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### **China: Infrastructure Development as a Solution to the Paradoxes of Rural Poverty**

Only one country in the world must feed 1.3 billion people. Only one country must maintain roads that span more than three thousand miles of cities, plains, deserts, mountains and rivers so that urban and rural dwellers alike can have access to transportation, services, and communications, though they use modes of transport that vary from semi-trucks to water buffalo. Agricultural efficiency must be maintained even when farms are owned collectively by small villages scattered throughout the country, whose inhabitants are as diverse as the land itself. In addition, it must compensate for the growing income and lifestyle disparity between the urban rich and the rural poor, when the richest live in high-rises and the poorest barely have enough to eat. It must mediate the rivalry that springs up between regions, while simultaneously mediating its relations with the rest of the world. It must seek a solution in a land where pollution is an ever looming problem; in which millions of acres of cropland are in danger of running dry; in which the use of fertilizers and pesticides poison the soil, and yet their disuse spells doom for an entire year's worth of crops. And moreover, this must be done in a country that is still recovering from the throes of a massive social upheaval, a country that, despite being in a startling boom of economic growth, maintains itself with an often secretive government bureaucracy and only recently joined the global economic arena. This country is China. And as it enters the next decades as a major world player, it faces a daunting host of paradoxical challenges and opportunities.

For thousands of years, China has been a society built on the back of farmers. 68% of the population still lives in rural areas and a majority of the population is still employed in agriculture (Gale 5). Although food security is rising, official reports still estimate the total poor at 26 million, with 93% in rural areas (The World Bank Group n. pag.). The typical poor farming family lives under a dollar a day, much lower than an urban counterpart (n. pag.). This disparity is due to policies historically biased in favor of urban areas, such as rural taxation, biased investments, and a strict resident permit system that is bolstered by the land-tenure system (Gale and Park 47). This means that although food security is rising overall, the west and southwest regions still experience high levels of poverty and food insecurity as compared to their coastal counterparts. Additionally, China must feed 22 percent of the world's population on less than 10 percent of its cultivatable land—a land that is quickly becoming unusable (Maidment n. pag.). Annual droughts and floods frequently affect the typical farmer, hitting the poorest the hardest. And almost 35 percent of the Yellow River, China's largest source of groundwater, is unfit for drinking and irrigation (Thomas n. pag.). Current policies seem to only encourage this pattern of non-sustainability—a stagnant infrastructure and east versus west disparity incontrovertibly encourages farmers to use fertilizers, pesticides, and more water in order to grow enough food to compete and to survive. Educational disparity must also not be overlooked. Although primary education has become widespread in rural areas, institutional inertia, budget shortages, and regional income differences have led to unequal educational access and school quality, especially for women. Local governments must fund their own schools, but poorer areas have little resources to support education (Gale and Park 48). Illiteracy rates are much higher among the rural population, with relatively few residents having completed secondary school or college. Persons with the highest levels of education are the most likely to find nonagricultural work, leaving the unskilled to do farming. Education improves the ability of farmers to understand and adopt new technologies and process market information, but since the education disparity between east and west is rising, so has income and lifestyle disparity.

A major problem for Chinese agriculture is its lack of solid infrastructure, which in turn, perpetuates a myriad of other problems. First, a distinction between hard and soft infrastructure will be drawn for the

