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# Agricultural productivity growth in China: farm level versus aggregate measurement

Colin A. CARTER<sup>a,b,\*</sup>, Jing CHEN<sup>a</sup>, Baojin CHU<sup>c</sup>

<sup>a</sup>*Agricultural and Resource Economics, University of California, Davis, CA, USA*

<sup>b</sup>*Giannini Foundation of Agricultural Economics, University of California, USA*

<sup>c</sup>*Agricultural Economics, Nanjing Agricultural University, Nanjing, China*

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## Abstract

We measure agricultural productivity growth in China using alternative data sets: farm level data for Jiangsu province, national data, and provincial aggregate data for Jiangsu. For all three data sets, productivity growth was estimated to be strong during the immediate post-reform 1978–1987 period. According to the farm level data, productivity growth then slowed from 1988 to 1996. Alternatively, the national and provincial aggregate figures showed continued high productivity growth in the 1990s. These findings suggest that aggregate data may blur the true picture with regard to agricultural productivity growth in China.

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## 1. Introduction

It is generally accepted that the rapid output growth in China's agriculture from 1979 to 1984 was due to significant productivity gain (Lin, 1992; Wen, 1993). In most developing countries such as China, agricultural productivity gain is central to the growth

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\* Corresponding author. Agricultural and Resource Economics, University of California, One Shields Avenue, Davis, CA 95616, USA.

*E-mail address:* [cacarter@ucdavis.edu](mailto:cacarter@ucdavis.edu) (C.A. Carter).

of national wealth (Johnson, 1997). The continuation of agricultural productivity growth in China is particularly important, as more than 300 million workers remain in agriculture (nearly 50% of the country's total labor force).<sup>1</sup> An increase in rural incomes, through further agricultural productivity gain, would help close the relatively wide urban–rural income gap.<sup>2</sup> The coastal-centered economic boom slowed down in the late 1990s and the reform of China's state owned enterprises resulted in high urban unemployment (Saywell, 1998). This suggests that China's overall development policy will continue to discourage labor movement from the countryside to the cities and therefore the rural economy itself will be viewed as a key to future national economic growth.

Labor is an abundant resource in rural China and a large percentage of the labor force is used in grain production. However, grain cultivation is a relatively low-return activity, and the marginal labor productivity in grain is small. Further economic reform in the countryside would encourage farmers to withdraw from grain in favor of other crops or activities. However, agricultural reform is slow moving in China. From 1998, the central government reasserted its emphasis on "grain self-sufficiency" and introduced renewed government control over grain prices, by prohibiting private agents in the grain market (Crook, 1998).

According to national aggregate data, total factor productivity (TFP) in China's agriculture increased by 55% from 1979 to 1984 (Wen, 1993). This jump in productivity was unprecedented in the developing world, and most of the rapid change was attributed to the Household Responsibility System (HRS), which was a one-off institutional change.<sup>3</sup> After the effects of the HRS petered out, a policy issue that surfaced in the late 1980s and early 1990s was a slowdown in the growth of investment in agriculture.<sup>4</sup> Despite this apparent investment slowdown, we report a surprising result in this paper. Namely, the tremendous agricultural productivity gains enjoyed by China in the 1980s continued well into the 1990s. The total factor productivity index (TFPI) increased by almost 50% from 1988 to 1996, according to national aggregate statistics, and using Wen's (1993) methodology. Are these strong

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<sup>1</sup> There is considerable variation in estimates of the percent of the labor force engaged in agriculture in China. For instance, Rawski and Mead (1998) argue that China's official data overestimate the number of Chinese farm workers.

<sup>2</sup> See Lardy (1994, p.24), who suggests that the gap in China's urban–rural living standards is wider than anywhere else in Asia.

<sup>3</sup> Stone (1993) suggests that the effects of the HRS may have been overstated. He indicates that several technological improvements were made prior to 1979. These included the adoption of new varieties of wheat, rice, and corn. For wheat and rice, it was new short-straw varieties and, for corn, it was hybrid varieties. In addition, Stone documents the significant improvement in irrigation facilities prior to institutional reform and the accelerated growth of fertilizer supplies. Stone (p. 352) notes that, "For staple crops, the increased supply of fertilizer nutrients was more significant than labour incentives fostered by the responsibility system reforms, which on balance led labour away from the previous overconcentration on staples. Food grain yields had been constrained not by inadequate labour application, but by insufficient soil nutrients."

<sup>4</sup> Total investment in agriculture slowed down between 1985 and 1990, and actually fell in real terms over this period. It then resumed growth at the beginning of the 1990s, but fell again in 1993 and 1994, in real terms. Only after 1995 did real investment in agriculture begin to rise again (Statistical Yearbook of China, 2000).

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