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China, Factor 13: Demographics

By the year 2050, at least 9.6 billion people are projected to be on this earth (United Nations Department of Economic and Social Affairs, 2013). As we approach this frightening realization, we, as agriculturalists, must find the most efficient way to feed the soon to be overpopulated world. As we work to this enormous goal, we need to take a look at countries, like China, that are overpopulated today without a massive world population increase.

Surprisingly, the average family size in China has decreased from a little over 5 people per household in 1950 to around 3 people per household in 2012 (China Daily, 2014). The average income of a Chinese household differs greatly depending on if you live in rural or urban areas. In urban areas the average salary is \$2600, while in rural areas the average salary is roughly \$1600 (Wong, 2013). The typical Chinese family will spend 35% of their income on food and 20% of their income on savings, which is customary in China (Censky, 2012). Unlike the United States, China does not have a designated middle class, but it is said that the middle class in China ranges from families earning \$10000 to \$60000 a year (Censky, 2012).

What is the education like in China? Each citizen ages 6 through 15 are required to attend free schools in China (Mack, 2017). Classes average around 35 students. After middle school, parents must pay for public high school. Urban families can easily afford to send their kids to high school while rural families rarely send their children to high school and stop their education at 15 (Mack, 2017). Students attend classes five to six days a week and have nine hour school days. Summer vacation in China only last a month at the most and there is minimal breaks throughout the school year (Mack, 2017).

The most common diet in China is filled with a lot of vegetables being steamed or stir fried, meat and fish, and starches like rice (Smith, 2015). Chinese keep a lot of tradition in their lives and their diet has remained one of them for thousands of years.

95% of people in China have health insurance (The Wall Street Journal, 2015). Health insurance is something that is vital to have today and only 5% of China's population is not covered. This five percent is those mostly of poverty who cannot afford health care.

In China, food insecurity is a sad reality for some. Soils have become depleted after over 5000 years of agricultural practices and Chinese farmers have tried to revive the depleted farm lands with fertilizers on the World Health Organization's banned list (Chan, 2011). We also cannot forget that there is food price

inflation in China causing some people to go hungry because they cannot afford the high price of food (Chan, 2011). The inflation is caused mostly by the fact that since the mid 1990's, 8.3 million hectares of arable land has been lost to urbanization (Chan, 2011).

In 2012 China was the leading destination for exports of United States Agriculture Commodities, but what is China doing for itself to strengthen its agriculture industry (United States Department of Agriculture, 2016)? China is the world's largest producer of rice and the largest producer of fresh vegetables (Simpson, 2012). Along with this, China is the second largest corn producer producing 55% of the world's leading country in corn production, the United States (Simpson, 2012). To follow up on China's large agriculture industry, I must point out that China is also ranked fourth in soy bean production (Simpson, 2012).

So how are China's demographics a threat when it comes to feeding the world in 2050? As I mentioned, China ranks at the top end of numerous commodities on this globe. China is also a country that is continuously growing in size. As of 2015 the average population growth rate was .51% (Trading Economics, n.d.). With China growing we have to acknowledge that land used today for agriculture practices may not be available for the same use in a few years as we will have to house more and more people each year. In 2011, China only used 55.66% of its land for agriculture purposes (Trading Economics, n.d.).

Since China is losing arable land and the population of China is growing I can only think of one agriculture practice that will help food security issues today and in the future in China and in similar countries across the globe. The practice is Hydroponics. Hydroponics offer a logical solution to food insecurity in places like China because China is needing more space for living and less for farming. Hydroponics are able to be used inside and anywhere

So what are hydroponics? Hydroponics are defined as the process of growing plants in sand, gravel, or liquid without using soil. Hydroponics offer China an amazing opportunity to use these fairly new techniques to feed their entire population. Do hydroponics work anywhere else? In Japan, hydroponics are being used. Lettuce is being grown with 99% less water and there is 100 times more lettuce per square foot being grown (Borras, 2014). China could greatly benefit from utilizing hydroponics seeing that it reduces water and increases productivity. Japan has reaped the benefits of hydroponics and I believe that China can see even larger results.

Before the Chinese can utilize hydroponics, there first must be funding. Most funding should be done from the farmers themselves as they implement these new practices into their operation, but some funds may be provided through grants. Grants will allow for the trend to start growing amongst Chinese farmers unlike privately funded hydroponics. Privately funded, or farmers paying for their own hydroponics system, will be the normal trend after the benefits of hydroponics have been explained, but as of now, grants will serve a huge role in implementing these into Chinese Agriculture.

To use hydroponics to their full potential, Chinese farmers would need to go through educational courses to know how to properly operate the hydroponic systems since it is much different than normal farming practices. These courses could be implemented in schools for younger generations, or there could be classes open to the entire community for all generations. These courses would allow for Chinese farmers to maximize their yields while coping with the increased population.

So does China's Agriculture Industry add to pollution? In 2010 Chinese farmers caused more pollution than factories (Watts, 2010) In China, the agriculture industry is responsible for 43.7% of the chemical oxygen demand, 67% of phosphorus and 57% of nitrogen discharges (Watts, 2010).

China is a country with a massive population. China has education that can improve its agriculture sector, but why improve a sector that is about to be taken over by China's growing population. The only logical thing for China to do is to start hydroponic factories in replace of the farmland being lost to house the overflow of people in urban areas. China has room to spare, but where there is room to spare it is not livable conditions. China has no middle class, there is a high and a low. In china, you either eat the best food or receive the best education, or you receive no food and end your schooling at age 15. Food insecurity is a real problem in china, a place that you wouldn't imagine it would be. The Agriculture Industry in China will soon be suffocated by the growing population and the only thing that will allow China to partially feed its citizens in hydroponics.

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