purpose of this essay. Hard infrastructure will be defined on the physical level, as the irrigation, energy, telecommunications, and transportation needed to move agricultural goods from the origin to the market; and soft infrastructure as the structures or systems of markets, farms, and institutions of Chinese agriculture. On the physical level, China has a notoriously poor infrastructure. The Chinese Academy of Social Sciences estimates that transportation and logistics account for 20 percent of the retail prices of goods in China (even higher for perishable food goods)—five times the transportation share of the United States (Gilmour and Gale 24). Although the government has stepped up to the plate in some ways; for example, as of 2002, its railways were increased by 19 percent and it is expected to add 200,000 km of highway to the existing 1.4 million km, problems are still inherent, as evidenced by frequent bottlenecks. Freight transport, the main medium of transportation for grain and other bulk commodities, is experiencing a higher growth in traffic than in infrastructure development. Warehousing and other storage facilities, critical components to any efficient infrastructure, are in short supply. Cold storage facilities are only about 30 percent of cargo demands, and losses due to spoilage of up to 33 percent are common (24). The problem is most troubling in China's interior provinces. China's main markets are the wealthy urban regions along the east coast. These urban markets are the highest source of demand for agricultural goods, and as incomes rise, an ever increasing demand for perishables such as meat, vegetables, fruit, oils and specialty goods (Gale 7). But without the proper infrastructure, farmers in China's interior provinces can never hope to compete. For example, much of China's livestock production currently occurs in inland provinces, while demand for livestock products center in wealthy coastal cities. If the costs of transporting feed grains to inland provinces remain high due to a lack of infrastructure, livestock production may shift eastward for better access to both final markets and imported feed grains (Gilmour and Gale 26). If this cycle is unresolved, regional income disparity will increase, inland farmers will have more difficulty in competing, keeping poverty high and incomes low in China's interior.

There are many key systemic problems that perpetuate, as well as result from, a dysfunctional physical infrastructure. The first of these issues is the structure of Chinese farming itself. Most farms are owned collectively by individual villages or groups of about 30-40 households (*xiaozu*), a testimony to ancient history as well as more recent social reforms. The village leader allocates each household a plot of land, the size of the land depending on the size and ability of the household. Each household is responsible for growing enough crops to fill a quota, with residual crops free to the household (Lohmar and Somwaru 38). On one hand, this land-tenure system secures the availability of land for each household; on the other hand, it can also be a bottleneck that impedes the development of China's rural economy. When viewed in terms of a country that must produce 22 percent of the world's food on less than 10 percent of the world's land, the system hardly seems effective. First, land-tenure can discourage families from moving to towns, cities, and other rural areas because they may lose their land rights (38). This means rural residents living in areas with poor infrastructure are forced to remain in place, despite the rising income disparity between them and their more fortunate eastern neighbors who are closer to the large coastal urban markets and thus have an advantage. Also, because of the risk of land-reallocation, the land-tenure system discourages agricultural specialization or long-term investments and encourages practices with short-term payoffs, such as the use of pollutant fertilizer and pesticides (39). Finally, rural residents do not benefit from China's increasing land values because there are no clear rights to land ownership (38). To solve this problem, the land tenure system must be reexamined. It is unlikely that land will ever be completely privatized, as a myriad of legal and social issues bar the way; however, the framework of the existing collective ownership system can be changed to benefit smallholders. New innovations should allow farmers to maintain ownership of their land, while also participating in non-farm work. Policies should strike the balance between luring all farmers to more lucrative urban jobs as opposed to completely preventing farmers from modernizing—in other words, farming should be transformed into a profitable enterprise that guarantees land security yet promotes further land development and food yield. Smallholders must be transformed from “peasants” into modern farmers.

