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China, Factor 6: Sustainable Agriculture

A Modern Proposal: A New Standard in Sustainable Agriculture

China is one of the great cradles of human civilization and for over five-thousand years, empires have existed along the Yellow river. Agriculture began independently in China even earlier; it is believed that rice was first cultivated in 7500b.c. (Diamond), and it has continued to today. China has, since ancient times, been a world superpower and the world continues to marvel at its grandeur and innovation, including gunpowder and paper. In the past hundred years, China has seen a dramatic change, from an empire sieged by western powers and opium to a Communist regime, which has, in just a few short decades, become a world superpower with an economy rivaling even that of the United States. Just as the government of China has changed dramatically, so has life for its people. China is a land of extremes: rainforests, deserts, and snow-covered forests can all be found, and so can the rich living in mansions and the very poor living in government built housing. Life in China has improved dramatically for some and has crumbled around others; as huge modern metropolises have risen in places like Beijing and Shanghai, life continues as it has for thousands of years in providences like Yunnan, where the economy is based nearly entirely on agriculture. In the west, when one thinks of China, images of skyscrapers, congested streets, communist rallies, and fortune cookies come to mind. In the capital of Beijing and in other urban areas, life is not very different from life in any other first world country; you live with your nuclear family, commute to work, and could walk to the nearest McDonald's. But China is classified as a developing nation for a reason and the majority of the population still lives in rural communities, where life seems to be identical to life in the third world.

China is a vast country. With a total land area of 9,596,961 sq. km., it is the fourth largest country on earth. The terrain is just as diverse, from tropical rainforests in the south of the country to sub-arctic boreal forests in the north. China is mountainous, with deserts, hills and the Himalayas covering most of the country (world fact book). Only 12% of China is arable land, however, China has fed three times the number of people per unit of arable land than any other country, feeding 20% of the world population, harvesting 600 million head of swine annually, and is the world's leading producer of rice, wheat, tea, millet, potatoes, barely, apples, cotton, and fish (Lawton).

Despite the amazing volume of crops produced and the seemingly exponential growth of its economy, China is still a developing country and around 15% of the population lives below the international poverty line, on less than two dollars a day (Carter). Around 35% of the work force, 300 million people, is employed in agriculture and 10% of the GDP is from the agricultural sector.

Half of the population of China lives in rural areas. The majority of Chinese who live in rural areas live in towns ranging in population from 1,000 to 2,000 people (china.org.cn). Historically, the vast majority of Chinese lived in rural villages, practicing subsidence agriculture. The Great Leap Forward was a government policy initiated by Chairman Moa Zedong, beginning in 1958, with the purpose of rapidly changing China from an agrarian society to a modern Communist state. During this time all land in China was collectivized by the government. In order to increase food production, two of three villages were put

together onto farming communes, where mass production of staple crops such as rice and wheat were made possible by sharing labor in the camps. A disastrous drought in 1960 and the mismanaging of local governments led to the Great Famine, in which an estimated 30 million people died, which led to the fear of starvation that continues to stay at the back of Chinese minds. The system of communal agriculture continued until the 1980s, when Chinese farmers were finally allowed to leave the communes and move to larger cities to join the new industrial sector or even merge into the service industry. Although the urban population continues to grow with the rate of urbanization being 2.9% annually, many Chinese still live and work on farms.

Due to the One Child Policy, a law which requires all Chinese couples living in urban areas to only have one child, most families in cities are nuclear, consisting of a mother, a father, and a child, although divorce is also common. The One Child Policy does not apply to rural families, however, and these families will often have multiple children. Traditional Chinese society values male children over female children, especially in the rural areas where a family's income relies on how many working members it has; male children are considered more beneficial to the well being of the family. Although gender selected abortion is illegal in China, some families still choose to abort female children before they are born. This has led to the uneven ratio of males to females in China, which is a cause of consideration for the government. Traditionally, grandparents and extended family also lived in the same home, and this still seems to be the trend in rural China, although this is not as common in the cramped apartments of urban cities.

