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China, Factor 16: Education

China: Empowering Subsistence Farm Families through Education

China is a very well-known country; it is known as the place where most of our belongings come from but it is also known today as one of the most advanced nations in the world. China has an incredible population of 1.3 billion. Of these 1.3 billion people, 750 million Chinese still live on and depend on subsistence farming. Education is lacking in the rural areas of China; future farmers are not getting the education they need starting from a young age. China needs to end what seems to be an unbreakable cycle of illiterate subsistence farm families and make changes to better all of China and further its rural population. This essay will describe a typical subsistence farm family in China, while examining the challenges faced by these families. As well, the effects of education on Chinese agriculture will be discussed. In the end, recommendations regarding how education can be used to improve food security in China will be presented.

An overview of Chinese agriculture

A typical subsistence Chinese farm family consists of a man, woman, and two children. China implemented a one-child policy in 1979 for families living in urban areas. Rural families and ethnic groups are not held to the one-child policy and as many as twelve children are born into some families. In China, male children are preferred; this is because the family wants to pass their name down to a son. Rural families will normally consume what they produce on their small plots of land. If they cannot get everything they need from their own plot, they may go out into surrounding forests to source other food that they can find. However, any food that is produced but not eaten by the family is sold at markets, usually for low prices. Many subsistence farming families only live on 450 dollars per year (Nicolette, 2006); which works out to roughly \$1.20 a day (USD).

Rural families have access to little or no education; most of the pastoral working and farming population in China are illiterate. This lack of education may contribute to the prevalence of land degradation due to the mismanagement of land. There are many challenges with China's rural healthcare, particularly high medical costs and the inaccessibility to medical services. Presently, more than 90% of China's rural residents are not covered by any health insurance system (Brant, 2006).

A typical subsistence farmstead will consist of roughly three to five acres; the average farm size is only one to three acres in the eastern portion of the country (Nicolette, 2006). On these small plots of land, families will grow or raise many useful trees, shrubs, perennial crops, annual plants, and beneficial animals. Depending on environment a variety of fruits such as pears, apples, dates, peaches, oranges, papayas, palms, jackfruit, and bamboo can be grown. Trees are also used for lumber, depending on the species. Again, contingent on environment, herbaceous plants and crops might be grown in the understory of the trees. These small plots of land are often utilized to raise beneficial animals including ducks, rabbits, geese, chickens, water buffalo, cows, horses, mules, pigs, goats, and sheep. Small ponds are often utilized by raising species like fish and worms. Organisms in the pond are fed the waste of the other animals; however this manure is also applied to the crops and plants as a source of fertilizer.

Farming on small plots of land is one of China's most popular agriculture practices. This practice creates a microbiome, where everything produced can be utilized in one way or another, creating a sustainable cycle. A major drawback to this widely used practice is the close proximity of the different plots. Owing to the plots being so close, diseases can quickly spread from plot to plot and wipe entire crops out. Mainstream agronomic practices are also being employed in Chinese crop production. These farms are

more common in communities where agriculture is predominant and more popular. On these modern farms crops like cotton, rice, corn, garlic, millet, and wheat are commonly produced. Until the 1980s, 95% of Chinese pigs came from smallholdings with fewer than five animals. Today, just 20% come from these backyard farms. These days' the large-scale farming model is more popular for raising pigs. Some industrial facilities, often owned by the state or by multinationals, produce as many as 100,000 swine a year (Empire of the pig, 2014). Chinese farmers also practice minimum till and zero-till; although this may be because they have virtually no tractors to power their tillage implements. They use various planting methods depending on what area you are in and what is grown as second crops in wheat fields. In some fields, they plant corn seed directly into the wheat stubble or the wheat stubble is burned and they transplant cotton from nurseries after harvesting a garlic crop (Nicolette, 2006). In some cases on larger farms, after the rice is harvested, it's then rotated into wheat and then back into rice again (Nicolette, 2006). Crop rotation is poorly practiced and over time the soil may lose its fertility. Nitrogen fertilizers are also put into the soil; it can be very harmful when it gets into the waterways because it boosts production of algae. The Chinese government realises these agriculture practices are not sustainable, and are leading to land degradation and reduced yields.

Farming always comes hand-in-hand with challenges. In the subsistence farm families of China they face obstacles like lack of agriculture education, lack of agriculture technology, and climate change. Chinese agriculture has been unaltered for hundreds of years but if they don't adapt soon, these factors may affect China's agriculture negatively.

