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Japan, Factor 16: Education

Japan: Education

Japan's education system regarding agriculture is not developing fast enough to meet desired rates of improvement. They are not using the land to its full potential. Japan is an island nation whose main exports and work force are electronic based. Japan imports approximately 60% of its food products ("Trade."). The problems in domestic agriculture can be traced back to the lack of educational opportunities.

In Japan the average family is different than in America. In 2015 there were approximately 51.88 million households and 113 million people in Japan. Of those homes 57.3% held nuclear families and 32.6% held only one person ("Statistical Handbook of Japan 2016."). The average size of the nuclear family has decrease over the past few decades and was approximately 2.5 in 2015. In 2015, 76.96% of households had zero children, 10.9% had one child, 9.49% had two children, and 2.66% had three or more children. 8.66% of the households with children are under six years old ("Family and Household Composition of the Population."). Children have a good education because it is the mother's job to prepare them to be successful in school before preschool starts. The education of a child is important because the colleges are very selective. 2.8 million students were accepted into 778 of Japan's universities in 2010 ("Higher Education in Japan."). Another aspect of the Japanese population is that it is aging faster than any country on earth, with 29.2% of its population being over 65 by 2020 and in 2015 Japan had a median age of 41.1 ("Agriculture and Food Industry Opportunities in Japan & China, 3). This is a problem because most of the older population are the ones running the rural farms.

The Japanese people have a diet where rice is the main carbohydrate. For poorer families it is the main source of their calories. However, the main food that is found in Japan is fish. The average person, in Japan, will eat more than 154 pounds of fish each year ("Facts About Japanese Foodways."). This is caused by "the decline in domestic production capacity due to a decrease in the number of workers engaged in agriculture, as well as the fact that the diet of the Japanese people changed significantly, leading to a lower consumption of rice, while there was an increase in the consumption amount of livestock products such as meats that domestic agricultural production alone cannot supply sufficiently" ("Statistical Handbook of Japan 2016."). Rice is projected to become lower in consumption. This decreasing demand will continue to negatively affect the Japanese balance of food economics.

Japan has very good health care because "all plans provide the same national benefits package, which covers hospital care, ambulatory care, mental health care, approved prescription drugs, home care, physiotherapy, and most dental care; it does not cover corrective lenses unless recommended by physicians for children under 9 years old" ("Proceedings of the International Conference on Health Care Systems Engineering."). The only problem with the system is that citizens are required to register for a public health insurance system based on their employment status or where they live. ("Proceedings of the International Conference on Health Care Systems Engineering.").

There is much less farmland in Japan then there is in the United States. Japan uses their land differently than the United States percentage wise. In fact, "the average Japanese commercial farm is now just 4.6 acres, compared with about 440 acres for the average American farm" (Fackler). The land that is used for farming is mostly used to grow rice, soybeans, tea leaves, vegetables, and fruits. The main livestock in Japan is cow. Many of people make a living fishing. The agricultural practices of Japan are surprisingly simple considering how advanced their technology is. About one-third of the food output is made from urban agriculture and urban farmers account for almost 25% of the Japanese farming households ("Japan's Urban Agriculture."). Most urban people live in the suburbs or in big cities. "Tokyo, one of the largest and most congested cities in the world, among the intricate networks of railways, roads, buildings and power wires, local agriculture produces enough vegetables to potentially feed almost

700,000 city dwellers," ("Japan's Urban Agriculture."). The problem is that almost 13.62 million people lived there as of July, 2016 ("Tokyo.").

Most people who live and work in big cities often live with their parents and other family members. They share everything; including car, rent, and wages. This has really good benefits because the jobs have lower wages than they would in the United States. In the article, Average Annual Salary by Occupation, a side by side comparison showed the average income of jobs in Japan and what it would be in American dollars. The highest listed jobs were aircraft pilot and medical doctor. Pilots make 17,121,000 yen or 142,857 dollars and doctors make 11,540,000 yen or 96,292 dollars. The lowest jobs were sewing machine workers and dress makers. Sewers making 1,987,000 yen or 16,576 dollars, and dress makers making 1,990,000 yen or 16,602 dollars ("Average Annual Salary by Occupation, in Japan, 2014."). Japan is a rich country throughout urban and rural settings and is described as, "an affluent society where extreme poverty does not exist, although extreme wealth does. High wages and salaries guarantee high living standards, reflected in the high percentage of ownership of electronic devices and home appliances" ("Japan - Poverty and Wealth."). The work industry in Japan is doing great with an unemployment rate of 3.6% in 2014. The main exports are power generating machinery, plastic materials, auto parts, iron and steel products, semiconductors, and motor vehicles ("Agriculture and Food Industry Opportunities in Japan & China.", 12). Japan mostly exports high quality electronics to the rest of the world.

