.

TREND IN FORESET COVER



The trends in four types of forest cover and total forest cover are very similar across the two groups during the pre-program time period 1988-1995 and 1995-2000. The trends in forest cover across the two groups are quite different in the program period 2000-2005, suggesting a potential impact of GFG.

RESULTS

- The GFG program has led to an increase of 612 ha in total forest cover in the priority counties during our study period. This is equivalent of +0.47% forest cover growth compared to the forest cover in the priority counties in the baseline year (2000). This rate is larger than global annually mean change in forest cover of -0.13% (2000-10).
- We find evidence of heterogeneous impact: closed canopy increased by 382 ha and shrub-covered canopy by 215 ha. The larger impact on closed-canopy forests is counterintuitive. GFG is a reforestation program and we expected a larger impact on shrub-covered or open canopy forests.
- Caveats: The results may be confounded with uncontrolled time-variant variables such as other forest policies implemented during the same time period.

