

New Horizons for Rural Reform in China: Resources, Property Rights and Consumerism

by

Fredrich Kahrl, David Roland-Holst and David Zilberman

We present a reform agenda to alleviate rural poverty and improve environmental sustainability in China. It focuses on labor reform, suggesting reductions in the work week and providing incentives aimed at encouraging exit from farming, trading in land and water rights, and adopting and developing new technologies.

China's agricultural development in recent decades is impressive. Its farmers continue to feed the world's largest population and China's crop yields are well above global averages. Yet rural incomes have been stagnating, with wide and growing geographic disparities. Overall, China's median net per capita rural income is low, estimated at US\$317 in 2003. Nevertheless, Chinese agricultural development faces other challenges. In China's northern region, for example, water use appears to be on an unsustainable trajectory. The chemical intensity of Chinese farming is high by global standards and is a growing source of public health risk. Technologically, China could benefit from advances in biotechnology and irrigation science, but the successful deployment of these technologies will also depend on well-functioning institutions.

In this article, we introduce a reform agenda to address China's rural poverty and sustainability challenges, based upon an assessment of the primary resources used in China's agricultural sector: labor, land, water and technology. The reform agenda we present is unconventional, but we believe it opens

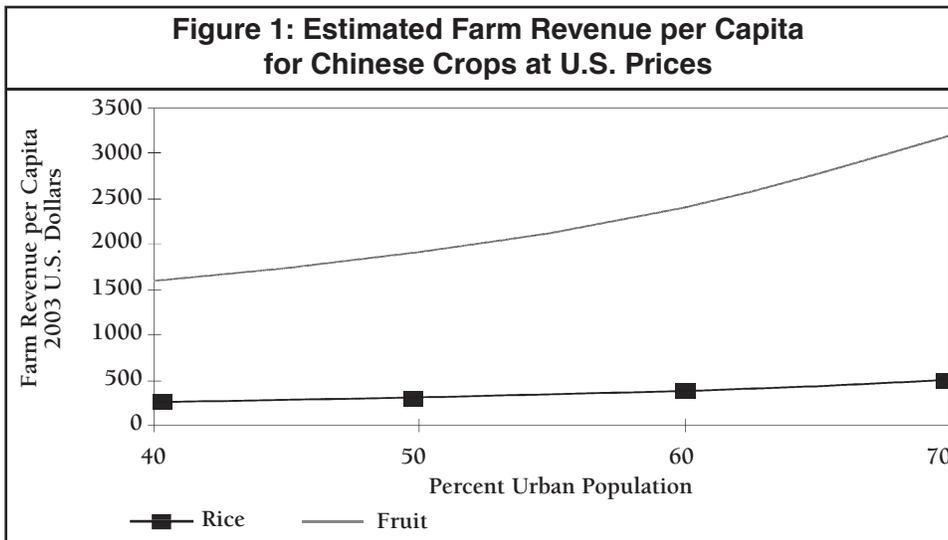
new opportunities for meeting China's objectives for rural and national economic growth, water and environmental sustainability, and food security.

Labor

Labor has been a comparative advantage for the modern Chinese economy, yet labor markets pose a longer-term conundrum for policymakers. Rural labor mobility has provided a perennial resource of competitiveness, yet continued migration requires high economic growth to sustain labor demand. From the opposite perspective, population density in the agricultural sector could seriously constrain long-term efforts to alleviate rural poverty. In 2005, only 40 percent of the Chinese population is urban. Even under the government's more aggressive migration projections, implying anywhere from 50-50 to 40-60 rural-urban population percentages by 2020, our estimates indicate the average Chinese farmer could remain below the World Bank's threshold for poverty (\$2/day). Figure 1 illustrates this point, displaying per capita farm revenue that would result from current Chinese yields marketed at current U.S. prices.

The average amount of land per farmer is only 0.47 hectares. Figure 1 shows that total rice production on this land, valued at California farm gate prices (the highest in the U.S.), would yield only about US\$244 per capita, while tree fruits and nuts would be much more lucrative (\$1,589). Given these extremes, crop composition will clearly be important to the distribution of farm incomes, yet extensive staple crops are expected to

Figure 1: Estimated Farm Revenue per Capita for Chinese Crops at U.S. Prices



dominate domestic production acreage for the foreseeable future, and this will exert a significant drag on per capita income growth.

A sustained commitment to poverty alleviation in China must address the issue of farm population density. To meet income targets of US\$1,500 per farm worker annually, using present technologies, roughly 75 percent of current farmers would have to switch to other activities, implying a need for 234.4 million jobs. This would require massive job creation in urban areas, in addition to growth in off-farm employment in rural areas. Since the late 1970s, China's rural township and village enterprises have made significant contributions to the country's economic growth, creating nearly 110 million rural non-farm labor jobs since 1985. These rural enterprises will have to substantially expand to absorb a surging labor supply.