Japan has good food safety now, but this region of the world has seen its share of war and is still being threatened by North Korea. Japan has a large population living on an island where the main source of domestic food production is fish and rice. If there is a war, the waterways will be filled with war ships and cause fishermen to not fish. Also, their food suppliers might not sell them food because they do not want to risk their trade ships. Right now, however, the Japanese government is very conservative with the food and does a good job managing imports that are high quality. Unfortunately, they have very little money and few people working in Agriculture Sciences that can help increase farm yield. Although food importing is working well any small problem could hurt consumers in the average household.

Some problems that affect the average household food consumption are caused by problems in the importing industry. This makes the produce much more expensive to the average consumer. There have been links found between oil prices and food prices. In 2008 there was a spike in oil prices and there was a corresponding spike in food prices that was very concerning (Barrett and Notaras). However, Japan is a relatively rich country, so it could compensate for the increase in price for a short period of time. However, there are still major concerns a problem like this happens again and for a longer period of time (Barrett and Notaras). There have also been times when there were droughts or other natural disasters in the countries that supplied Japan with its food and the prices increased. Japan has sometimes needed to find other countries to supply their food demand. The United States had a 24% market share with Japan in 2013. But due to a drought in the United States in 2012 imports from the US declined went from 15.09 billion to 13.8 billion. This caused Japan imports from other countries to increase. There are very strict regulations for growing crops in the United States that there might not be in the other countries, so the quality could have gone down when Japan had to import produce from other countries ("Agriculture and Food Industry Opportunities in Japan & China.", 3). The reason price of food is so important is that the, "cost of living in **Japan** is 17.14% **higher** than in **United States**. . . Rent in **Japan** is 30.00% **lower** than in **United States** (average data for all cities)," ("Cost of Living in Japan."). This is important because of Japan expenses used, approximately 2.2% is clothing and shoes, 7.6% is sports and leisure, 8% is utilities (monthly), 9.1% is restaurants, 11.4% is transport, 22.7% is rent per month, and finally 39% is markets ("Cost of Living in Japan."). 39% is a huge amount to spend on markets. As food prices increase so does this area of expenses and that limits the average person from buying other needed products and, thereby, hurting the average household.

There are many advanced and innovative colleges in the Japanese higher education system. However, since most of the business in Japan is in electronics, mechanics, technology improvements, or technology development. Most colleges are focused there instead of agricultural based sciences. On the Top Universities website, searching for colleges in Japan with studies or majors in Agriculture &

Forestry, Biological Sciences, or Earth and Marine Sciences in any level of education has a very limited selection of 27 Universities. Of these 27 only 7 are under the #200 QS World University Ranking in 2016. This can't provide the necessary graduation rate for such a large field of opportunities.

On the college level there has been some decreases on the agriculture landscape. For instance, The University of Tokyo went from 13th ranked in Agriculture & Forestry in 2014 to 21st ranked in 2015 to 20th ranked in 2016 ("The University of Tokyo."). Kyoto University has gone from 25th ranked in Agriculture & Forestry in 2014 to 36th ranked in 2015 to 33rd in 2016 ("Kyoto University."). Hokkaido University has gone from 39th ranked in Agriculture & Forestry in 2014 to 51st ranked in 2015 and stayed 51st ranked in 2016 ("Hokkaido University."). These are the top three schools for Agriculture & Forestry in Japan. Based on this data a loose translation would indicate a major decrease occurred from 2014-2015 but there was a slight increase from 2015-2016. This could affect funding for programs in the Agriculture & Forestry departments and thereby hurting the education of the students.

Japan does produce a large amount of food but most of it does not stay in Japan. This is confusing because most articles only show that Japan imports most of its food (which is true), but Japan does export a vast amount of food. Japan has the ninth largest agricultural sector but the GDP has been decreasing by almost two percent each year (Goedde et al). By improving the education in agriculture Japan would be able to close the gap between imports and exports. It will do this by compensating for the decreasing numbers of farmers, improving agricultural techniques, improving use of the land, and increasing the diversity of Japan's production.

By improving the base of the Agriculture and Forestry industry in Japan, there would be a ripple effect into other problems that face the food industry such as; Sustainable Agriculture, Demographics, and Farm to Market. In the article, Empowering Japanese agriculture for global impact, it points out many areas where Japan can do better in agriculture and why problems like those exist. Some problems that are mentioned are "producer population is rapidly aging. . . heavy emphasis on rice and vegetable output. . . high procurement costs. . . small, fragmented industry. . . significant distribution costs. . . agricultural export stagnation. . . supply struggles. . . quality demand also changing. . ." (Goedde et al).

The lack of education in agriculture leads to other problems in the industry. An example of this are the demographics because the producer population is rapidly aging. This is one of the base problems because in 2015, 77% of the Japanese farmers were 60+ years old (Goedde et al). This could lead to greater problems in the future due to lack of training the next generation of farmers.

International trade (Japan to world) is another problem. In 2013, rice and vegetables accounted for 48% of the Japanese food production (Goedde et al). Increasing educational opportunities could help diversify Japanese food industry by applying new research to increase yields in crop production. This research could allow more land to be used to its full potential. The production of rice and vegetables could be improved by utilizing better breeding methods or GMO research.