In 1986, China made twelve years of education compulsory. Preschool usually begins around the age of three or four, although this is uncommon in rural China, where many preschool are just now being built. Both primary and secondary education in China takes a total of twelve years to complete (chinaeucenter.com). All children in China are educated in government operated schools. Every family in China pays taxes which contribute to the education system. For most Chinese in rural areas, education ends after the mandatory twelve years, however in recent years more Chinese, especially male Chinese, are choosing to go on to higher education. As of 2012, an estimated 9.15 million students took the National higher Education Entrance Exam, which must be passed in order to proceed onto higher education (chinaeucenter.com). The overall literacy rate in China is 95%. For males it is 97% and for females it is 92% (world fact book).

The healthcare system in China is a relatively good one, but is much better in urban areas than in rural ones. Around 5% of the GDP was spent on healthcare. Beginning in the 1980s, a push was made to have at least one doctor per rural town, treating around 1,000 patients. The physician population in China is 1.4 doctors per 1,000 persons and the hospital bed density is 4.2 beds per 1,000 persons (world fact book). There are ten times as many doctors and twice as many hospital beds in urban areas than in rural ones. Medical facilities in rural areas are often not well-equipped with the best equipment and technology and are staffed by nurses or doctors with limited training or limited access to medicine and technology. Around 3.4% of children under the age of 5 are underweight (world fact book). Many Chinese in rural areas still practice and rely on traditional Chinese medicine to cure mild illnesses (cignaglobal.com). Chinese medicine relies on ancient philosophies and herbs, some beneficial, some not. Many endangered species, such as the tiger, elephant, bear, and rhinoceros, are poached and their body parts sold for use in traditional medicine.

Although all land in China belongs to the government, farmers are allowed to lease land for up to twenty years (Lawton). Since the dismantlement of the communes in the 1980s, the Chinese government has introduced the Family Production Responsibility System, which focused on giving small traces of farm land to be used as family farms. The average farm in China is around 1 to 2 acres and each farm is allowed to grow what they want, and as long as they meet their government assigned quota, they are allowed to continue to farm. Incentives in the form of tools, animals, and seeds are given to farms that meet their quota (oecd.org). Crops grown on Chinese farms range from corn, wheat, and rice used in agriculture, to lotus seeds and cockroaches that are used in traditional Chinese medicine. Rural Chinese are able to buy and sell surplus products at rural free markets.

Rural areas in China range from highly productive and prosperous areas in the south and coastal areas to the impoverished and struggling areas in the west and northwest, where running water and electricity are still rare. The extremely rapid increase of the size of cities has led to the displacement of many Chinese farmers who once farmed the areas that are now skyscrapers. Many of these people are now migrant workers, working in industrial jobs and in extreme poverty in these large cities. The employment opportunities in rural areas are still relatively low and consequently there is a high level of unemployment.

I believe that the main problem facing the productivity of agriculture in China is sustainability. While agriculture in China is the world leader in terms of productivity, they are still not able to sustain themselves alone and import large amounts of soybeans from the United States (Sidwell). There are several farming practices in China which make their agricultural unsustainable, ranging from the drastic overuse of fertilizers to the types of livestock produced.

Sustainability in reference to Chinese agriculture is in often unthought-of of by farmers and government. Agriculture uses more than 75% of the notations fresh water, relies on fertilizer, and focuses on monoculture, all practices that harm the environment. Sustainability is not often considered when farmers are producing crops because the effects are not felt until the future. At this time, most rural Chinese produce enough food to meet their quota, earn enough to purchase food, and have adequate nutrition, however their practices negatively affect them in the long run and other modes of agriculture could be more efficient.

For example, Chinese farmers use more fertilizer than any other country in the world; in the extreme cases using up to one thousand pounds of pure nitrogen on every one acre of crop. Because of this, farmers are now able to produce twice as much as they were able to produce thirty years ago, up to 7,500 pounds of rice per acre, which allows them to feed the massive population of China. To some Chinese farmers, who still remember the Great famine in which 30 million people perished, this increase in production can only be a good thing, however, this wonton use of fertilizer in China is leading to lasting environmental effects in not only China but the entire world. It is estimated that fertilizers are overused by 60% in China. Runoff from agricultural plots leads to Chinese lakes and rivers, and eventually to the ocean, where the excess nitrogen causes algae blooms, polluting the water, killing fish and making the water unsafe for human consumption without extensive cleaning.

The Chinese government does not allow the use of GMOs, or genetically modified organisms, which allow American farms to produce the same amount of crops but with significantly less fertilizer. GMO

crops can significantly improve the production and yield of crops, which the Chinese government makes up for in its use of fertilizers (Upton).