Some of the new urban jobs required to absorb migrants from rural areas can be partially created by a more drastic reform of current labor laws. China's 1995 Labor Law mandates an eight-hour workday, a six-day workweek and a minimum wage. But these standards are seldom enforced and many Chinese workers have an 80-hour workweek. A labor-leisure reform could dramatically alter both labor markets and consumption patterns in China. Reducing the workweek without reducing pay would marginally lower China's competitive advantage, but would dramatically stimulate demand and urban job growth. Similarly, hours worked in excess of 50 could be compensated with overtime pay. We estimated the aggregate effects of imposing a 50-hour workweek on China's urban labor force, assuming different prior levels of weekly work commitment. For example, reducing the urban workweek from 75 hours to 50 hours would increase urban employment by 50 percent, thereby translating into 125 million new jobs. The increased leisure would also increase domestic consumption.

Currently, the Chinese population is saving about 30 percent of its earnings, as compared to much less than ten percent in most of the developed nations. One reason for the high savings rate is China's long workweek. Consumption activities require time. A shorter workweek would lead to the development of a leisure culture, thereby increasing consumption and creating new jobs. For example, most of the employment and earning in the U.S., as well as many developed countries, is driven by domestic demand. China's current export-driven model of growth will not in and of itself create sufficient jobs to absorb hundreds of

millions of farmers into the wage labor force. Creating a vibrant domestic market would instead be the key toward sustaining China's economic growth over the longer term. From a labor-market perspective, employment to offset the declining workweek would create new urban demand and increase the cities' capacity to absorb rural migrants. In turn, this rural outflow would stimulate rural wages and marketed-food demand. Furthermore, as farm residents become urbanites, this greater demand for goods in cities would increase industrialization in rural areas and buffer the migration process.

Land

Many of China's rural policy challenges stem from existing land and demographic conditions. Sixty percent of China's population currently resides in rural areas, 312.6 million of whom were officially registered as "farm laborers" in 2003. Average farm size in China is roughly 0.13 hectares (0.32 acres) per household, dipping to 0.04 hectares in Guangdong Province. While Chinese farmland has shown remarkable capacity, the yield increases needed to keep pace with evolving food demand will require renewed commitment to investments in technology, improved genetic material and more efficient scale of production in extensive food staples. Current farm size contributes to a low degree of mechanization, high costs of input use and marketing, limited access to credit and subsequently low investment. Overcoming scale constraints will require establishing clear land-property rights and incentives for expanding the leasing of land.

The virtues of leasing rights are many. Migration in China to date has been varied. While some rural-urban migrants leave villages to take up permanent residence in mega-cities like Beijing and Shanghai, more often migration has been temporary, focused away from major cities, and a boon for rural economic growth, as migrants send remittances and return to their villages to establish small enterprises. Leasing provides a means for farmers to diversify income sources as they make a stepwise transition into other sectors of employment.

At present, China is undergoing a transition in rural property rights, including secure tenure arrangements atop ambiguous state ownership. China's central government has long advocated some degree of land transfer, with "leave the land but not the village" directives beginning in the 1980s. However, while the legal basis for land leasing has significant precedent,

in many areas leasing remains a taboo, possibly because of uncertainty about enforcement of leasing rights and lack of functioning markets.

Land reform can play an essential part in raising rural incomes and stabilizing rural populations, but only if it facilitates a smooth transition to more labor-efficient production systems. Providing farmers with the legal and market institutions to lease their land is a key component in encouraging labor migration and increasing profitability of farming.

Water

China's water resources are unevenly distributed. The five municipalities and provinces of the North China Plain—Beijing, Tianjin, Hebei, Henan and Shandong—produce approximately 25 percent of China's total agricultural output and 24 percent of its GDP, with only five percent of its water resources. Thirty-five percent of the country's total planted area, and 40 percent of northern China, is irrigated. With rapid expansion of agricultural capacity, irrigation has increased in both its scope and intensity. In major watersheds in northern China, this has led to sustained imbalances between water demand and supply, as in the case of the Yellow River (Figure 2). Northern China has a high degree of groundwater dependence—accounting for 64 percent of total water use in the North China Plain—and aquifers in many areas are under stress from rising water demand. Agriculture remains by far the largest use of water in China, accounting for 65 percent of water use in 2000. Nevertheless, competition for water is expected to intensify with the pace of urban migration, both from residential and industrial water needs.