Other problems are high procurement costs and significant distribution costs. When getting the harvested food to the people, the cost is almost as high as growing the food. In 2011 "production and import costs for food sold directly to consumers was 3.1 trillion yen, but commissions, shipping, and other distribution costs added 2.8 trillion yen to the cost before it reached consumers" (Goedde et al). This is a massive amount of money which makes consumers and markets want to sell and buy imported produce to save money rather than locally grown crops. In addition to importing much of their food, Japan also imports much of their needed materials in the agricultural sector. Two examples mentioned from a 2013 study are the input costs in rice and soybeans agriculture. Inputs for rice cost four times as much as it would cost in China or the United States and soybeans inputs cost five times as much. Inputs listed that were imported include seeds, fertilizers, and agrochemicals (Goedde et al). A diverse education could improve Japan's input problem by providing research that would allow Japan to manufacture materials needed to farm that are being imported now. Education could be used to help teach farmers better pest control methods like biological control, low tillage practices, and growing GMOs with built in pesticides. Japan has very strict regulations for growing food, so GMO research and usage could help educate the common family about what GMOs are and how they are good for them and a growing world.

A barrier that would make it difficult to solve these problems is finding funding to put into

solving the problem. According to the Global Food Security Index, Japan's score for public expenditure on agricultural R&D, the government spending on agricultural research and development, is 1 out of a 1-9 rating system. The world average is 2.1 ("Global Food Security Index."). This means that to reach their goal of being self-sufficient, the Japanese government would have to increase spending on agricultural research and development or the funds would have to come from sponsors. Another barrier is that the system of importing most of the food is working, for now. This means that people are not concerned with improving this flawed system. This can be solved by informing the Japanese people of the problems facing the agricultural industry with discussing these problems on public news stations or in newspapers.

One way to effectively improve the education system is to insert new courses into high schools. This will introduce students to the problems and opportunities in agriculture at a younger age. This would need to be funded by the department of education in the Japanese government. Another way is to enact more diverse, well-funded, and rigorous programs that can be shared with sister programs on the college level. This can be done by tying agriculture in with other sciences. For instance, it was suggested that the best way to improve the agricultural industry in Japan is to innovate the methods of companies to "acquire raw materials, reduce input costs, streamline the value chain, collaborate with partners, and harness technology" (Goedde et al). By working closely together with sister program major improvement could be shared and applied easier. Japan's sister state in the United States is Indiana. Indiana has very well developed agricultural science programs in the college level and has a growing agriculture industry. Indiana has 11 sister cities in Japan and has Japan as its largest Asian trading partner. Many universities in Indiana have partnerships and good relationships with Japan ("Economic Ties Indiana-Japan."). Programs could be created to involve very diverse groups of students. In terms of harnessing technology, students interested in computer sciences could get involved in data collecting techniques. In terms of acquiring raw materials like seeds and fertilizers, chemists and chemical engineers could find a fertilizer that can be produced with only materials found in Japan. Biology, genetic, and plant biology students could work with selective breeding, genotyping, and sequencing of crops DNA to improve yield and resistance to diseases. They could also modify the crop's DNA to make natural pesticides instead of using real pesticides that could harm the environment. This could be funded by partnering companies or city governments in both Japan and the United States.

Japan has set goals to increase their GDP every year and for the past several years they have fallen short. This could be more specifically due to the low self-sufficiency rate which is the consumption of food produced by Japan itself. In 2015 Japan missed its target rate for the sixth year in a row. Japan wanted to be 45% sufficient but was 39%. The average rate has been 40% for the past 20 years (KYODO.). My recommendation is to put more money from the department of agriculture or the department of education or funding from sponsors into three places. One in college level courses and research. Having a wide course range is important because it shows the variety of professions needed and it could attract students who have different backgrounds and majors. College level research is crucial because it is normally base line experiments that actual companies can build on to create an end product that is very helpful. A second option could be putting money directly into the farmers. It is important to teach them new techniques to improve farming, crop yield, and quality. This requires people to go out and teach farmers how to use new pesticides, watering techniques, planting, and other innovations to improve the farming industry. Another good way to do this is make a farmer mentoring youth program to give students in middle and high schools a chance to go out to farms to work with the farmers and see what it's like. If there is money to be made, then more people will go into that profession. They need to get younger farmers to prepare for the next generation. A third place to invest money would be to help improve Japan's self-sufficiency rate. Some small projects the government could do are roof top farms and vertical farms. These farms take place in the urban setting on the roofs of buildings and their crops could be sold at local markets for less. The urban household families who live in the building can be vital to this project. Families could volunteer in urban farms near where they live by planting, watering, weeding, or harvesting. People who work for the government can also help to maintain and farm it.

Improving Japan's food security is based on the technology and the people who can use this technology to improve Japan's self-sufficiency. This knowledge will come from the education system, but

that is only if the government steps in and help those students. Increasing the education system for agricultural sciences could help diversify Japanese production. It could do this by increasing research directed at yield in food productions, usage of the available land, and improvement of the production of rice and vegetables. With better methods that have yet to be developed Japan can achieve its goal of being self-sufficient.

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