The effects of education on Chinese agriculture

Another part of their life that goes unchanged is the lack of schooling among rural families. Even if children go to school, there is a large dropout rate in the last three years of schooling. Some quit school because of the cost. Senior middle-schools are often far away from villages, so students have to board. Including the cost of books, the bill for three years can easily amount to thousands of dollars—more than a year's income for poorer rural families. Approximately fifty percent fail the test to get into senior middle-school (Down and out in rural China, 2014). If these children fail the entrance tests in high school or university, they will most likely follow their parent's footsteps and become farmers. If the children of these farming families would receive a basic education and learn about agriculture, they could bring this knowledge back to their family to benefit the farm. There should also be resources for the Chinese subsistence farmers to have the opportunity to learn about proper agronomic methods, soil nutrition, and crop rotation techniques. Maybe then, the soil would be improved and produce higher yields.

Although China's urban areas are bursting with technology, the rural areas are quite lacking. Most subsistence farmers do not even own a tractor. They are still working the plots like they did a hundred years ago. "On the farms and ranches at the local level, we've noticed that technology has not advanced quite as far in those areas yet (as compared to urban areas)," said Caldwell broiler and cattle producer Carl Homeyer. "As we drove down the road going from city to city, they are westernized with a lot of commerce. But as soon as you break into the countryside, it's farm upon farm upon farm. They're very small. Yet when you drive down the road and look out into that field there may be 50 people in a 15 to 20 acre area, all working the same field. There are people pulling plows just like an ox or a mule that we used 70 or 80 years ago" (Nicolette, 2006). The poorer farmers of China have no extra money to buy new beneficial technology for their farms and there isn't much financial aid for them either. This lack of technology and advancement is putting these farmers through tough times and harsh labour.

Climate change affects the world in many different ways. Climate change in China is predicted to increase the frequency and magnitude of extreme weather events such as droughts, floods and storms (Wang, 2010). Climate influences essentially all aspects of life, however the impact on agricultural production is extremely important. China's agriculture sector will definitely be affected if the predictions hold true. In 2005, the emission of greenhouse gases from agricultural sources constituted 15.4 percent of China's total emissions, behind electricity and heat, and manufacturing and construction (Wang, 2010).

Studies by scientists indicate that the impacts of climate change on crop yields are expected to be significant. Rain-fed crops are projected to be much more severely affected by climate change than irrigated crops. Higher incidences of drought and rising temperatures will increase water demand per unit of cropland area and negatively affect crop yields (Wang, 2010). Although right now crop yields are increasing every year due to over production and improved plant genetics, China could possibly see a drop in the years to come.

As for improving agriculture productivity, some farmers harvest two to three times a year. Improved genetics and proper use of crop inputs and rotations could benefit production. Crop production will need to increase to meet the needs of the growing Chinese population.

Using education to improve food security

Many factors affect Chinese subsistence farmers and their families. Farmers need the opportunity to access available agriculture education. Subsistence farmers are sometimes affected by reduced yields; most likely because of improper agriculture practices. These people would have learned what they practice from their family. This cycle has gone unchanged for many generations and new and proper knowledge would not have been learned and practiced. Production could be lacking for reasons like the misuse of fertilizers, the plots may be set up incorrectly, poor crop selection and rotations and livestock are not suitably taken care of.

For the previous two decades more than 30% of the county's elementary schools were located in the rural area of Sichuan's Butuo County, whereas that number has now dropped to 10% in a time-span of less than ten years. In the year 2003 in Butuo County there was 190 elementary schools in all 190 villages, but that number has since dropped to only 58 schools (Fang, 2013). The children that don't have a school in their home village must walk hours every day to a neighbouring village for school. Another option is for the children to board at the school. This option can be expensive and young children that attend elementary school must then be away from their family when they really just need to be cared for. Rural girls are being affected by poverty and school costs. These girls are put into un-favoured positions among family members because of China's cultural traditions. Poorer parents, and especially subsistence farming parents, try to avoid costs connecting with their daughters' education (Hannum, 2002). It is a Chinese tradition for sons to live with their parent after marriage; they care for their parents until they die. On the other hand, daughters marry out of the family. So in these types of families and traditions, it seems beneficial to the parents to educate their sons because one day they will be taken care of by them, where the daughters will not.

In September of 2012, the rural schooling situation became so dire that the government stepped in. Rural families had to take into consideration if it was safe for their children to walk such far distances to school; especially among younger students. Parents had to make tough decisions for their children attending school hours away and in some cases the decision was to drop out and try again in a few years. In 2012, the State Council published a new document asking local governments to re-open some closed schools or learning centers if they were absolutely needed. An official from the Ministry of Education said they will ensure students from the first to third grades of elementary schools could attend a nearby school rather than a boarding one, and use stricter measures to promote compulsory education for rural students. There are high hopes that some rural schools will open again but as of 2013 only the northern area of Jiangsu Province had taken action (Fang, 2013). Even though the national government requested the re-opening of schools if necessary, it does not mean the local governments have the budgets and financial resources to re-open at the present time. It may be some time before China's rural education is operating as it should but at least the government has recognized the problem and has taken action in an attempt to improve it. It is a step in the right direction and hopefully improvement will be seen in the near future.