Another unsustainable factor in Chinese agriculture is their choice in type of livestock to produce. China is the largest producer of swine in the world, harvesting 600 million head of swine annually (McOrist, 1961). While this is the largest production of swine in the world and the market is still favorable, it is a well known fact that the production of red meats, such as cattle and swine, is much more expensive and resource consuming than in the production of white meat, such as chicken or turkey. Millions of pounds of soybeans are imported from the United States in order to feed the swine in the pork industry. The United States actually runs a trade surplus with China in agriculture.

Sustainability in China is not a factor that farmers or the government is considering and this is not likely to change in the foreseeable future. Although the situation is not very severe and people are not dying of starvation, the environment is being greatly harmed due to these unsustainable practices and the economy of China could improve if changes are made. The life of Chinese farmers is not changed greatly because of this, but lasting effects could be dire.

An increase in agricultural sustainability will ensure that the environment is not being seriously harmed, which will increase the likelihood of more nutrition and safe crops. If resources are managed better, than it will cost less to produce crops and the income of farmers will increase. If the amount of imports could be cut back, the overall economy of the People's Republic will increase and more government programs could be formed to do things like increase health care and the availability of fresh water in rural areas.

It is estimated that the population of the world will continue to increase, and the population of China is no exception. The rate of urbanization in China is 2.5% and this will continue at a steady rate. As more people move to urban, modern cities, they require more protein in their diet. This will increase the demand and therefore production of meat, namely swine, which is a resource straining livestock. As urban areas continue to grow and the amount of arable land shrinks, the productivity of land will need to increase and the use of more and more fertilizer is illogical. More strain will be placed on farmers to grow more food.

In order to cut down on the use of fertilizers, I believe that the use of GMO crops should be allowed in the People's Republic of China. GMO crops are able to produce exceptionally large yields of crops without the use of large amounts of fertilizers. If GMOs will not be allowed in the near future, then I believe that crop rotation would also help to replace fertilizers. Alternating the use of land to allow land the chance to recover lost nitrogen, or the alternation of crops which fix nitrogen into the soil, such as soybeans, will make fertilizer less of a necessity and in the case of soybeans, reduce the amount that is needed to be imported.

Pork is a resource draining livestock which is raised in China. Pork is the staple of many Chinese dishes, but as more and more people request pork in their diets, resources will be lost. Chicken and other poultry are a much more sustainable option. Three chickens could be raised with the same resources that could be used to raise one pig. Approximately 4 billion birds are produced every year in China, supplying jobs to 9 million people (Flannery), but this is only a fraction of the swine industry. The production of swine requires four times as much water and total space than the production of poultry. The production of poultry requires half the energy of swine production. The fesses of poultry also contain much more

nitrogen than the fesses of swine. This could be used to fertilize fields, instead of using the high concentrations of nitrogen that cause serious harm to the environment (Ramos).

These changes would work towards the seventh Millennium Development Goal: ensuring environmental sustainability.

I believe that encouraging farmers to rotate crops in order to fix nitrogen into the soil and reduce the use of fertilizers should be implemented on small scale farms, and then slowly made to become the standard. Chinese farmers are allowed to choose the type of crops they plant and they could easily choose to grow corn one year and soy beans the next. They could also switch their pork production to poultry production and benefit in the long term.

Seeing as the Chinese government controls agriculture of China, it must be their decision to enact these changes. Laws must be lifted to allow GMO crops and monetary or material encouragement must be given to make farmers choose to use less fertilizer, which harms the environment, and use more sustainable farming practices, like crop rotation and the raising of more efficient livestock, like poultry. Local governments must educate farmers on the negative effects of fertilizers and how to apply alternative methods.

In the past fifty years, the nation of China has changes dramatically, and agriculture in China has changed just as drastically. From villages practicing subsidence farming, to the forced collectivization and farm communes of the 1950s, and finally to the modern family run farms, Chinese agriculture has changed dramatically, but it is still not perfect. Even though China produces more food than any other country in the world, their methods are unsustainable and are harming the environment and the nation's economy itself. The government of China is responsible for promoting sustainable agricultural practices and seeking the well being of their citizens, especially the poor.

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