Expanding water supply and controlling demand can address the water imbalance. Supply expansion includes the current proposed south-to-north water transfer and other proposed water projects, but they are costly and have negative environmental effects. Demand can be reduced by conservation activities, improved water productivity and improved conveyance. Policy reforms are needed to induce conservation and to improve water management. To promote conservation, water-pricing reforms were passed in 2003, yet implementation has been slow and uneven.

The Chinese government's official objective is to increase national average water efficiency for irrigation systems from 45 percent to 55

percent. While increased water-use efficiency will come through public and private investment in conveyance facilities and new application technologies, the key to more sustainable water use in China is efficient pricing. However, water pricing remains a subject of contention, due to its impact on farmers' incomes. All of these considerations have to be incorporated into water reform with the following elements:

- *Mechanisms for efficient investment in water infrastructure:* A formal procedure should be introduced to evaluate the economic impacts of proposed projects. Its outcomes should avoid wasteful projects.

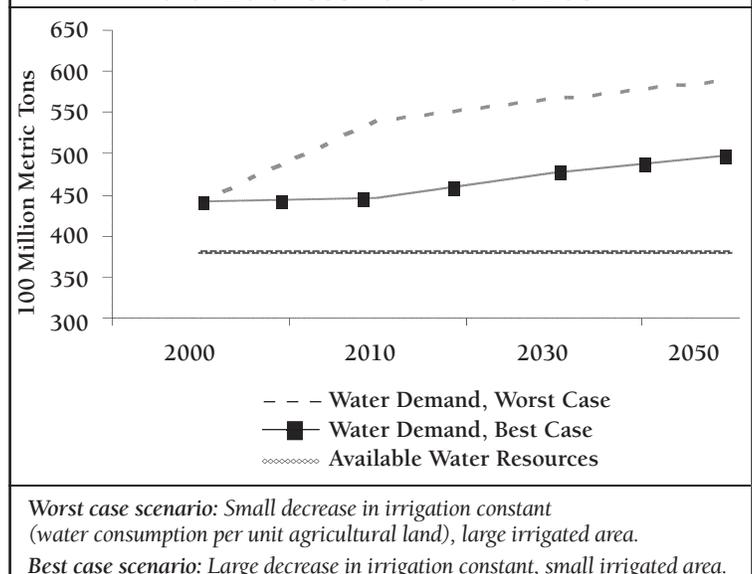
- *Water management institutions:* These institutions include: 1) Water-user associations (WUAs) and water-service organizations (WSOs) that are effective in maintaining and improving conveyance and facilitating water trade. 2) Groundwater-management districts that should control overdraft. 3) Water-quality boards that will monitor and enforce water-quality standards. China now has more than 500 WUAs, and their experience in promoting improved management has been promising.

- *Water rights and trading:* Water ownership should be clearly defined and an institutional framework to support trading in water rights should be established. Efficiency is likely to increase when water users have water rights and trading is allowed.

Technology

The crop-breeding sector has supplied Chinese agriculture with diverse and productive genetic materials.

Figure 2: Current and Projected Water Balances: Yellow River Basin



Maintaining and improving private and public capacity to enhance genetic materials using traditional breeding should continue to be a priority. However, China should also continue to invest in alternative methods of improving its genetic materials. China can take advantage of new tools of molecular and cell biology and develop genetically modified varieties.

Bt cotton illustrates the potential of transgenic varieties in China. Bt cotton had nearly a 50 percent adoption rate in 2001, five years after its introduction. It increased yields by 10 percent, decreased pesticide use by 70 percent, and improved profitability and workers' health. China has not taken full advantage of available transgenic traits. Transgenic-rice varieties can save pest-control costs and improve farmers' health. Herbicide-resistant varieties—internationally the most widely adopted transgenic varieties—can almost eliminate the time spent on weeding. Experiments with Bt maize in China show yield increases of 23 percent and insecticide savings of more than 50 percent.

Agricultural biotechnology is still in its infancy. New transgenic traits currently in the experimental stage will extend the shelf life of vegetables, increase the nutritional value of animal feed and fortify grains with valuable nutrients. China can benefit from new technologies that improve the precision of agriculture, increase yield and reduce residues, and improvements in livestock production that increase efficiency, and especially reduce public and environmental health risks.

Technological change in agriculture will require investment in research development and industrial facilities. Expansion of the Chinese agricultural research and education system will be essential, since agricultural technologies need adaptation to local conditions, and some of the problems of China are unique and will not be sufficiently addressed elsewhere. The educational system in China tends to be centralized, and much of the research capacity is in the major cities. Some decentralization of research capacity will be needed to produce the knowledge base for technological changes in agriculture. Since much of the agricultural research products (seed varieties, pollution control strategies) have public good properties, the public sector may need to invest in much of this research. Less than three percent of China's GNP is spent on public education, and that must increase to continue growth. The public sector will also need to

invest, or provide incentives for investments in infrastructure that reduce transportation and communication costs to the farm sector. That includes improved and well-maintained roads, and the infrastructure for modern information technologies.

