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China, Factor 8: Spoilage and Waste

### **China: Resuscitating Ancient Food Preservation Techniques**

Currently containing one-fifth of the world's population and the largest consumer of food in the world, China is gradually declining as issues that were previously disregarded at the expense of economic growth are beginning to resurface. With a population of 1.364 billion in 2014 (World Bank) and continuing to rise, China can no longer afford to overlook these problems. The most prevalent concern is that, though being one of the largest countries in the world, the west is uninhabitable due to hazardous terrain such as mountains and deserts, and thus a large majority of China's population resides in the east. This supplies China with a limited amount of space for both agricultural and economic development, and in the past years, China has chosen to prioritize the latter. As China's population and economy increases, more land is urbanized, and consequently, less land is available for agriculture. And with the one-child policy having been lifted last year, China's population is set to grow at potentially an exponential rate. One way China is attempting to combat this escalating issue is to purchase arable land from neighboring countries, but this process will take time and may prove to be unsuccessful, as some countries are opting to deter China from purchasing much needed land. With no large increase in food production in the foreseeable future, China must look to other methods. A look back at how previous populations in China's history fed themselves leads to the rediscovery of ancient processes of food preservation: namely drying and fermentation. These techniques make better use of the food produced and avoid waste, thus maximizing the output of current farms while decreasing pressure on the acquisition of additional farmland. Due to the low cost nature of these processes, they are readily available for implementation on a large commercial scale and on an individual consumer scale, therefore ensuring a higher rate of success.

To recognize the issue at hand, an in depth analysis of the average farm family in China must be performed. Most farms in China are run by small farm families, and thus the average size of a farm in China is on the low end at only around 0.6 hectares or about 6000 square meters (Lowder, Skoet and Singh 11). Due to the recently repealed one-child policy, Chinese families in general are relatively small. However, an exception to the rule for rural families allows them to have a second child if the first was female, which brings the average farm family size up to four against the urban family average of three. This family size also takes into account that sometimes uncles and aunts will also work with the main family and includes them in the average. The diet of these small farm families reflects the crops grown on the farm.

The major crop of China and its staple food is rice. Other crops normally grown include wheat, corn, soybeans and potatoes, which are all very common in a family's diet. Little to no meat is produced or consumed by farm families (Gale 4). Tea and cotton, though not consumed, are also a large part of the cash crops produced in China. Due to the low prices of food in China, rural families are not malnourished, but about 50 percent of their budget goes into food. This large percentage of the household budget being allocated to food leads to a decrease in funds for education.

Rural farm families make very little wages, making it almost impossible to afford college. Even if a family could afford, most of the times it is not worth it to send a child to college. This is because education for adolescents in rural areas is much worse than in urban areas, and college acceptances depend heavily on the all-important college exam, giving a clear disadvantage to children living on farms. The situation is further worsened by the fact that lower-tier colleges in China actually have higher tuition rates than elite colleges. Unable to compete with the competition and highly in need of a job, most rural children only graduate middle school and immediately seek occupation, usually in nearby or urban

factories. Healthcare is not much better, and in rural areas, it is almost nonexistent. Less than 10 percent of the rural population in China actually owns health insurance (Brant, Garris, Okeke and Rosenfeld 5). Healthcare has a premium cost while not actually providing much of a benefit to farm families, which leads to the logical decision to forgo healthcare. In total, about one-third of farmers in China receive no medical treatment at all.

China's rapid agricultural expansion has taken a toll on the earth. A lack of proper methods to maintain the earth, such as splitting a farm into three sections and only using two sections at a time to allow one section to rest, has resulted in soil erosion and pollution and a lack of agricultural biodiversity does nothing to benefit the situation (Cook). And to make matters worse, a heavy dependence on fertilizers and pesticides has resulted in groundwater pollution. Recent studies show that an astounding 60 percent of groundwater in China is polluted due to the excessive use of these artificial compounds (Larson).

On average, one-third of all food is wasted (Royte), and the need to cut back on this number increases every day for China. Because of this high amount of food wastage, more food must be produced by farmers to take its place, which in turn drives up the overall price of food. However, producing more food requires more land to be used and land to quickly be reused, and with China's highly polluted soil, simply attempting to grow more food at the expense of long-term environmental sustainability is not an option. Though some of these issues are being combatted by new technology and techniques, many of them, like the addition of preservatives, come with their own criticisms. And as the population begins to rise exponentially over the coming decades, more food will need to be supplied by land that just simply cannot be used, if there is any land left after urbanization.