A second systemic issue that perpetuates infrastructure problems lies in the differences between China's provinces themselves, which escalate east versus west and rural versus urban conflicts. Economically, coastal growth is accelerated due to the natural advantage of coastal locations such as connections with overseas investors; thus producers in the interior provinces must compete fiercely with coastal and overseas producers for markets. Regional differences also create differences in national policy. For example, wealthy coastal regions, with manufacturing export sectors and reliance on food imports, tend to support free trade—while interior provinces populated mostly by poor farmers vulnerable to foreign competition are more skeptical of free trade. Foreign investment has thus historically been limited mostly to coastal cities, accounting for some of the regional income disparities today (Gale "Regions in China: One Market or Many?" 23). Socially, it is important to remember that, due to past policies that encouraged provinces to be independent of one another, there is less economic integration between east and west than expected. For example, in the 1980s and 1990s, interior provinces sought to block shipments of manufactured goods from coastal provinces, and tried to prevent raw materials from leaving the provinces. Interprovincial flows of labor were also limited by restriction on migration, further confining the west to the west and the east to the east. Although regional battles have ended, their aftereffects remain, as evidenced by the regional disparities that still prevail. Recently, markets have become more integrated and local self-sufficiency is being undone as the agricultural industry is restructured to fit an increasingly competitive environment. The physical infrastructure has improved in previously mentioned ways, such as the growing trucking, highway, and communications system, which all encourage inter-region motility. Moreover, following China's WTO accession commitments, more foreign and domestic firms have entered the market by investing across multiple provinces, accelerating integration of the national economy (20). Yet more changes and more infrastructure developments are needed in order to truly integrate provinces, such as increasing regional specialization in agriculture, or making a conscious choice to specialize in crops that are optimal for a region's natural environment and resources (Carter and Rozell 27). Specialization may make more efficient use of China's scarce farmland, and increase production capacity as well as interdependence between regions. It may also decrease the use of unsustainable agricultural practices by naturally increasing crop yield. Additionally, government policies should be more region-specific, with domestic and foreign investment directed at the poorer western regions in order to encourage industrial development and modernize agricultural practices.

Another key problem that prevents development is the bureaucratic administrative style that characterizes China's statistic reporting infrastructure. China's official statistical agency is the National Bureau of Statistics (NBS). However, NBS reports in a dysfunctional parallel with China's Ministry of Agriculture (MOA) (Gale, Fred A. "China's Statistics: Are They Reliable?" 50). Both rely on a bottom up style of data collection, in which village leaders report to townships, then to county offices, and so on. At each level, there is incentive to pad statistical data in order to reach targets, avoid taxes, or any number of other temptations. The accuracy of the higher level depends on the lower, and accuracy of some data may be disputed. Furthermore, data on many major field crops, such as grain, oilseeds, and cotton are considered a state secret, and therefore not publicly available (51). These discrepancies all combine to bottleneck the development of infrastructure by inaccurately portraying the conditions of each region, to both to the Chinese people and to the world. For example, when comparing data from the Agricultural Census data in China in 2004 with the official data published by China's State Statistical Bureau (SSB), "the Census data for road density, rural telephone, and rural electricity consumption are 34%, 43%, and 30% higher than the official data released from SSB, respectively" (Pinstrup and Shimokawa n. pag.). The infrastructure of statistical reporting must be streamlined and made more accessible to allow for information to spread to foreign and domestic investors and well as individual farmers. . The system has made considerable progress, as international organizations and foreign governments have assisted China's statistical agencies in modernizing their reporting capabilities.

Though the problems of China's infrastructure are clear, it is difficult to determine the appropriate amount, type and location of physical infrastructure development, since regions vary widely from each

other and within themselves. And, since infrastructure development is split between the public, private, and official development assistance (ODA), it is difficult to determine which sector should finance the development. However, it is crystal clear that China *needs* better rural roads, freight systems, highways, and storage facilities in order to combat regional disparities. And it is clear that infrastructure development *works*—investments in both high and low quality roads have been shown to have significant returns in Gross Domestic Product (GDP) in rural areas (n. pag.). Improvements have also been shown to attract private financial institutions and foreign and domestic investments to rural areas, as well as increase the availability of credit to farmers at reasonable interest rates due to lower risks (n. pag.). Thus, investment in physical infrastructure should include roads, electricity generation, irrigation, communications, as well as efforts to implement new rural institutions, improve domestic rural markets, create technology for smallholder farmers, and facilitate non-agricultural development and investments in rural areas (n. pag.). And most importantly, the east versus west disparity should be resolved by removing historical trade-distorting policies as well as directing more investment into poorer, western regions. Since most infrastructure investments are public, most funding should come from the public sector, including the Chinese government and international organizations such as the World Bank Group. Regardless of problems, failure to make investments far outweighs the costs of trying. Lack of infrastructure will result in bottlenecks for future growth in agriculture and poverty alleviation and maintains the divide between east and west—economically, socially, competitively—rendering the west unable to benefit from future growth.