Concluding Remarks

China's remarkable economic attainments inspire both admiration and concern. It has made unprecedented progress in poverty alleviation and economic advancement, yet major regions of China still suffer from rural poverty and unsustainable environmental situations.

The only avenue to substantially improve rural income levels is to establish policies that will provide incentives to drastically reduce employment in farming. They include urban labor-market policies that would enforce existing work rules, reducing the average workweek significantly. This would contribute to more off-farm employment and more efficient scale in agriculture, both of which could raise rural incomes substantially. It would also stimulate domestic demand though increased leisure, reducing China's reliance on external demand when this is an increasing source of international controversy.

The proposed reform agenda also includes the establishment and protection of land and water rights and removal of barriers to water trading and land leasing. It suggests the establishment and strengthening of institutions for the management of shared natural resources and generation and dissemination of new technologies.

Fredrich Kahrl is a Ph.D. student in the Energy and Resources Group at UC Berkeley. He can be reached by e-mail at fkahrl@berkeley.edu. David Roland-Holst is an adjunct professor and David Zilberman is a professor in the Department of Agricultural and Resource Economics and Policy at UC Berkeley. They can be reached by e-mail at dwrh@are.berkeley.edu and zilber@are.berkeley.edu, respectively.

Continued from page 10

One potentially important difference between China's exports and California's exports is that California's exports of fresh strawberries are more important than its exports of frozen strawberries, in terms of volume and share of production. In contrast, frozen exports are much more important in China. The California Strawberry Commission's Processor Task Force has concluded that China's processed strawberry exports are a potential threat to the California industry. Alternatively, the Task Force found that China is not currently a threat to California's fresh markets. Indeed, because fresh strawberries are not available in China from July until production begins again in November or later, the Task Force sees an opportunity to export fresh strawberries to China during this market window. However, strawberries are not currently approved for import into China, by China's State General Administration for Quality Supervision, Inspection and Quarantine.

One market where China's strawberries have proven to be competitive is in Japan, which is an important export market for California. In 2003, China replaced the U.S. as the largest supplier of frozen strawberries to Japan. California's exports to Japan have declined, while China's exports have increased. In 2004, California's exports to Japan were roughly one-quarter of the 2002 level of exports. Because frozen strawberries from China cost roughly one-half as much as frozen strawberries from the U.S., this trend of an expanding market share for China and a declining market share for the U.S. and California is projected to continue.

In conclusion, China is becoming a more important competitor for California strawberries. Although estimates of the size of the strawberry industry in China vary, by all accounts it is growing rapidly. To the extent that its current yields are limited by disease problems and production techniques, China has the potential to increase production even without increasing acreage. China's share of exports of processed strawberries to third markets historically important to the U.S. has been increasing, while the U.S. share has declined. All indications suggest that China will become an increasingly important competitor for the California strawberry industry.



Compared to China, strawberry farms in California are more specialized.
Photo by Rachael Goodhue

For additional information,
the authors suggest the following resources:

- Carter, Colin A., James A. Chalfant, Rachael E. Goodhue and Wensi Zhang. "How Large is China's Strawberry Industry?" *The Pink Sheet*. California Strawberry Commission. June, 2005.
- China's Ministry of Agriculture (2001-2003) "Production and Acreage of Major Agricultural Commodity-12." <http://www.agri.gov.cn/sjzl>.
- USDA Foreign Agricultural Service Global Agriculture Information Network Report #CH2616 (2004), "China, Peoples Republic of: Strawberries Annual 2004," prepared by Ralph Gifford and Zhang Lei. http://www.fas.usda.gov/scriptsw/AttacheRep/attache_lout.asp.
- USDA Foreign Agricultural Service (2005), "Strawberry Situation and Outlook in Selected Countries-February 2005." <http://www.fas.usda.gov/htp/horticulture/strawberry.html>.
- Yang, Wei and Tom Payne. "The Chinese Strawberry Industry in Perspective." *California Strawberry Commission Industry Newsletter*. Summer, 2004.
- Yinghuang Zhou, Xianhui Geng, Liyue Huo, Feilun Du, Lv Chen and Jun Xiong (2001), "Chinese Strawberry Industry--Middle-term Report," Nanjing Agricultural University.

Colin Carter and James Chalfant are professors, and Rachael Goodhue is an associate professor, in the Department of Agricultural and Resource Economics at UC Davis. The co-authors can be contacted by e-mail at colin@primal.ucdavis.edu, jim@primal.ucdavis.edu, and goodhue@primal.ucdavis.edu, respectively.