Though artificial preservatives are often stated to cause several diseases, they do come with their advantages. With the increased longevity these preservatives provide crops, less food must be produced as less food is wasted due to rapid degeneration of quality that comes with all natural crops. With less waste, the cost of food is decreased and in turn the profit of farmers increases. However, this process is unnatural and allegations towards artificial preservatives have clearly shown that there are many issues with this new technique. Other ways must be discovered to increase the length of optimal quality.

Instead of looking to new and upcoming technological advances, there are many natural preservation methods that were employed centuries ago but have since been discarded in today's society. One such method of the past is the drying of foods. Though this technique is still used today, dried goods have gained a reputation of being overly salty and sweet and lack the visual appeal of fresh crops. There is some truth to these allegations, as drying foods will remove the water and thus concentrate its flavor, which will result in increased saltiness and sweetness. However, many foods are dried using salt, which will increase the overall salt content in the food. Sweeteners are also often added to these dried foods, which is a major reason for the stereotype. The simplest method and likely the most appealing is letting foods dry out naturally in sunlight with no added ingredients.

To prevent spoilage, foods can be dried, and thus save a lot of money in the process. It allows food to be kept all year long and pack it into smaller space due to a more compact size. Fruits and vegetables contain a lot of water that does not provide to its nutritional value and by removing that water, its size is greatly reduced. And by removing the moisture from fruits and vegetables, the growth of mold, yeast and bacteria is inhibited and thus, the food can be stored for a much longer period of time at practically no cost and simply be rehydrated if water is preferred in the fruits and vegetables. Also, removing moisture from fruits and vegetables increases the nutritional value of foods, as more nutrition is compacted into less of a mass, and it creates a more concentrated flavor, which is good for soups. However, there are some disadvantages. Drying food removes some vitamin C from foods, but the increased nutritional value and decreased spoilage is worth this one negative.

China can also look to its neighbors for influence, such as South Korea. Kimchi is a major dish in South Korea and is in almost every meal. China has been copying South Korea by producing their own kimchi, but it has not been widespread. Kimchi is made by allowing vegetables to ferment over time, and this fermentation process gives rise to lactic acid bacteria and acetic acid, which like drying foods, inhibits the growth of bacteria and germs, thus allowing kimchi to be kept for a long time as well. However, kimchi has other benefits that go hand in hand with drying foods. It is low in calories unlike dried foods and is low in sugar. It also has a large amount of vitamins, including vitamin C and has a large amount of water. Other benefits include reducing body fat and increasing stamina. And fermentation is not restricted to kimchi. Another popular food in South Korea that is also fermented is soybeans, and many other vegetables can be fermented to allow them to last longer and gain nutritional value. Putting fermented goods such as kimchi and dried foods together gives two foods that can be stored for a long period of time, contain a wide variety of nutrients and fill each other's flaws.

With the introduction of very few policies and investments the issue of food spoilage and waste could be solved by increasing the amount of dried and fermented foods consumed in China. The country currently produces kimchi, but it has had a limited amount of exposure to consumers and a majority is exported to other countries. Importing kimchi from South Korea where it originated from will help to influence people to try out fermented products, but as of now, all imports of kimchi have been banned. This is due to the fact that kimchi was classified as a pickled product, and because of the large amount of bacteria it contains, though beneficial, it cannot meet the import hygiene standards (Stevenson). China has begun to reconsider this classification, and if the World Trade Organization does indeed adjust it, kimchi may begin to spread rapidly across China.

When it comes to dried goods, starting with individuals is most likely the best method to introduce the technique to the community. Drying fruits and vegetables at home is very easy to achieve, and simply laying them outside with the most amount of sunlight will do the trick. If each family slowly begins to convert to this ancient concept, eventually companies and governments will respond. As Mahatma Gandhi once said, "be the change that you wish to see in the world." Companies who have already invested heavily in the dried goods industry can begin to reduce the amount of sweeteners and salt added to their products to appeal to a larger percentage of the population. And with government backing and funds for advertisement, dried goods can gain a different and more positive reputation. However, the government cannot impose laws that enforce drying foods. Ultimately, it is up to individuals and communities to implement dried foods.