If schooling in rural areas was consistently teaching compulsory lessons starting in elementary school and carrying through to high school, there would be a chain reaction of improvement. If these children attended school in every grade they would be more ready for entrance exams for university and would be less likely to drop out. The children of the subsistence farmers would have a chance to better themselves and expand their knowledge. They could get better jobs which could provide financial support for their parents or even further their education in related agriculture fields. If they learned more about safe and sustainable farming practices, they could bring this knowledge back to their parents. This could, in the end, help reduce soil and land degradation, planning of a more sustainable cropping strategy, and produce an improved and stable food supply for the family. With more educated rural people, there would be less poverty. In China, poverty definitely affects the lives of girls and the possibility for them to attend school. In future generations if more rural people were educated it would be more common for girls to attend school and become more educated and have a less vulnerable position in the family.

Issues like unpredictable weather, population growth, water scarcity, urbanization, and pollution will all impact subsistence farmers in China. Extreme weather can decrease yields and even destroy whole crops. Water scarcity is already occurring in China and it is expected to worsen in the decades ahead. Many of China's crops are currently irrigated because of the lack of rain; if the availability of water resources continues to deteriorate China could possibly see their fertile land be affected by desertification. The loss of farm land in the future could cause the people living in rural China to leave rural areas and head to the cities in search of work. All these issues could have a crippling effect and if less food is being produced in the future because of all these complications, people could starve. China already has a population of 1.3 billion and that number keeps climbing. If food production would start to decline or another drought would occur, history could repeat itself and China could possibly have another deadly famine. Past famines have happened due to war, rebellions, and drought. The Great Chinese Famine of 1958-1962 had a death toll of 20 to 40 million people (List of Famines in China). Where does education play a role in all of this? If these major issues actually do happen in the future and China is in disarray, education will be forgotten and the whole system will be at serious risk of collapse. For this reason, China's rural schooling needs to improve in order that, if China is faced with a food security issue, future farmers will be educated and ready to step forward and help.

The parents living on subsistence farms need to be taught about all the benefits for their children attending school and how their children could live a better life in the future. The teachers at the schools, along with local governments, could join together and hold information sessions for the parents. Additionally, organisations and volunteers could step up to the challenge to support rural education by renovating rural schools, donating books and school supplies, and even helping with teaching. To date, organisations like the China Tomorrow Education Foundation have renovated more than one-hundred eighty rural schools and have aided rural education in thirteen Chinese provinces.

If the government fully committed to helping rural children attend school, the lives of subsistence farmers could be changed. If more schools in rural villages could be opened, it would allow children more access to attend school. For some families, the closest school is hours away and requires the child to walk or to board at the school. It is not only safer but easier for the child to live at home, which in the end would eliminate the fee for boarding and save the parents money. The government could also set up some form of transportation to and from school for children who do not live near their closest school. The government could put more of the tax payer's money towards education. This could lower or eliminate costs associated with buying books and supplies that are only used for a couple of years. There could be laws put in place stating that children must attend school until a certain age so students will receive a mandatory education. Teaching staff could also be improved by having teachers with more than just a high school education. Being a teacher in rural China is not very rewarding because the pay is so low and teachers are more isolated from cities; also the schools are not in the best condition. If teachers could be paid more and have access to more teaching resources maybe people would not be turned away from a teaching career because of the lack of benefits. The more educated the teachers, the more educated the

students. If the education in rural Chinese communities could improve, it could in turn help shape the children into better farmers for the future.

Another worthwhile commitment from the government and its resources would be to help educate the subsistence farmers. Agriculture experts, or even volunteers, domestic and/or foreign, could teach them sustainable agriculture practices they could use on their plots. They could educate farmers utilizing methods such as farm or village visits and hand-on demonstrations relating to useful farming practices. Another problem among subsistence farmers is the lack of money; if there were mechanisms in place for these farmers to get loans they could upgrade the technology used on their farms. It could also be useful for small farmers to be able to rent small farm equipment as costs may be too high to purchase a whole machine. Everybody from the government, companies, students, subsistence farmers, volunteers and organizations need to work together and solve the problem of the education deficit in rural China.

All people of China need to come together and prepare to face the future. Change does need to happen in order for Chinese agriculture to continue growing and advancing. Subsistence farmers may be close to the bottom of Chinese society but they have a huge impact on the nation. Farmers need to be educated so that precious land is taken care of so it can be farmed for hundreds of years to come. The farmers of today and tomorrow need to be educated and learn how to apply beneficial and sustainable agriculture practices to their farms. China needs to experience a chain reaction of agriculture growth and development to remain as one of the top agriculture producers of the world.

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