Reforming systemic infrastructure is even more difficult than reforming physical problems. As discussed previously, the land tenure system, inter-provincial disparity and conflict, and a government bureaucracy are key components that often cause problems. Although unlikely to be eradicated, the systems should be restructured to better benefit individual smallholders, and to provide more incentive for sustainable agriculture and modernization. Some individual villages in coastal provinces have already begun experimenting with new methods of consolidating collective land, creating cooperatives, land trusts, and joint stock companies to pool their land and form large-scale farm operations that allow for growth while still distributing collective gains household (Lohmar and Somwaru 38). However, western, poorer provinces have historically been wary of free trade and mostly remained stagnant. Moreover, as discussed earlier, national policies and foreign investments tend to favor the east, forever agglomerating roads, storage, communications, and economic development near the coast. As proposed earlier, regional specialization to increase interdependence may spur development of western regions and lessen the disparity. Agriculture should be modernized, and rural infrastructure should strive to connect regions and to make land use more sustainable over time and a greater emphasis should be placed on providing ready credit access to poorer, interior enterprises and farmers (Gale and Park 48). Foreign and domestic investments in western regions that promote non-agricultural development may also increase economic development by introducing new technology, increasing incomes, and eventually encouraging adoptions of the coastal model of land ownership. Yet such reforms are easier said than done. The process hinges upon governmental funding for development projects, global pressure for inter-regional competition for global and domestic markets, support from international organizations, and the education and enterprise of smallholders themselves.

If China's food security and poverty problems are ever to be alleviated, the World Bank Group, UN, and other international organizations must assist the Chinese government. The World Bank (a family of five international organizations which provide leveraged loans to many poor countries) has an ambitious agenda focused on the modernization of agriculture, the development of a sound agricultural economy, and linking rural regions to urban markets (The World Bank Group n. pag.). It should strive to offer loans and expertise to increase secure credit loaning to smallholders, as well as large-scale projects to reform or establish service, business, and bank institutions in the China's western regions. As a second example, the United Nations (UN), has done well in recognizing that China's modern day poverty problems stem not from surface issues, but from deeper, socio-cultural issues such as those described in this essay. It has

responded by “improving policies on farmland registration and protection, food security, increasing agricultural productivity and rural access to financial services” and by increasing “access to adequate schooling and health care services (“Poverty and Inequality n. pag.). Yet the strength of the UN should not necessarily be in loaning money or funding development, but in cooperating with the Chinese government and publicizing statistics. In the last decades, it has cooperated with the government to significantly improve rural infrastructure in western regions, as exemplified by successful irrigation, health, and women’s education projects in the Gansu and Guangxi Provinces (The United Nations).

China’s paradoxes will not be reconciled immediately. Reconciling the separate interests of east and west, a control-based government with a booming economy, and an urban society that is still inextricably connected to a rural base—this must take time. However, as improvements to the infrastructure take place, perhaps the paradoxes will unravel and present themselves as a solution. By giving smallholders an equal chance to access markets, perhaps cooperation between regions will follow. By striking the correct balance between collectively owned farms and commercial operations, perhaps poor farmers will be provided with the security they need to pursue novel, sustainable forms of agriculture without fearing the loss of their income. By reforming bureaucratic reporting systems, perhaps a solution will finally emerge from a myriad of scattered figures. With some assistance of international organizations, China can connect its peoples and lands with freight, roads and shipping, as well as structures and institutions. In the end however, the change will not come from government, but from farmers themselves. For ultimately it will be up to them to forge, despite distances of over three thousand miles, a unified and connected China.

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