As Benjamin Franklin stated centuries ago, "you may delay, but time will not." China has delayed its problems for years, and as time has passed, the situation has only worsened. Groundwater pollution has increased alongside soil erosion and pollution. Increased fertilizer and pesticide usage has led to this predicament and a rapidly increasing population will only force China deeper into this pit it has dug itself into. The time to act is now. As urbanization progresses, less land is allocated to farmers and thus, the country must find ways to save as much food as it can. Increased production is no longer an option, and purchasing land from nearby countries does not seem to be bearing any fruit. Preservation methods from the past, specifically drying and fermentation, can easily be implemented in today's society. The increase in nutrition and longevity will ease the need for more land and allow some of the earth to rest before the damage becomes irreparable. With the initiative of individuals and communities, both methods can quickly be adapted to and become widely accepted in other societies, not just China's. And with the influential aid of governments, the conversion can be hastened. The time for change is now. The noose is slowly tightening around China's neck, and as the population begins to increase exponentially due to the recent revocation of the one-child policy, the noose will only begin to tighten faster. As the world becomes an increasingly dangerous environment due to rapidly advancing industries, it is often wise to take a step back if mankind wishes to see its survival in the future. It is irresponsible and selfish to only solve every issue with a solution with short-term economic advantages. One must also take the long-term

effects into consideration. Take the story of chlorofluorocarbons, better known as CFCs: decades after their introduction, they were found to deplete the ozone and were banned, and several decades later we have finally seen the ozone partially recovered. But if people had continued to use CFCs instead of more expensive alternatives to increase profit, the ozone might now be beyond repair and millions of more people would have contracted skin cancer. All of these potential issues were avoided due to a group of people who fought not for themselves, but for the next generation and the generations to come. It is up to every person, not just in China, to recognize to put their own selfish desires aside and consider the species as a whole and adjust to ensure its continuation.

## Works Cited

- Brant, Simone, Michael Garris, Edward Okeke, and Josh Rosenfeld. "Access to Care in Rural China: A Policy Discussion." (n.d.): n. pag. University of Michigan, Apr. 2006. Web. 24 Nov. 2015.  
<[http://www.umich.edu/~ipolicy/IEDP/2006china/1\)%20Access%20to%20Health%20Care%20in%20Rural%20China,%20A%20Policy%20Discussion.pdf](http://www.umich.edu/~ipolicy/IEDP/2006china/1)%20Access%20to%20Health%20Care%20in%20Rural%20China,%20A%20Policy%20Discussion.pdf)>.
- Cook, Seth. "Sustainable Agriculture in China: Then and Now." Internation Institute for Environment and Development, 26 Mar. 2015. Web. 24 Nov. 2015.  
<<http://www.iied.org/sustainable-agriculture-china-then-now>>.
- Gale, H. Frederick. "Commercialization of Food Consumption in Rural China." Self Produced Food Minimizes Expenditure (n.d.): 3-11. Economic Research Service. USDA. Web. 24 Nov. 2015. <<http://www.ers.usda.gov/media/878818/err8b.pdf>>
- Gao, Helen. "China's Education Gap." The New York Times. The New York Times, 04 Sept. 2014. Web. 29 Jan. 2016. <<http://www.nytimes.com/2014/09/05/opinion/sunday/chinas-education-gap.html>>.
- Larson, Christina. "Government Study Finds 60 Percent of China's Groundwater Polluted." Bloomberg Business. Bloomberg, 25 Apr. 2014. Web. 29 Jan. 2016.  
<<http://www.bloomberg.com/bw/articles/2014-04-25/government-study-finds-60-percent-of-china-s-groundwater-polluted>>.
- Lowder, Sarah K., Jacob Skoet, and Saumya Singh. "What Do We Really Know about the Number and Distribution of Farms and Family Farms in the World?" (n.d.): n. pag. Apr. 2014. Web. 24 Nov. 2015. <<http://www.fao.org/docrep/019/i3729e/i3729e.pdf>>.
- Royte, Elizabeth. "One-Third of Food Is Lost or Wasted: What Can Be Done." National Geographic. National Geographic Society, 13 Oct. 2014. Web. 29 Jan. 2016.  
<<http://news.nationalgeographic.com/news/2014/10/141013-food-waste-national-security-environment-science-ngfood/>>.
- Stevenson, Alexandra. "Uncertain Trade Path for South Korea's Kimchi." The New York Times. The New York Times, 29 July 2015. Web. 30 Jan. 2016.  
<<http://www.nytimes.com/2015/07/30/business/international/chinese-trade-rules-put-south-koreas-kimchi-industry-in-a-pickle.html>>.
- World Bank. "World Development Indicators." The World Bank. The World Bank Group, 22 Dec. 2015. Web. 28 Jan. 2016. <<http://data.worldbank.org/data-catalog/world-development-indicators>>.

